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Community College Student Learning in Phlebotomy Preceptor-Led Clinical Internship

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COMMNUNITY COLLEGE STUDENT LEARNING

IN PHLEBOTOMY PRECEPTOR-LED CLINICAL INTERNSHIP

by

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ABSTRACT

COMMUNITY COLLEGE STUDENT LEARNING
IN PHLEBOTOMY PRECEPTOR-LED CLINICAL INTERNSHIP

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The purpose of this study is to describe how allied health preceptor-led clinical internship improves or expands community college student learning. There is a significant gap of information in the literature related to the importance of this clinical internship experience for the learning, socialization, and professional development of allied health students in general and community college students in particular. The absence of relevant data for these internships as a situated learning experience is evident in the literature review. The majority of the allied health work force is prepared by community colleges. Therefore, community college leaders need data to make data-driven decisions about community college allied health programs to insure students meet learning goals established by professional accrediting agencies, employers, and other stakeholders in the most efficient and comprehensive way possible.

Harris, Jones, and Lang (2006) observed, "Allied Health is like a 1,000 piece puzzle. It is assumed that all the pieces will go together, but it's challenging finding sufficient information on the big picture" (slide 9). Student learning during the clinical experience is studied from the perspectives of the student, clinical coordinator, and preceptors and the essence of student learning during the clinical internship is defined. The results of this nested case study provide important, initial conclusions regarding

how students construct learning in a clinical learning experience. The data generated three themes, which informed the research questions: (1) allied health clinical education improved and expanded learning in community college students; (2) the cognitive apprenticeship framework supported student construction of learning; and (3) community college student learning, as a result of clinical experiences, is time and place bound and the locus of student learning is geographically determined based on learning domains.

Based on the results of the study, there are several conclusions: First, in spite of a lack of reference to pedagogy, the traditional apprenticeship is firmly entrenched in instructional strategies employed by clinical preceptors to promote student learning. Cognitive apprenticeship, as an instructional method, is the result of data collection for this study and not as a commonly employed instructional strategy. However, the results suggest cognitive apprenticeship may provide a mechanism for development of cognitive and metacognitive processes in students during their clinical learning experience. Last, the results of this study indicate the use of technology may break the barriers of time and place and expand cognitive and metacognitive processes in students.

This dissertation is dedicated to my loving and supportive family. My husband, Robert (Sonny) Phelan, our sons, Robert W. and Christopher J. Phelan, and our daughter and son-in-law, Meghann and Darryl Tyndorf. Your patience, understanding, and unwavering support made completion of this project possible.

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DEFINITION OF TERMS

Accreditation agencies - The preceptor-led clinical internship component of community college allied health programs is frequently defined and mandated by such professional accreditation agencies as the Commission on Accreditation of Allied Health Education Programs (CAAHEP) on the recommendation of the Curriculum Review Board of the American Association of Medical Assistants (AAMA), Committee on Accreditation of Education for Polysomnographic Technologists (CoAPSG), the Illinois Department of Public Health, and the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Allied health professionals - According to the Health Professions Network (2005),

> Allied health professionals are health care practitioners with formal education and training who are credentialed through certification, registration, or licensure. They collaborate with physicians and other members of the health care team to deliver high quality patient care services for the identification, prevention and treatment of diseases, disabilities, and disorders (p. 10).

Allied health program director - The allied health program director is usually employed and compensated by the college and oversees the affective, didactic, psychomotor, and clinical components of the program. The program director is also responsible for defining the curriculum and assessing student learning.

American Society for Clinical Pathology (ASCP) - The ASCP is a professional society for clinical laboratory professionals, including phlebotomists. "The ASCP Board of Certification, with accreditation from the American National Standards

Institute, represents the gold standard for certification of pathologists' assistants and laboratory professionals". (www.ascp.org/MainMenu/AboutASCP/FactSheet.aspx)

Butterfly needle - This device is also called a winged infusion blood collection set and is a tool used for collecting blood from such small or difficult veins as hand veins, the veins of elderly, and pediatric patients. (McCall & Tankersley, 2012, p. 212)

Clinical internship - This internship is a situated learning component of allied health programs which includes a specified number of hours of clinical practice supervised by a clinical preceptor at one of the program's clinical internship sites.

Clinical internship site - This is a health care facility that has agreed to accept students for clinical internship. The relationship between the internship site and the community college is contractually defined according to allied health program accreditation standards.

Clinical preceptor - A preceptor is an allied health professional employed and compensated by the clinical internship site, who supervises students during their clinical internships as students work directly with patients. The clinical preceptors report daily on student progress to the clinical coordinators and collaborate on student evaluations at the completion of a student's clinical internship. Qualifications for clinical preceptors are defined by allied health program accreditation standards.

Clinical coordinator - The coordinator is an allied health professional employed and compensated by the clinical internship site, who serves as the clinical contact person for the college allied health program director. The clinical coordinator usually is an administrator at the clinical facility and collaborates with the program director regarding the organization and implementation of student experiences at the

health care facility. The clinical coordinator collaborates with the allied health program director on such tasks as student scheduling, learning objectives for the clinical internship, and student evaluation mechanisms.

Morning draw - This is jargon used in the clinical laboratory to describe the collection of patient blood specimens very early in the morning, when patients are in basal state. A patient is in basal state when resting, fasting, and in a supine position, usually in the morning after fasting for a minimum of 12 hours (McCall & Tankersley, 2012, p. 508).

Order of Draw - In blood specimen collection, this term refers to a prescribed sequence in evacuated tube collection intended to minimize additive carryover or cross-contamination problems (McCall & Tankersley, 2012, p. 517).

Panel - This is jargon for 'Panel Grouping', such as a basic metabolic panel (BMP) that characteristically includes glucose, blood urea nitrogen, creatinine, sodium, potassium, chloride, carbon dioxide, and calcium (McCall & Tankersley, 2012, p. 27).

Prothrombin Time (PT) - Prolonged times may indicate coagulation stage 2 and 3 defects, liver disease, or vitamin K deficiency. PT values are often used to monitor warfarin therapy (McCall & Tankersley, 2012, p. 26).

Phlebotomy - The phlebotomy profession is comprehensively described in the NAACLS Guide to Approval for Clinical Assistant & Phlebotomy (p. I-1). (See Appendix A).

Port - This is jargon for "implanted port" a chamber attached to an indwelling line that is surgically implanted under the skin most commonly in the upper chest or arm (McCall & Tankersley, 2012, p. 299).

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CHAPTER 1: INTRODUCTION

Allied health professionals represent 60% of the United States' health care work force and total approximately 6.3 million allied health workers (Health Professions Network, 2005, p. 10). Additionally, the American Association of Community Colleges (AACC) (2008) reported sixty-three per cent of allied health professionals, numbering approximately 4 million workers in the United States, are educated at community colleges. Allied health professions are very diverse and over 200 different occupations and professions fall under the broad definition of allied health (Health Professions Network, 2005, p.10). The U.S. Bureau of Labor Statistics (BLS) (2011) reports allied health professions are among the fastest growing occupations at the national level and include home health aides, medical records technicians and health information technicians, radiologic technologists, and medical assistants. Labor shortages in the American health care work force are well-documented, placing the onus for preparing the allied health workforce on community colleges.

In 2003, former Governor Rod Blagojevich of Illinois launched the Illinois Critical Skill Shortages Initiative (CSSI) in response to the critical shortage of skilled healthcare workers. The CSSI recognizes significant shortages in allied health professionals including technicians and technologists, therapists, medical records professionals, and certified nurse assistants. Shortages will increase as a result of an aging population, retirements of current health care workers, and advances in medical technology resulting in longer life expectancies of populations requiring medical care (The Workforce Boards of Metropolitan Chicago, p. 2). This finding is recently

corroborated by Gearon (2011): "...a growing and aging population, the promise of wider health insurance coverage and advances in medical technologies are translating into attractive salaries and signing bonuses for many of the people delivering care" (p. 1). The shortages are rapidly approaching a "tipping point," defined by Harris, Jones, and Lang (2006) as: "The point at which a crisis can become a disaster …one million nursing positions will be open by 2012 (U.S. BLS) [and] as great a need exists in the Allied Health Professions [sic]" (slide 18).

The health care worker shortages are compounded annually as qualified nursing and allied health students are turned away from community college allied health and nursing programs because of limited program capacities. It is impossible to significantly increase capacity in existing community college allied health and nursing programs as they are currently structured. Shortages in qualified faculty, classroom and laboratory space, and clinical site availability contribute to limits in enrollment capacities. The added threat of diminishing clinical sites due to cost constraints dangerously impedes the community college's ability to meet a major segment of healthcare workforce needs. The focus of this study is the preceptor-led clinical internship component of community college allied health programs, one of the limiting factors for enrollment in health science programs.

Background of the Study

In order to prepare program graduates to enter the workforce, a clinical internship must be included as an authentic situated learning component of community college programs. The clinical internship is provided as a result of community college partnerships with health care facilities and is essential to allied health programs. A

significant percentage of required student contact hours in these programs are spent in clinical internships. Healey (2008) noted, "Clinical education comprises nearly one-third of physical therapist (PT) students' professional education..." (p. 49). The continued support of the clinical facilities is threatened by reduced funding to the facilities because of managed care (Little & Harmening, 2000). Reduced numbers of programs will diminish the number of workers prepared to enter the work force. As a result, patient care in the American health care delivery system will be seriously compromised, making this a compelling issue for community college leaders charged with workforce development (Little & Harmening, 2000).

The importance of clinical practice in nursing programs is well-documented. Clinical education literature consistently credits the importance of situated learning experiences for the education, enculturation, and professional development of undergraduate nursing students (Bain, 1996; Byrd, Hood, & Youtsey, 1997; Charleston & Happell, 2005; Lofmark & Wikblad, 2001; Ohrling & Hallberg 2000a). Chan (2002) described,

> ... Identification of factors of the social climate that characterize a clinical learning environment could lead to strategies that foster those factors most predictive of student outcomes... Clinical practice is a period of transition, which allows students to consolidate knowledge and practice skills acquired during fieldwork practice in a working situation. During clinical field placement, students are expected to develop competencies in the application of knowledge, skills, attitudes, and values inherent in the nursing profession (p. 69).

These findings are reinforced on a very limited basis in allied health education. Berry, Miller, and Berry (2004) report that athletic training clinical field experiences "offer students the opportunity to integrate and execute theoretic knowledge learned in the academic classroom into real-life situations and aid in preparing students to become sensitive, competent, and successful professional practitioners" (p.176). Consistent with the references to nursing and clinical education of athletic training students cited above, the clinical environment for allied health students is an extension of classroom learning. However, the allied health clinical learning environment situated within a complex social context is largely unexplored. Accrediting agencies characteristically prescribe such a component or clinical as a required learning module for students to meet end competencies of allied health programs. The critical nature of this issue is acknowledged at the national level.

A National Consensus Conference titled, "Pioneering Allied Health Clinical Education Reform," sponsored by the Division of Associated, Dental, and Public Health Professions, Bureau of Health Professions, Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services was held July 12-13, 1999 in Baltimore, MD. Little and Harmening (2000) state,

> The purpose for the Conference was "To provide key stakeholders an opportunity to collaborate on a strategic plan for clinical education/training to ensure the availability of health care professionals who are qualified to meet the needs of patient populations and health care service providers" (p. 171).

Several themes emerged during the proceedings and translate into a set of needs and corresponding recommendations for economically-driven clinical education reforms. The recommendations of the National Consensus Conference include:

- Data on costs/benefits regarding clinical education of students are lacking and innovative models based on performance outcomes of students, as well as cost and value benefits, should be explored to achieve cost-neutral status.
- The recognition and preparation of clinical educators are needed and systems to address this need, including collaboration between clinical educators and curriculum development, are recommended.
- Innovative uses of technology for clinical education, including models of distance learning, are needed to promote recommended collaboration among schools and institutions (Little & Harmening, 2000, p. 172 - 173).

A literature review does not yield results on the themes identified above for community college allied health programs. Therefore, a significant gap of information exists in literature as it relates to the importance of clinical internship for the learning, socialization, and professional development of students. This study will explore the impact of allied health preceptor-led clinical internship on community college student learning.

Statement of the Problem

This study's orientation uses the constructivist perspective and is framed by situated learning theory operationalized through cognitive apprenticeship. Clinical internship is a major component of allied health programs but lacks a generally acknowledged theoretical framework. Lack of a consistent framework and resulting

lack of standardized mechanisms to implement teaching strategies supported by a theory prevents consistent development of professional practice. As a result, continuous quality improvement mechanisms are impossible to develop, either to improve quality or make student learning more efficient. Most allied health clinical internships are designed to meet program end competencies consistent with curriculum standards prescribed by the related accreditation agencies. Students are expected to meet end competencies within a time frame specified by each program. Most programs establish clinical internship time frames based on clinical site availability and the amount of time needed to meet the program's learning objectives as recommended by such external program stakeholders as accreditation agencies and academic and health care administrators. The standard practice is to provide students with adequate amounts of time in the clinical setting to absorb the knowledge and skills they require to meet program end competencies. Schellhase (2006) observes "… little is known about how students learn best in this environment" (p.18).

Current clinical internship opportunities are not generating sufficient allied health program graduates to meet projected health care workforce needs. Moreover, it is unclear if end competencies are met in the most efficient and effective manner possible. Berry et al. (2004) observe,

> Active Learning Time … is considered the amount of time students are engaged in activities contributing to their academic success [3, 15, 17, 19] ... Time depleted in noninstructional activities such as transition time is negatively correlated with student academic achievement and task success[23] and is

thought to be the largest cause of a reduction in opportunity time[24] (p.176-177).

Berry et al. (2004) report approximately 17% of student time spent in situated learning (clinical) is unengaged (p. 179). Page and Ross (2004) report physical therapist clinical instructors spend 46% of their work time in noninstructional activities (p. 46). The perception that student learning occurs in the clinical setting is largely undisputed. However, active learning time is not clearly defined or studied. The essence of allied health clinical internship as a learning module must be defined to maximize its impact on student learning and the efficient use of limited clinical resources. By making internship more efficient, program capacities may be expanded to help alleviate health care worker shortages.

Purpose of the Study

The purpose of this study is to describe how allied health clinical internship improves or expands student learning. There is a significant information gap in the literature about the importance of the internship experience for the learning, socialization, and professional development of students (Bain, 1996; Chan, 2002; Ohrling & Hallberg, 2000). The absence of relevant internship data as a situated learning experience is evident. Abrams notes, "...there is little evidence to support the effectiveness of either traditional training or the newly emergent models for clinical education. And the lack of outcomes data makes it difficult to prescribe future directions for clinical education and training" (Little & Harmening 2000, p. 173). Allied health Doctoral programs are few in number and because there is a lack of formal education and research mechanisms related to these education issues, studies

related to community college allied health clinical education in general and clinical internship in particular are nonexistent. Clearly, a need for research related to the impact of internships on student learning exists. The majority of the American allied health work force is prepared by community colleges. Therefore, community college leaders are in need of data to make data-driven decisions related to allied health programs to insure students meet learning goals established by professional accrediting agencies, employers, and other stakeholders in the most efficient and effective way possible. The results of this study describe the impact of allied health clinical internship on student learning for this group.

Research Questions

The research questions framing this study are as follows:

1. What are the constructions of learning that emerge in the community college student allied health preceptor-led clinical internship experience?
2. How do community college students reflect on their classroom / laboratory experience during their allied health preceptor-led clinical internship experience?
3. How do stakeholders in community college allied health programs describe the impact of allied health preceptor-led clinical internship experience on community college student learning?

Significance of the Study

Harris et al. (2006) observe, "Allied Health is like a 1,000 piece puzzle. It is assumed that all the pieces will go together, but it's challenging finding sufficient information on the big picture" (slide 9). By identifying the constructions of learning

that emerge because of student participation in clinical internship experiences, from the perspective of the student and clinical stakeholders, the essence of these clinical internships is defined. Once the unique internship learning process is defined, strategies for reform to improve student learning and potentially ease capacity issues are identified. The purpose of this study is to provide a map for navigating the gap between learning in the academic environment and learning in the clinical environment.

I quote Sir William Osler, Johns Hopkins' first professor of medicine, (1849 – 1919): "To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all" (Brainy Quote, 2009). Allied health clinical internship has been adrift on the sea of patient care for many years. The results of this study contribute to the creation of a more strategic approach to situated clinical learning, thus navigating the sea of internships in a more efficient and strategic manner. The results of this study will assist community college leaders in streamlining clinical internship experiences, potentially resulting in expanding program capacities and, therefore, providing a mechanism for alleviating the impending, unprecedented American health care worker shortage.

Hypotheses

The main theme in the literature is clinical internship, consistent with situated learning theories, improves and expands student learning. As a result of internship experiences, students report an increase in knowledge and skill. Additionally, they report increased confidence levels in their ability to function as health care professionals and expand their professional identities. Students also report reality

shock in reaction to the gap between classroom learning and the clinical experience. Moreover, the clinical internship experience is emotionally charged for students, requiring students to rely heavily on preceptors as role models.

One expected opportunity for improvement in the clinical model includes clarification of the preceptor's conflicted role. Preceptors are responsible for simultaneously providing patient care and educating the student. If clinical preceptor roles, responsibilities, training, and preparation are not clearly defined, the importance of a clearly defined and communicated curriculum is magnified. Hart and Rotem (1994) report "...students believed that improved communication between the educational institution and health care facility would help to clarify the respective roles of students, clinical supervisors and ward staff" (p. 29). The preceptor's role is one aspect of clinical training acknowledged in the literature review that has a significant impact on student learning during clinicals. The dual function of the preceptor contributes to "down time" for student learning and represents an opportunity to increase the efficiency of student learning.

Overview of Methodology

A case study describing the essence of clinical student learning was conducted. As a result of the study, the impact of common instructional strategies and the roles of program stakeholders on student learning is defined. The nested case study explores the elements of the internship within specific, individual cases and culminates in the creation of a macro case study (Patton, 2002), representing the "big picture" referred to by Harris et al. (2006). The study addresses the gap in data related to student learning in a clinical setting and describes the impact of the clinical internship on

student learning. Creswell (2005) describes, “A case study [is] an in-depth exploration of a bounded system …based on extensive data collection (Creswell, 1998)” (p. 439). Case study qualitative analysis begins with defining the bounded system for this study.

The selected bounded system is one allied health program: the Moraine Valley Community College (MVCC) Phlebotomy Program. Qualitative data comes from clinical coordinators, clinical preceptors, and students. The design of the study, in support of the research questions, employs data collection and analysis and triangulation using three methods of data collection. These methods include documents review, focus groups / interviews, and observations. Documents include student evaluations of clinical experiences and student contributions to asynchronous web-based discussions called "Discussion Boards." Creswell (2005) notes, "Documents represent a good source for text (word) data for a qualitative study. They provide the advantage of being in the language and words of the participants..." (p. 219).

Focus groups include clinical coordinators, preceptors, and students. Creswell (2005) describes, "Focus groups can be used to collect shared understanding from several individuals as well as to get views from specific people... Focus groups are advantageous when the interaction among interviewees will likely yield the best information and when interviewees are similar to and cooperative with each other" (p. 215). Participants were interviewed if they could not attend a focus group. Finally, observations at the locus of student learning in the clinical setting were conducted. The locus of learning occurs proximal to the patient and includes the interaction between the student, the patient, and the clinical preceptor. Creswell (2005) notes,

"Observation is the process of gathering open-ended, firsthand information by observing people and places at the research site... Advantages include the opportunity to record information as it occurs in a setting, to study actual behavior..." (p. 211). Observer collected data on the interaction of clinical preceptors and students at the interface of learning while performing phlebotomy procedures and interacting with patients.

Summary

In summary, the clinical internship component of community college allied health programs is threatened by reduced funding as a result of managed care. Clinical training for students is often recognized as a cost to the clinical facility. Health care worker shortages are becoming more severe even as qualified community college students are turned away from allied health programs because of limited program capacities. The absence of data relevant to student learning in internships is obvious. As a result of this study, factors contributing to and detracting from high-quality, cost-effective internships are identified, creating a comprehensive view of its impact on student learning. The results of this study provide emergent findings useful to data-driven decision making by community college leaders charged with workforce development. This study may improve student learning and potentially be used to increase health program capacities.

CHAPTER 2: LITERATURE REVIEW

Nursing Preceptor-led Clinical Internship Training

The literature review does not yield any studies related to allied health clinical education for community college students. There is a lack of empirical research on internship training (Healey, 2008, p. 49; Kilminster, Cottrell, Grant, & Jolly, 2007). Nursing clinical education is commonly provided using one of two models. Ohrling and Hallberg (2000) described,

> There are two common models (Nehls et al., 1997) of clinical instruction in nursing education. One model involves faculty members working directly with student nurses in clinical settings. The other, the preceptor model, utilizes nurses who are employed in hospitals and provides on-site supervision and clinical instruction...Patton and Cook (1994) described the use of preceptorship as being based on the assumptions that a one-to-one relationship facilitates learning and socialization into the nurse's role (p.14).

The nursing preceptor model closely approximates the allied health clinical internship model. The effectiveness of the nursing preceptor model in expanding and improving nursing student learning is well-documented. Therefore, research related to the model of clinical education was considered in this literature review to document preceptor-led clinical education is effective in expanding student learning.

Nursing Clinical Preceptors

Several studies report increased learning as a result of the nursing preceptorship model, from the students' perspective (Chapman, 2006; Charleston & Happell, 2005; Hart & Rotem, 1994; Lofmark & Wikblad, 2001; Ohrling & Hallberg,

2000; Starr & Conley, 2006). These clinical experiences have a positive impact on nursing students' learning in a variety of ways. Students report the clinical experience increases their knowledge, clinical skill level, and professional development. Students value the opportunity to participate as a health care team member and recognized the clinical placement contributes toward increased self-confidence in performing duties in the clinical setting. Students also recognized the clinical preceptor contributed to their ability to assume responsibility and work more independently toward their role as a professional (Byrd et al., 1997; Lofmark & Wikblad, 2001; Ohrling & Hallberg, 2000; Starr & Conley, 2006).

Additionally, the experience increases confidence levels in student performance of clinical tasks while delivering patient care (Byrd et al., 1997; Chapman, 2006; Lofmark & Wikblad, 2001; Ohrling & Hallberg, 2000). Students have an opportunity to practice their clinical skills in an authentic patient care setting while under the close supervision of a preceptor. Lofmark and Wikblad (2001) reported, "students emphasized how many times they had practiced a special task and what they had learnt through practicing" (p. 45). Concurrently, the clinicians served as role models for the nursing students. As a result of partnering with clinical preceptors, students reported their problem solving abilities and clinical confidence improved (Charleston & Happelle, 2005). In addition to the benefits associated with these experiences, the literature reports challenges from the nursing student perspective.

Challenges for Nursing Students

Two challenges associated with these clinicals are identified from the nursing student perspective. One challenge reported by Byrd et al., (1997) recognizes the gap

between standards and procedures taught in the college classroom and laboratory and application of those knowledge and skills in real clinical situations. Ohrling and Hallberg (2000) observed that the knowledge of student nurses "was limited and fragile in the beginning and when the practice on the ward was not consistent with the students' newly learned theoretical knowledge, this created uncertainty" (p. 19). Starr and Conelly (2006) also identify the gap between classroom and clinical learning:

> Recognizing both the stress that new nurses encounter and the gap they often face between theoretical knowledge, application of that knowledge and practical skills, YRMC in Yuma, Arizona recently revised its nurse extern program in an effort to better meet student externs' needs (p. 87).

Finally, Bain (1996) reports, "Beginning a new role with limited experience and knowledge provokes much anxiety, described by Kramer (1974) as "reality shock" (p. 104). Coping with the gap between simulated practice in the classroom and laboratory and actual practice in the clinical setting was a source of stress for nursing students.

Nursing students reported a wide range of feelings associated with the clinical assignment. Lofmark and Wikblad (2001) reported students felt stressed during the experience and suggested the lack of time available for teaching and learning in the clinical setting as a contributing factor. They also reported students experienced damaged self-esteem due to lack of initiative or knowledge, concurrent with a heightened sense of confidence and assurance following a successful experience. Additionally, Ohrling and Hallberg (2000) report that,

> Feeling in learning included two sub-themes (a) emotions in action and (b) bodily sensations…The student nurses expressed feelings of such bodily

> sensations as discomfort, pressure, tiredness, hesitation, and being overwhelmed …Feelings of having learned were connected with many obstacles in the way, such as 'reducing the feeling of being clumsy', overcoming feelings of discomfort in learning or starting from a dreadful feeling of uncertainty… (p. 20).

Learning within the context of the clinical setting is an emotionally charged experience for students, who rely on the clinical preceptors to serve as role models and leaders.

Opportunities for Improvement

The greatest impact on nursing student learning is determined by the preceptor, and is directly correlated to the preceptor's ability to model professional behavior and skill successfully (Byrd et al.,1997; Chapman, 2006; Charleston & Happell, 2005; Hart & Rotem, 1994; Ohrling & Hallberg, 2000). Charleston and Happell (2005) report "when the relationship [between preceptor and student] was positive, students described increased comfort and the development of more positive attitudes towards people experiencing a mental illness…" (p. 1174). In spite of the preceptor's pivotal role, it is not clearly defined (Bain, 1996). Ohrling and Hallberg (2000) report, "Harding and Greig (1994) stressed the dilemma of practitioners not having sufficient experience and training to be accountable for the teaching, supervision and assessment of learners" (p. 26). Moreover, clinical preceptors often accept the responsibility for instructing nursing students in addition to their responsibilities for patient care. As a result, time limits and the absence of compensation for the additional teaching responsibilities contribute to a range of preceptor skill and preparation (Bain, 1996;

Byrd et al., 1997; Chapman, 2006; Lofmark &Wikblad, 2001; Ohrling & Hallberg, 2000).

The lack of training, time, and compensation for nursing preceptors has a negative impact on student progress if the relationship between the clinical site and the educational facility is not clearly specified, and if the responsibilities for student learning are not delineated. The lack of clearly stated learning objectives is a frequently reported weakness of the experience (Hart & Rotem, 1994). Hart and Rotem (1994) report "the learning objectives for students during clinical practicums were not always clearly understood by either students or staff" (p. 29). Additionally, Hart and Rotem (1994) concludes the "... liaison between educational and clinical institutions must be very efficient and effective to ensure that ward staff have an understanding of, and commitment to, students' learning needs" (p. 32). Educational facilities rely on clinical facilities to provide clinical experiences for students. The literature suggests clinical educators rely on academic leaders to provide clear, consistent guidelines to maximize student learning during clinical placement.

Comparisons to Allied Health Clinical Internship

Clinical internships are similar to nursing preceptorships in several ways. Like nursing clinical assignments, allied health clinicals are credited with improving and expanding student learning. The preceptor contributes significantly to the facilitation of student learning. Consistent with the nursing preceptorship model, the allied health mentor accepts the responsibility for student learning in addition to clinical responsibilities for patient care without additional compensation or workload

reduction. However, differences between nursing and allied health clinical placements can also be identified.

The most notable difference is the amount of research supporting the preceptor-led internship experience as a learning activity to prepare students for entry into the allied health workforce. Unlike nursing, allied health internships are carefully prescribed and learning outcomes are consistent with accrediting agency learning standards. Clinical internship requirements constitute a significant percentage of student curriculum hours. Healey (2008) notes the significant time devoted to physical therapist student's professional education and "yet research on PT students' learning approaches during clinical education (CE) is limited" (p. 49). Hammel, Finlayson, Kielhofner, Helfrich, and Peterson (2001) stated, "occupational therapy's scholarship too often fails to result in a cumulative body of knowledge that is directly relevant to practice, and links theory and research to practice" (p. 157). Additionally, the qualifications of preceptors in allied health internships are specified by accrediting agencies that mandate standards for personnel and curriculum for various allied health programs. However, training requirements for clinical preceptors are rarely specified, possibly because a widely accepted, theoretically-based, and empirically researched set of instructional strategies is not available. Formal learning theories rarely frame educational practices in allied health clinical internships for students. Instead, the clinical closely approximates a traditional apprenticeship. Clinical internships, like a traditional apprenticeship, is historically grounded and based on the best teaching practices of "just plain folks" who train apprentices to be their successors (Lave, 1988, p. 4).

Situated Learning Theory

Learning occurred long before formal educational systems were established. The Washington State Department of Labor and Industry provides this information:

> Since time immemorial, people have been transferring skills from one generation to another in some form of apprenticeship. Four thousand years ago, the Babylonian Code of Hammurabi provided that artisans teach their crafts to youth. The records of Egypt, Greece, and Rome from earliest times reveal that skills were still being passed on in this fashion. When youth in olden days achieved the status of craft workers, they became important members of society (Paragraph 6).

Over the last century, formal schooling has emerged as the primary means of educating the populace thus replacing traditional apprenticeship as the most common mechanism for training novices to become experts in a variety of fields (Collins, Brown, & Newman, 1989). This study's empirical research is based on application of a situated learning theory and cognitive apprenticeship. The six components of cognitive apprenticeship are divided equally between traditional and cognitive apprenticeship.

Traditional Apprenticeship

Traditional apprenticeship makes use of legitimate peripheral participation within a community of practice and is consistent with constructivist theory. Learners construct knowledge based on experience and integrate new knowledge and experiences with previously learned knowledge and experience (Brown, Collins, & Duguid, 1989; Collins, et al., 1989; Kerka, 1997; Lave, 1988; Lave &Wenger, 1991;

Rogoff & Lave, 1990; Wenger, 1998). Learners, immersed in the social context of their craft, learn in traditional apprenticeships by gradually increasing skills until they can perform complex tasks unaided. Collins, Brown, and Holum, (1991) described,

> … the basic notion of apprenticeship [is]: showing the apprentice how to do a task, helping the apprentice to do it. There are four important aspects of traditional apprenticeship: modeling, scaffolding, fading, and coaching (p. 2).

The definitions of each aspect are presented in Table B1, Appendix B. As in traditional apprenticeship, much of the learning in allied health clinical internship training occurs through observation (Collins et al.,1991; Lave, 1988).

Modeling / Observation.

During observation, learners watch the masters as they use skills and knowledge to complete a particular task *in situ.* Observation is an important component of traditional apprenticeship for learners for three reasons. Observation provides learners with an opportunity to conceptualize the final product or activity goal. It provides the learner with a visible process or procedure and a frame of reference for instructor feedback and critique following learner initial attempts to complete a task or a procedure, and immersion in a learning environment with continuous access to skilled professionals, thereby providing learners with an opportunity to internalize procedures and standards of excellence prior to independent practice of complicated skills and procedures (Collins et al., 1989; Collins, et. al., 1991). Once the learner appears to have an overall concept of the completed procedure, the student begins to complete the steps in the procedure, with significant

support and direction from the teacher. This teaching method is called scaffolding and has an inverse relationship to the fading process.

Scaffolding and fading.

Scaffolding was first described by Vygotsky, consistent with his theory of proximal development (Lave, 1988; Lave & Wenger, 1991). The zone of proximal development is a two-stage theory of development that employs language and cultural artifacts to scaffold learning between actual student development and maximum student potential for learning within a particular environment (Cole & Wertsch, 2002; Daley, Menke, Kirkpatrick, Sheets, 2008; Kolb, 1984; Rogoff & Lave, 1999; Spouse, 1998). The theory of proximal development agrees with the learning process of the allied health student. The first phase of development is knowledge-in-waiting, located in the learner, and created through past experiences including formal didactic and psychomotor instruction in the academic setting. The second phase is knowledge-in-use. During the initial stages of the student's clinical experience, knowledge-in-use is located almost entirely in the preceptor who has refined theoretical knowledge into clinical practice through actual experience (Cole & Wertsch, 2002; Spouse, 1998). Vygotsky believes that socially-mediated learning involves both intrapersonal (individual learning) and interpersonal (social interactions) while employing language and cultural artifacts as the conduits for learning.

In both traditional apprenticeship and clinical internship training, the learner is assigned to a process or procedure and brings knowledge and skills to the task. Initially the learner is not capable of performing the procedure or task independently. However, the student possesses the potential to successfully complete the procedure.

Scaffolding is performed by a coach, expert, or clinical preceptor, who guides the novice through the component steps of the procedure. At first, the preceptor provides significant and continuous support for the novice. As the novice gains skill and expertise, the preceptor gradually removes support until the novice can perform the entire procedure independently with minimal supervision. The process of gradually withdrawing support is termed "fading" (Collins et al., 1989; Rogoff & Lave, 1999; Spouse, 1998). Fading, listed separately in Table B1, Appendix B, is employed concurrently with scaffolding and on a continuum. During the initial phase of learning the combination of skills in a procedure, the learner is supported with a great deal of scaffolding from the coach or clinical preceptor. As the learner's skill increases, the scaffolding provided by the coach fades until the learner is capable of successfully completing the task independently.

Coaching.

The final aspect of traditional apprenticeship is coaching. The learner works very closely with the expert or preceptor and is supervised in every aspect of the learning experience within the situated learning environment. The clinician coaches the learner through the learning process by employing several teaching methods including selection of activities, providing constructive criticism of learner performance of skills and tasks, evaluating learner progress, and identifying and troubleshooting barriers to learner success and progress. The teacher also offers encouragement, provides challenges, and assists learners in strengthening weak areas (Collins et al., 1991). A significant facet of coaching within the situated learning

environment of traditional apprenticeship is the social context in which it occurs. Collins et al. (1989) described coaching this way:

> Another key observation about apprenticeship concerns the social context in which learning takes place. Apprenticeship derives many cognitively important characteristics from being embedded in a subculture in which most, if not all, members are participants in the target skills. As a result, learners have continual access to models of expertise-in-use against which to refine their understanding of complex skills. Moreover, it is not uncommon for apprentices to have access to several masters and thus to a variety of models of expertise. Such richness and variety, helps them to understand that there may be multiple ways of carrying out a task and to recognize that no one individual embodies all knowledge or expertise. And finally, learners have the opportunity to observe other learners with varying degrees of skill; among other things, this encourages them to view learning as an incrementally staged process, while providing them with concrete benchmarks for their own progress (p. 456).

Traditional apprenticeship and a clinical internship as situated learning for students have several common characteristics.

Traditional apprenticeship and clinical education.

In a situated learning environment, the learning experience is defined by the work and successful completion of tasks that immediately add value to the enterprise. As reported in the nursing preceptor literature, students correlated the clinical placement experience with increased ability to assume responsibility for patient care and gradual transition to independent work. In this study, the discipline is phlebotomy

and the work is the safe, accurate, and efficient collection of patient specimens for laboratory analysis. Work is the driving force of the learning experience, and the environment emphasizes the novice's ability to complete a task (psychomotor skill) instead of just being able to describe it (cognitive skill). Students enrolled in phlebotomy clinical internship are expected to participate in collecting patients' blood and body fluid specimens as authorized by their preceptors. The progressive mastering of tasks by apprentices is appreciated not as a step toward a distant, symbolic goal, such as a diploma, but for its immediate value in getting the work done and contributing to patient care.

Expert performance of a task or procedure is immediately recognizable both to the master and novice allowing the novice to self-assess and critique their progress toward mastering a process or procedure. In spite of expertise being readily apparent, teachers and teaching are transparent. Berryman (1991) noted, "...apprentices are inducted into a community of expert practice in which the 'teacher' continuously engages in and is a master at the practice being learned. His or her performance constitutes the standard for the apprentice" (p. 2). To the outside observer, little teaching appears to occur but the learner is continually observing and continually learning from the expert. Modeling, scaffolding and fading, and coaching strategies guide learners to their maximum potential and are the cornerstones of traditional apprenticeship.

The traditional apprenticeship has certainly endured the test of time and, therefore, has proved its effectiveness. However, the apprenticeship is limited to tasks that are observable and unique to a particular enterprise. Therefore, skills and

knowledge learned in a traditional apprenticeship may not be generalized. Apprenticeships of tailors and cabinet makers illustrate this point. Both tailors and cabinet makers become experts by learning tasks and processes that are easily identifiable within those trades. However, the skills from one workplace are not transferred to the other. It is unlikely that a cabinet maker would need to create a buttonhole in a garment and equally unlikely that a tailor would need to install a door hinge (Collins et al., 1991). In contrast, the cognitive apprenticeship combines aspects of traditional apprenticeship with mechanisms for making cognitive activity of both the teacher and learner visible. Therefore, unlike traditional apprenticeship, the cognitive apprenticeship ultimately constructs learner knowledge that is transferrable.

Cognitive Apprenticeship

Like traditional apprenticeship, cognitive apprenticeship is described as a constructivist approach to learning (Kerka, 1997; Nickle, 2007). Oliver (1999) explains that "Cognitive apprenticeships are representative of Vygotskian 'zones of proximal development' in which learner tasks are slightly more difficult than learners can manage independently, requiring the aid of their peers and instructor to succeed. Cognitive apprenticeships reflect situated cognition theory..." (p. 1). Traditional apprenticeship is focused on skills that are readily observable and external to the learner. In contrast, cognitive apprenticeship requires that cognitive processes, usually not readily observable, be brought to the surface and made visible (Brandt, Farmer, & Buckmaster, 1993; Brown et al., 1989; Collins et al., 1989; Collins et al., 1991; Cope, Cuthbertson, & Soddart, 2000; Page & Ross, 2004; Wilson & Cole, 1991; Wong & Matsumoto, 2007; Wooley & Jarvis, 2006). In addition to the aspects of traditional

apprenticeship, the cognitive apprenticeship model requires teachers and learners to make their cognitive reasoning visible through articulation, reflection, and exploration.

The cognitive apprenticeship incorporates the traditional apprenticeship presented in Table B1, Appendix B and three additional aspects based on cognitive and metacognitive functions. Collins et al. (1991) indicate "Cognitive research... has begun to delineate the cognitive and metacognitive processes that comprise expertise. By bringing these tacit processes into the open, learners can observe, enact, and practice them with help from the teacher and other learners" (p. 3). The term "cognitive apprenticeship" was first coined by Collins et al. (1989):

> We call this rethinking of teaching and learning in school "cognitive apprenticeship" to emphasize two issues. First, the method is aimed primarily at the processes experts use to handle complex tasks...Second, our term, cognitive apprenticeship, refers to the focus of the learning-through-guided-experience on cognitive and metacognitive, rather than physical skills and processes (p. 457).

Aspects of the cognitive apprenticeship model of situated learning are presented in Table C2, Appendix C.

The cognitive apprenticeship, as applied to allied health clinical education, employs modeling, coaching, scaffolding and fading of the traditional apprenticeship (Table B1, Appendix B) and detailed further in Table C2, Appendix C. However, the cognitive apprenticeship model differs from traditional apprenticeship in three important ways. First, in traditional apprenticeship student learning is grounded in work flow. In contrast, cognitive apprenticeship is grounded in formally articulated

curricula. Second, in traditional apprenticeship, the curriculum is situation-based, and the teacher serves as the expert who guides the learner to skill mastery. The roles of teacher and learner are clearly defined, the teacher teaches and the learner learns. In contrast, in cognitive apprenticeship, both teachers and learners must make their thinking visible through articulation, reflection, and exploration. Strategies for making cognition and metacognition visible include reading, writing, problem-solving, and verbalizing. Third, in traditional apprenticeships, the transfer of knowledge to new situations is not a goal as illustrated in the earlier buttonholes and cabinet doors example. In contrast, a cognitive apprenticeship strives to create knowledge and skills learners can generalize and transfer to new circumstances. Collins et al. (1991) summarized:

> In cognitive apprenticeship, the challenge is to present a wide range of tasks, varying from systematic to diverse, and to encourage learners to reflect on and articulate the elements that are common across tasks… The goal is to help learners generalize the skill, to learn when the skill is or is not applicable, and to transfer the skill independently when presented with novel situations (p. 4).

Because cognitive apprenticeship supports the development of higher order thinking skills, it is uniquely suited as a theoretical framework for clinical education (Cope et al., 2000; Dolmans, Wolfhagen, Essed, Scherpbier, & van der Vleuten, 2002; Page & Ross, 2004; Taylor & Care, 1999).

Cognitive apprenticeship and clinical education.

According to nursing preceptor literature, students credited their clinical placement experience with increasing their body of knowledge. However, the way

nursing students constructed knowledge during their clinical placement is not described. Because cognitive apprenticeship requires skill mastery framed by a clearly articulated curriculum while making cognitive and metacognitive functions visible both to the clinical instructor and the student, the cognitive apprenticeship is the theoretical framework used in this study. Additionally, the nursing preceptor literature identified student frustration with a lack of time available for teaching and learning in the clinical setting and the lack of training available for preceptors. This study explores the use of cognitive apprenticeship to strategically and intentionally construct generalized and transferrable knowledge in students. Finally, clinical instructors may use cognitive apprenticeship to guide students efficiently in individualized continuous quality improvement strategies through the practice of reflection while employing generative and evaluative processes in completing complex tasks (Brandt et al., 1993; Collins et al., 1989).

The clinical environment requires learners to rely on the theoretical background and psychomotor skills learned in classrooms and laboratories to perform effectively in the complex clinical environment. The clinical environment requires experts to use higher order problem-solving and critical thinking skills within a complex social setting while providing direct care to patients. The goals of cognitive apprenticeship are congruent with the goals of allied health clinical learning experiences and are summarized in Table C3, Appendix C. Consistent with situated learning theory, the student's ability to complete clinical tasks accurately, safely, and efficiently must be learned as a result of immersion within the clinical environment. Lave (1988) explains:

> Culture and the (professional) mind are seamlessly related, both composed of knowledge. Knowledge is arranged in the mind in condition/action pairs, that is, as means/ends relations – the forms of instrumental rationality. The social world is acknowledged only in the form of professional occupations, translated immediately into knowledge domains. Correspondingly, cognition is not that of a whole person, but only of the person conceived of in a professional role, and only of course, as a rational problem solver (p. 88).

The cognitive apprenticeship model of situated learning supports the development of higher order thinking skills and is uniquely suited as a theoretical framework for clinical education. It is also a possible solution to the gap in clinical preceptor training identified in the nursing literature. However, empirical studies employing the cognitive apprenticeship model are limited in both education and health care literature.

Empirical Studies

The literature review yields few studies based on the cognitive apprenticeship model and the number of studies reported was further divided into two categories: traditional education and clinical learning. The studies performed in both educational and clinical learning are consistent in their variation. In both sets of studies, there is tremendous variation in student participant populations. Additionally there is tremendous variation in academic subjects and health care disciplines included in the studies. In spite of the wide variation in both kinds of studies, four common themes emerged in the literature review. The themes include: the variation in students and subjects studied; expanded student learning as a result of instruction using the

cognitive apprenticeship model; the importance of the mentor's role; and the need for additional empirical research.

Variation in Students and Subjects

In spite of the small number of empirical studies using the cognitive apprenticeship model of situated learning as a theoretical framework *(N = 17)*, the studies encompassed a variety of students in different educational settings. In traditional academic learning environments *(N = 8)*, students studied ranged in age from eleven or twelve (seventh grade) to adult graduate students (Collins et al.,1989; Darabi, 2005; Evanciew, 1994; Hendricks, 2001; Jarvela, 1995; Mayer, Mautone, & Prothero, 2002). In clinical environments *(N =9)*, students studied were enrolled or graduated from higher education programs, and included undergraduate, graduate, and medical doctor programs (Cope et al., 2000; Daley et al., 2008; Dolmans et al., 2002; Graham, 1996; Healey, 2008; Page & Ross, 2004; Prowse & Lyne, 2000; Scully & Shepherd, 1983; Wong & Matsumoto, 2008). One program was associated with in-service training post graduation for registered nurses. In addition to the range of student ages and educational levels, there was a tremendous variation in the subjects studied.

In the traditional academic setting, the effectiveness of cognitive apprenticeship to provide instruction was studied using two academic subjects: math and geology. Cognitive apprenticeship was also used to frame studies focused on such activities as the creation of a washing machine design for mediating modern technological thinking and problem-solving, and systems analysis. One study used cognitive apprenticeship to examine a high school apprenticeship program. Programs

in the clinical setting were also varied and included physical therapy at the undergraduate and graduate level, registered nurses, and medical doctors. No studies were conducted with community college student participation. The seminal research for the cognitive apprenticeship model was introduced by Collins et al. (1989).

Seminal Studies Using Cognitive Apprenticeship

First proposed by Collins et al. (1989) cognitive apprenticeship is described as "a new cognitive apprenticeship to teach students the thinking and problem-solving skills involved in school subjects such as reading, writing, and mathematics" (p. 454). Success models for cognitive apprenticeship were first introduced by Brown et al., (1989) and included Palincsar and Brown's reciprocal teaching method for reading comprehension to seventh and eighth grade students; Scardamalia and Bereiter's facilitation of writing in children; and Schoenfeld's method for teaching mathematical problem solving to college students. The purpose of the studies was to test the effectiveness of the model in teaching academic subjects requiring cognitive and metacognitive skill development in the learner. All of the studies reported by Collins et al. (1989) employed aspects of this apprenticeship to improve student learning. The results generated were positive and often dramatic (See Table D4, Appendix D for a summary of these results). All of these studies employed modeling, coaching, scaffolding and fading, reflection, and articulation as instructional strategies. The use of exploration was also included in the studies reported by Palincsar and Brown (1984) and Schoenfeld, (1983, 1985) but not specifically reported in the study performed by Scardamalia and Bereiter (1985). All of the seminal studies reported significant gains in student learning.

Cognitive apprenticeship serves as the common factor across all of the studies beginning with the introduction of a conceptual framework and employing the strategies summarized in Table C2, Appendix C. The studies performed by Palincsar and Brown (1984), Scardamalia and Bereiter (1985), and Schoenfeld (1983, 1985) serve as seminal research studies that demonstrated the effectiveness of cognitive apprenticeship in developing student cognition and metacognition in the foundational academic subjects of reading, writing, and mathematics. A review of empirical studies conducted in traditional academic and clinical settings also reported increased student learning as a result of instruction using situated learning theory informed by cognitive apprenticeship.

Impact on Student Learning

Consistent with the research results on cognitive apprenticeship, situated instruction led to increased student learning in traditional academic settings (Darabi, 2005; Hendricks, 2001; Mayer et al., 2002). In a study conducted in a graduate level systems analysis course, Darabi (2005) documented large differences in learning between situated and abstracted groups:

> The application of CA [cognitive apprenticeship] appeared to improve the instruction of a complex subject such as PSA [performance systems analysis]. It made the content of the course more meaningful in the context of its goals and objectives and made significant contribution to the students' preparation for their future careers (p. 60).

Evanciew (1994) uses situated cognition theory to study learning in high school students enrolled in a youth apprenticeship program and reports high school students

gained proficiency in communication, multitasking, problem solving, and developed such work related-skills as operating equipment (p. 11). Hendricks (2001) conducted a study on seventh graders learning math causality and reported large differences in learning between students taught using situated learning techniques and students taught using abstracted learning techniques. The situated learning group posted the most significant learning gains. Mayer et al. (2002) employs cognitive apprenticeship to teach authentic geology problems to college undergraduate students using computer simulation. The task involves surveying a planet's surface and identifying such geological features as a trench, ridge, or seamount using a computer simulation. Students are divided into two groups. One group received instruction using scaffolding and fading, an instructional strategy of traditional and cognitive apprenticeship, and one group did not. Mayer et al. (2002) noted that

> … the worst performing group in our study was the group that received the least amount of support beyond basic instruction (i.e., the no-aids group), and the best performing group was the group that received the most support (i.e., the both-aids group) (p. 14).

Increased learning as a result of cognitive apprenticeship applied in traditional academic settings is consistent with study findings conducted in clinical settings.

Increased learning in the clinical setting is demonstrated in seven qualitative and two quantitative studies employing cognitive apprenticeship. Learning is contextualized and has a powerful effect on its meaning (Cope et al., 2000). Students clearly formed connections between real time learning and past clinical experiences (Cope et al., 2000; Graham, 1996; Prowse & Lyne, 2000). Additionally, discussion in

the clinical learning environment with peers and instructors serves to develop conceptual knowledge (Daley et al., 2000; Graham, 1996; Prowse & Lyne, 2000). Healey (2008) describes deep learning in students who "actively seek to understand the meaning in what they are learning, relate and organize ideas into a complete whole, and are critical in analyzing the evidence and their decisions" (p. 49). Physical therapist students and clinical instructors indicated that student deep-learning approaches are influenced by the student's interaction with patients and the clinical learning environment (Healey, 2008).

The Clinical Learning Environment and Cognitive Apprenticeship

Students enrolled in medical education programs spend significant time in the clinical setting (Healey, 2008). Consistently, the MVCC Phlebotomy Program requires 264 contact hours of instruction that includes 120 clinical hours (45% of the total contact hours). Page and Ross (2004) use cognitive apprenticeship as a framework to survey the time clinical instructors spend using each of the instructional strategies comprising cognitive apprenticeship. (See Table E5, Appendix E). These findings suggest that the clinical preceptors are indoctrinating students into physical therapy and assisting them with mastery of clinical skills but are not consistently asking students to provide theoretical rationale for clinical tasks they performed. Additionally, the physical therapist preceptors spent 55.41% of their time instructing students and 45% of their time on non-instructional activities (p. 46). Page and Ross (2004) noted,

> although not central to the purpose of this study, the findings suggest that the amount of time the CI actually spends with the student in a clinical

> apprenticeship deserves direct examination. Because it appears students are left without input from their CI [clinical instructor] during their clinical experiences, fundamental components of the productivity debate should be studied further (p. 47).

The component of the clinical learning environment that had the greatest impact on student learning was the clinical preceptor or mentor.

Mentor

The role of the mentor, or clinical instructor, is critical to the successful implementation of cognitive apprenticeship in both traditional academic and clinical settings (Cope et al., 2000; Dolmans et al., 2002; Evanciew, 1994; Graham, 1996; Healey, 2008; Jarvela, 1995; Page & Ross, 2004; Scully & Shepherd, 1983; Wong & Matsumoto, 2008). Clinical instructors provide a variety of learning experiences and assist students in developing confidence in accomplishing various duties. Jarvela (1995) noted the task and situation must be reciprocally understood by both the student and the clinical instructor for scaffolding and modeling strategies to be effective and stated "... cognitive apprenticeship tends to put trust in the dominance of the expert and her or his ability to control the interaction" (p. 239). Additionally, clinical instructors demonstrate social skills appropriate for the environment and serve as role models for the students (Cope et al., 2000; Evanciew, 1994). Kilminster et al. (2007) summarized:

- Direct supervision seems to help trainees gain skills more rapidly
- The quality of the supervisory relationship strongly affects the effectiveness of supervision. Particularly important aspects are

continuity over time in the supervisory relationship, the trainees have some control over the supervision… and that there is some reflection by both participants

- Behavioral changes can occur relatively quickly as a result of supervision whilst changes in thinking and attitude take longer. This is particularly important because there may be relatively frequent changes of supervisor due to rotations.
- Self-supervision is not effective; input from a supervisor is required (p. 7).

The crucial role of the mentor is consistent with the important role of the preceptor reported previously in the nursing literature. However, the most prevalent theme reported in the literature is the need for additional research.

Additional Research

All of the studies included in this literature review are limited in scope and cannot be generalized but consistently recommend the need for additional research (Darabi, 2005; Dolmans et al., 2002; Evanciew, 1994; Graham, 1996; Healey, 2008; Hendricks, 2001; Jarvela, 1995; Mayer et al., 2002). Hendricks (2001) acknowledged the lack of empirical studies published on situated cognition. Recommendations for additional study include exploring the essence of learning within a social context such as a workplace or clinical setting (Evanciew, 1994; Graham, 1996; Jarvela, 1995; Page & Ross, 2004; Prowse & Lyne, 2000). Page and Ross (2004) observed, "[i]t seems reasonable to pursue further investigations, particularly in regard to the content, sequencing, and sociology principles of the CAM [cognitive apprenticeship method]

and then to apply the CAM to a specific physical therapy clinical education module" (p. 47). Scully and Shepard (1983) noted, "there should be further qualitative research studies to expand the [CAM] model through grounded theory, field studies of students' and patients' perspectives on clinical education, and further explanation of how specific teaching tools are used so that programs to train physical therapy CTs [clinical teachers] are meaningful" (p. 357). Not surprisingly, the need for additional study on situated learning is consistent with the need for additional study reported in the nursing literature.

Critique

Strengths

Cognitive apprenticeship based on situated learning theory improves and expands student learning is a consistent literature finding despite a heterogeneous mix of students and subjects included in the literature review. Situated learning opportunities in clinical education are long-established cornerstones of allied health, nursing, and medical education programs. The rationale for including clinical education just made sense, as observed by the physician, Sir William Osler, almost 100 years ago. Traditional apprenticeship serves as the retro-fitted framework for the long-established practice of lengthy, mandatory clinical education learning components included in allied health, nursing, and medical education programs. Cognitive apprenticeship builds on traditional apprenticeship, modeling, coaching, scaffolding / fading, and supports student cognitive and metacognitive development through reflection, articulation, and exploration. Wong and Matsumoto (2008) summarized the six aspects of the cognitive apprenticeship model:

> The cognitive apprenticeship model is derived from the traditional apprenticeship model; however, the traditional model teaches skills in the context of their use, whereas the cognitive apprenticeship model decontextualizes the knowledge so that a learner can apply their new skills in different settings. The cognitive apprenticeship model has three components performed by the mentor (modeling, coaching, and scaffolding) and three components performed by the learner (articulating, reflecting and exploring) (p. 4).

Because cognitive apprenticeship provides students with legitimate participation within a community of practice, it is highly compatible with the current practice of required clinical internship training in allied health, nursing, and medical education programs. Darabi (2005) clarified the point in this manner:

> Even though not considered a theory in the scientific sense, cognitive apprenticeship (CA, Collins et al., 1991) is a well-recognized instructional approach with extensive roots in the instructional design literature (Brown, Collins & Duguid, 1989; Ceci, Rosenblum, & De Bruyn, 1998; Quinn, 1994, 1995; Tripp, 1994) that is prescribed for designing learning environments (p. 49).

Therefore, cognitive apprenticeship may be used to define an educational method grounded in situational learning theory suitable for the allied health clinical learning experience. Cognitive apprenticeship, grounded in situational learning theory and employing legitimate peripheral participation within a community of practice, serves as this study's framework on allied health clinical education for students.

Weaknesses

Evanciew notes, "The constructivist paradigm is a 'wide-ranging eclectic framework' (Schwandt, 1994, p. 128)" (p. 7). Collins et al. (1989) recommends a framework for designing learning environments that includes four dimensions: content, methods, sequence, and sociology. Each dimension defines a set of characteristics to consider when developing and assessing learning environments (p. 477). Collins et al. (1989) assign the six characteristics presented in Table C2, Appendix C as the methods dimension of an ideal learning environment. Components of the methods dimension of the ideal learning environment seem suitable for use as teaching techniques to assist students with constructing cognitive and metacognitive strategies for using, managing, and discovering knowledge for patient care delivery. Collins et al. (1989) note, "[a] major direction in current cognitive research is to attempt to formulate explicitly the strategies and skills underlying expert practice, to make them a legitimate focus of teaching in schools and other learning environments" (p. 480). Unfortunately the developing body of research is fragmented, focusing on selected segments of cognitive apprenticeship. Additionally, the cognitive segments explored in various studies are inconsistently and sometimes inaccurately framed within cognitive apprenticeship and situated learning theory. The inconsistent application of situated learning theory is evidenced by the proliferation of taxonomies employed in the literature.

The literature lacks standard terminology to describe cognitive apprenticeship. Merriam, Caffarella, and Baumgartner (2007) reported cognitive apprenticeship as a method for enculturation of learners into authentic learning situations (p. 180). Nickle

(2007) sees theory development described in the literature along a continuum: constructivism, social constructivism, situated cognition, and cognitive apprenticeship. Thus, Nickle (2007) elevates situated cognition and cognitive apprenticeship to a learning theory in contrast to the categorization of Merriam et al. (2007) of both as experiential learning procedures. Additionally, most researchers differentiate experiential learning practices: cognitive apprenticeship as situated cognition with distinct elements and methods. However, other researchers see the various methods as synonymous. For example, Hendricks (2001) explains that "situated cognition exists in various forms and assumes different names, including cognitive apprenticeship, situated learning, and legitimate peripheral participation" (p. 302). Darabi (2005) exceptionally used "cognitive apprenticeship" to define the four dimensions of ideal learning environments first described by Collins et al. (1989): content, methods, sequence, and sociology (p. 476).

Collins et al. (1989) recognized cognitive apprenticeship methods as a component of an epistemology of situated cognition, a distinction also accepted by a number of additional researchers (Cope et al., 2000; Darabi, 2005; Jarvela, 1995; Mayer et al., 2002). Still others correlate situated cognition with learning processes that cannot be separated from the situation in which learning is presented (Evanciew, 1994; Merriam et al., 2007). To add to the confusion, cognitive apprenticeship is often seen in the literature as an instructional design model rather than a learning theory or an experiential learning practice based on constructivist epistemology. Current research is attempting to formulate the strategies and skills underlying expert practice as reported in the literature (Collins et al., 1989). Consequently, studies were based on

a range of subsets of teaching methods included in cognitive apprenticeship. The subsets were inconsistently selected and ranged from none of the elements included in Table C2, Appendix C (Scully & Shepherd, 1983) to all six elements (Page & Ross, 2004).

Cognitive apprenticeship includes six components, but only two studies employed all six (Page & Ross, 2004; Wong & Matsumoto, 2008). Several other studies limited cognitive apprenticeship to scaffolding and modeling (Evanciew, 1994; Jarvela, 1995; Mayer et al., 2002) with one other unique aspect of cognitive apprenticeship: coaching (Evanciew, 1994) and reflection (Jarvela, 1995). Most studies extrapolated the methods dimension of the ideal learning environment described by Collins et al. (1989) and referred to selected characteristics of the cognitive apprenticeship methods dimension as cognitive apprenticeship (Jarvela, 1995; Mayer et al., 2002). The studies examined a piece, or several pieces, of the 1,000 piece puzzle (Harris et al., 2006), but none of the studies considered how the information contributed to the development of a body of knowledge related to cognitive apprenticeship in general and preceptor-led clinical education in particular. Dolmans et al. (2002) explained the matter in this way

> When evaluation focuses only on the outcomes, the influence of process variables on the outcomes is often ignored. Making improvements in education based on outcomes of these evaluations is difficult. Evaluations should therefore focus on the variables that influence the educational process in order to identify which features of a programme produce the desired effect (p. 736).

The process of cognitive apprenticeship was not explored in the literature studies. Instead, the studies focused on various components of cognitive apprenticeship. The lack of standardization in theoretical frameworks resulted in mismatched studies and erratic results with limited generalizability and inconsistent interpretations. Moreover, because the studies are inconsistently framed by a theoretical foundation, the development of a body of knowledge based on empirical research is sporadic at best.

Gaps

There is a lack of standardized, theoretical framework for studies on situated learning operationalized by cognitive apprenticeship. As a result, a systematic method for studying clinical education in allied health clinical internships for students is largely unavailable. Additionally, there is no comprehensive study on the essence of situated learning through legitimate peripheral participation by applying the elements of cognitive apprenticeship within a specific community of practice from the viewpoint of the stakeholders. Clinical education is a complex activity. The literature focuses on various elements of a complex activity. While elements of cognitive apprenticeship have been studied in a variety of situated learning environments, a comprehensive study of the impact of situated learning framed by cognitive apprenticeship and its impact on student constructs of learning has not been studied. Most significantly, not a single study in the literature presented findings on community college-based, allied health clinical education. The purpose of this study is to determine how legitimate peripheral participation in a specific community of practice assists students with construction of didactic, psychomotor, and affective learning using the cognitive apprenticeship model as a framework for the study.

Summary

Historically, nursing and allied health education is experience-based and strongly rooted in traditional apprenticeship. In the clinical aspect of an allied health program, students apply knowledge and skills gained in classrooms and laboratories within the authentic context of the clinical setting while delivering patient care under the supervision of a clinical preceptor. Student learning in the cognitive, psychomotor, and affective domains initially develops as knowledge-in-waiting in community college lecture halls and laboratories and is subsequently applied in apprenticeship-like learning activities in the clinical setting as knowledge-in-use. The increasing knowledge base of the health science professions and the increasing complexity of patient care requires a situated learning experience in allied health programs which allows students to construct cognitive, psychomotor and affective learning through legitimate peripheral participation within the context of a community of practice distinguished by a specific allied health discipline.

Situated learning theory, based on legitimate peripheral participation and located within communities of practice, applies to student learning during placement in allied health clinical internships. Because student learning in the clinical environment is socially situated within the clinical environment, this study explores how the experience of delivering patient care supervised by a clinical preceptor in the work unit of a specific allied health discipline assisted student construction of learning. The cognitive apprenticeship applied to allied health clinical education employs the aspects of modeling, coaching, and scaffolding / fading of the traditional apprenticeship. Additionally, cognitive apprenticeship incorporates articulation,

reflection, and exploration to promote student development of cognition and metacognition. Because cognitive apprenticeship provides students with legitimate participation opportunities and because it develops cognitive and metacognitive student abilities critical for skilled patient care, it is highly compatible with the current practice of including clinical internship training in allied health, nursing, and medical education programs, and serves as the framework of this study.

CHAPTER 3: METHODOLOGY

The goal of this study is to determine how the clinical internship as a situated learning experience improves or expands learning. Situated learning in the clinical setting is provided through the collaboration of many allied health program stakeholders, including clinical coordinators, clinical preceptors, academic faculty, clinical and academic administrators, accreditation agencies, students, and, of course, patients. A nested case study answers the question, "How does the allied health preceptor-led clinical internship improve or expand community college student learning"? Defining the essence of student learning in the complicated clinical environment is useful for the stakeholders involved in clinical placements in general and educators in particular. Chapter three outlines the research design and describes the context of the study, including study participants and data collection, and analysis methods. The chapter concludes with a description of the strategies that validate the study and the ethical protection of the participants.

Research Design

In an effort to improve the effectiveness and efficiency of student learning in phlebotomy clinical placements, a qualitative study was conducted. Clinical assignments are generally accepted as a crucial element in allied health programs and are used to bridge the gap between student learning in classrooms and labs and the knowledge, skill, and professionalism required of an entry level professional. Instructional strategies used to improve and expand student learning in the clinical internship and how those strategies assist learning is largely unexplored. A case study identified the unique attributes of the clinical environment that contribute to student

learning, ultimately culminating in a set of skills consistent with entry level into the profession post-graduation. Because community college student learning is constructed in the socially complex clinical environment, the study is framed by constructivist orientation.

Method Rationale

A constructivist viewpoint assumes that human learning is socially constructed. Wenger (1998) notes:

> *Constructivist* theories focus on the processes by which learners build their own mental structures when interacting with an environment. Their pedagogical focus is task-oriented. They favor hands-on, self-directed activities oriented toward design and discovery... (Piaget 1954; Papert 1980) (p. 279).

The internship is the learning environment in which students interact. Through authentic clinical activities, students discover and develop their own professional personas. Each student creates a professional persona using cultural and linguistic constructs (Patton, 2002, p. 96). Patton (2002) explains this about the philosophy: "...*constructivist* philosophy is built on the thesis of *ontological relativity*, which holds that all tenable statements about existence depend on worldview, and no worldview is uniquely determined by empirical or sense data about the world." (p. 97). Therefore, the most appropriate means to study learning in the clinical setting is a qualitative analysis. The constructivist viewpoint is congruent with qualitative analysis in general and case study analysis in particular.

Because each allied health discipline is responsible for a unique domain in patient care and because the essence of each domain cannot be captured through empirical analysis, a qualitative research method is used. Creswell (2005) clarified that "*Qualitative* research is used to study research problems requiring an exploration in which little is known about the problem and a detailed understanding of a central phenomenon" (p. 45). The literature yields few studies on clinical internship and no studies on how students learn in the clinical environment. This study is important because clinical internship comprises a significant amount of student contact hours. One barrier to this phenomenon is access to clinical sites. Because of the researcher's role as Internship Coordinator, access to the students, clinical personnel, and the clinical environment is available. The complexity of the clinical provides a rich learning environment in which students transfer knowledge-in-waiting obtained in their courses to knowledge-in-use in the complex clinical environment. Dolmans et al. (2002) noted that "[t]he learning experiences of students during rotations in hospitals and out-patient clinics are characterized by variability, unpredictability, and lack of continuity" (p. 735). As a result of the variable nature of learning, quantitative analysis is not appropriate because the parameters of the study, once defined, could not be controlled. Given the lack of information on internship at the community college level, access issues related to clinical sites, and the complexity of the environment, a qualitative study is best suited to explore the impact of clinical placement on student learning.

This approach describes the essence of learning within the kaleidoscope of clinical processes and procedures within a complicated social context focused on

patient care. Yin (2003) stated that "... the distinctive need for case studies arises out of the desire to understand complex social phenomena" (p. 2). A case study approach is used employing a nested case study design. Patton (2002) has observed

> ... that single case study is likely to be made up of many smaller cases - the stories of specific individuals, families, organizational units, and other groups... The qualitative analysis process typically centers on presentation of specific cases. Knowing this, fieldwork can be organized around nested and layered case studies, which means that some form of nested case sampling must occur (p. 297).

The researcher's study shows how the 1,000 pieces comprising the allied health puzzle promote student learning (Harris et al., 2006).

Two additional qualitative methodologies were considered as possibilities for this study: a phenomenological study and an ethnographic study. Because phenomenology encompasses only one perspective, a phenomenological study is not workable. A nested case study is appropriate to the essence of student learning in the clinical because it uses three perspectives: the student, clinical preceptor, and clinical coordinator. This study is framed within a social context with an undeniable culture, and studies of culture often follow an ethnographic tradition. However, an ethnographic approach does not work because the study's focus is on student learning and not the cultural framework for student learning. Because the purpose of this study is to seek conclusions about how clinical internship impacts learning, with criteria for validity and reliability described in a later section, this is a case study and not a program evaluation.

Description of the Case

Creswell (1998) described, "a case study is an exploration of a "bounded system" ... over time through detailed, in-depth data collection involving multiple sources of information rich in context" (p. 61). The bounded system is phlebotomy. Allied health is a complex system of disciplines, each providing a specific domain of patient care. Phlebotomy, as a short-term, certificate program, has the narrow focus that a bounded study needs. The scope of the bounded system in this study must be narrowed further to one type of phlebotomy training: a program approved by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

There are 57 NAACLS-approved phlebotomy programs in the United States (http://www.naacls.org/search/programs.asp). Even though there are 57 approved programs, there is considerable variation in structure and setting including hospital-based programs, proprietary schools, technical colleges, and community colleges. Because this study was completed as part of a community college leadership program and because community colleges represent approximately half of the NAACLS-approved programs, the setting is a community college. Selection of the specific program uses intensity sampling described by Patton (2002), "An intensity sample consists of information-rich cases that manifest the phenomenon of interest intensely... Using the logic of intensity sampling, one seeks excellent or rich examples of the phenomenon of interest." (p. 234)

Because of its history, size, and complexity, the community college-based phlebotomy program for this study is the MVCC Phlebotomy Program. This is one of four programs awarded charter approval by NAACLS in 1987, and is one of the oldest

NAACLS-approved phlebotomy programs in the nation. Additionally, it is an unusually large phlebotomy program and will be a rich source of information.

There are various settings for clinical experiences including hospitals, private laboratories, and patient service centers. Data from all of the sites were collected using two methods of sampling: maximum variation sampling and typical case sampling. Eleven clinical sites were selected by maximum variation sampling, and three hospitals by typical case sampling. The eleven sites were selected by maximum variation sampling so the full range of characteristics of interest are present. (Orcher, 2005, p. 102). Clinical site comparisons are made based on four characteristics: number of beds; number of bassinettes; number of lab tests (lab volume) performed per year; and number of FTEs employed. The eleven sites report a wide range of statistics for each characteristic. (See Table F6, Appendix F) Additionally, three clinical sites were selected by typical case sampling and are considered "normal." (Orcher, 2005, p. 100). The three clinical sites purposively selected by typical case sampling are similar in the characteristics defined above. Additionally, the hospitals have a long history of providing student clinical experiences, and their approach to selecting preceptors and structuring the clinical is similar. (See Table F7, Appendix F)

Context of the Study

Bounded System

This researcher has served as faculty member and Program Coordinator for twenty-four years and the Internship Coordinator since fall 2008 at Moraine Valley Community College. The College is located approximately 30 miles southwest of downtown Chicago and is the second largest community college in Illinois. The

college serves 48,000 credit and noncredit students annually in a district that spans 139 square miles, including 26 communities and 400,000 people. The college offers 109 degrees and certificates, and phlebotomy is one of the certificate programs offered. The Program is one of three NAACLS-approved phlebotomy programs in Illinois.

The mission of the program is to educate and train students to meet standards of practice for entry level phlebotomy professionals. Two program outcomes, developed based on the NAACLS standards and the recommendations of the Advisory Committee, support the mission of the program: To provide training in blood and specimen collection skills consistent with entry level in the profession; and a comprehensive didactic framework to prepare students to successfully challenge a phlebotomy certification exam post graduation. The goals are similar in format and scope to other approved or accredited allied health programs.

The certificate program is composed of three courses spanning two semesters. The first course, PHB-110 "Principles and Practice of Phlebotomy" is a six-credit hour course of lecture and laboratory classes taught at the college. Lecture topics include medical terminology, anatomy and physiology appropriate to phlebotomy, professionalism, safety, infection control, including isolation techniques, venipuncture, skin puncture, arterial puncture, special collection procedures, specimen processing, and point of care testing. The laboratory component includes instruction, demonstration, and practice of blood and other specimen collection procedures. To successfully complete PHB-110, students must complete at least 55 successful venipunctures and six skin punctures performed on simulators and fellow students.

Upon successful completion of PHB-110, students advance to the clinical experience. PHB-111 "Phlebotomy Clinical Practice Seminar" is a one-credit hour campus-based capstone course for students in a phlebotomy clinical rotation. Discussion topics support the clinical and include reaction to the experience and professional issues related to the internship and phlebotomy. Communication skills appropriate for diverse patient populations and customer service skills are also explored. PHB-111 is a co-requisite to PHB-112, "Phlebotomy Clinical Practice," a two-credit hour course of 120 contact hours of supervised phlebotomy clinical practice at one of the clinical affiliate sites. PHB 112 provides clinical practice and develops student phlebotomy skills to a level consistent with entry into the profession (http://www.morainevalley.edu/HealthSciences/Phlebotomy/more_Phlebotomy.htm).

The program is designed to evaluate the effectiveness of the internship because of the distinction between learning that occurs at the campus and the clinical. Most programs begin clinical training concurrently with academic courses, thus blurring the distinction of where and when student learning actually occurs. Additionally, most students do not have previous clinical experience and receive their first indoctrination into the clinical setting through the internship where the learning curve is the steepest. The program is supported by clinical internship opportunities previously mentioned.

Clinical Site Selection

The clinical affiliate sites are located within a 25 mile radius of the College, covering approximately 529 square miles. The Program uses clinical sites outside of the college's district to provide adequate opportunities for the enrolled students. Communities served by the various clinical sites are quite diverse and represent a

range in population demographics and per capita income. Data collection will occur initially through the participation of eleven clinical sites to achieve maximum variation sampling. Orcher (2005) describes the advantage of maximum variation sampling: "it makes it possible to compare results across a spectrum of variables. It also makes it possible to determine whether research findings apply only to certain subgroups or apply equally across the spectrum" (p. 102). The clinical personnel at the eleven clinical sites participated in focus groups and interviews to investigate the research questions. (See Table F6, Appendix F)

Yin (2003) believes that careful selection "predict[s] similar results ... "a literal replication," and then "finding[s could] be considered robust and worthy of continued investigation" (p. 47). The three clinical sites selected by typical case sampling represent the most common clinical internship available: hospital-based composed of 15 eight-hour days in three consecutive weeks for 120 clock hours. Clinical internships are offered on the day shift starting early morning, ranging from 4.30 to 6.00 a.m. The sites are very similar in size, scope, and student scheduling patterns, thus students are expected to have similar experiences in each of the three hospitals that has a long-standing relationship of twenty years or more with the program. (See Table F7, Appendix F). The relationships between the hospital personnel and researcher allowed access to conduct observations. Clinical personnel were chosen by criterion sampling.

Participant Selection

Clinical personnel.

Clinical personnel are categorized by title: clinical coordinators, clinical preceptors, and staff phlebotomists. Clinical coordinators are site administrators, and there are fourteen collaborating clinical coordinators at the sites. Typical titles include Supervisor of Laboratory Support Services, Phlebotomy Supervisor, and Laboratory Manager. Administrators have a manager's perspective regarding the internships because they supervise the preceptors and hire phlebotomists. Clinical coordinators are a separate case in the study.

Clinical preceptors are staff phlebotomists who directly supervise the students and must meet educational and experiential standards defined by NAACLS. Typical titles include Lead Phlebotomist, Phlebotomy Coordinator, and Phlebotomist. Usually, students work with several preceptors over the course of their clinical experience. The clinical preceptors are responsible for the students and complete student evaluations in addition to providing patient care. Staff phlebotomists are responsible for delivering patient care only and do not supervise students.

The clinical preceptors fall into one of two groups based on: clinical facilities chosen by maximum variation sampling and facilities chosen by typical case sampling. Clinical site personnel subgroups were selected using stratified purposive sampling that also selected participants from each subgroup so that all of the subgroups are represented in the sample (Ocher, 2005, p. 103). Clinical sites were subgrouped according to the following criteria: outpatient facilities; clinical affiliate sites providing non-traditional scheduling opportunities for students; clinical sites

added to the program site roster within the last five years; clinical sites located outside college's district, and typical clinical sites. (See Table G8, Appendix G)

Students.

The program admits approximately 175 students per year the majority of which are female (83%) and Caucasian (74%). Student minority populations include African-American (8%) and Hispanic (9%). Internships are assigned based on a declining numeric lottery system on the first day of PHB 112. All students assigned to clinical sites were invited to participate in student focus groups. Students were not aware to which subgroup each clinical site was assigned for this study, and, in this manner, students were selected by stratified purposive sampling. Students selected by maximum variation and typical case sampling were further categorized into subgroups based on additional criteria. (See Table G8, Appendix G) Additionally, students assigned to clinical sites selected by typical case sampling represented an opportunistic sample for data collection during observations. (See Figure H1, Appendix H) As a result, all student demographic populations were included in the study. Data collection was initiated after human subjects' approval was received. (See Appendix I)

Data Collection

Documents Review

Data collection methods included documents review, focus groups / interviews, and observations. Patton (2002) noted that a documents review provides a particularly rich source of information about programs (p. 293). Two types of documents were examined: The first is a Student Survey of Clinical Experience (See Appendix K).

Once student and graduate consent was obtained, comments were compiled into one document (total *N* for all six survey summaries =14). Student Surveys of Clinical Experiences from all fourteen sites over the past two years were reviewed and coded for themes related to the research questions. Reviewing the student surveys provided information regarding clinical experiences students valued and what aspects they did not value.

Additionally, students contributed to asynchronous Discussion Boards on Blackboard to supplement their clinical experience and as required assignments for PHB-111's outcomes. Five Discussion Boards are included in this study (See Table L9, Appendix L). The Discussion Boards also collect data on student perception of transferring knowledge-in-use to knowledge-in-waiting and data on student articulation and reflection behaviors. (See Table M10, Appendix M for topics and selection rationale). Student comments were reviewed and coded for themes related to the research questions (*N* for each Discussion Board = 64). In addition to student comments captured in the documents review, students were invited to participate in focus groups, based on the subcategory of their clinical assignment.

Student Focus Groups

A student focus group was conducted with students in each site subgroup. (See Table G8, Appendix G). Patton (2002) explains that ". . . in a focus group, participants get to hear each other's responses and to make additional comments beyond their own original responses as they hear what other people have to say" (p. 386). Additionally, focus groups offer the following advantages: cost-effective data collection; improved data quality as a result of participant interaction; and a forum for

quickly assessing whether a viewpoint is consistently shared or are divergent viewpoints (Patton, 2002, p. 386). Scheduling a focus group so all interested students could participate was a challenge. To provide all interested students an opportunity to participate in the study, individual interviews and written responses to the focus group questions were collected and included in the data corresponding to subgroup. After obtaining participant consent, the students discussed the impact of their internship on learning. Discussions began with this prompt: "Please use one word to describe your clinical experience." Subsequent questions were asked to determine how the students' learning was impacted by the clinical experience. Questions were developed based on the research questions, which were framed by cognitive apprenticeship. (See Table N11, Appendix N) The purpose of collecting student data is to determine what they valued in their clinical experience and what they thought contributed to or detracted from their learning.

Clinical Personnel Focus Groups

The clinical coordinator schedules and supervises student clinical training and collaborates with preceptors to complete student evaluations but usually does not work directly with the students. This researcher conducted one focus group with the clinical coordinators on campus. As with the student participants, scheduling a focus group so all clinical coordinators could participate was a challenge. To provide all clinical coordinators an opportunity to participate in the study, follow-up individual interviews and focus groups were conducted at the sites with coordinators who could not attend the campus focus group. All the coordinators participated (Total $N = 14$). This data reflects the strengths and weaknesses of the experience related to student learning,

from the clinical coordinators' perspective. This researcher also explored how the clinical coordinators select phlebotomists from the phlebotomy team to act as clinical preceptors. Additionally, this researcher used the focus group and interviews to obtain permission from each facility to conduct a focus group with the clinical preceptors. The clinical preceptors are responsible for working directly with the students and supervise student contact with patients. Preceptor qualifications are defined by NAACLS (2008): "Clinical instructors must hold current certification in phlebotomy or clinical laboratory science or have one year of full-time phlebotomy experience" (p. I-3). This researcher conducted focus groups from each clinical site subgroup (Total participant $N = 34$). (See Table O12, Appendix O). The preceptor focus groups explored actions taken to improve or expand student learning and how they select teaching strategies. Questions were developed based on the research questions, which were framed by cognitive apprenticeship. (See Table O12, Appendix O for sample questions).

Observations

In addition to the documents review and focus groups described above, three observations on students assigned to each clinical facility selected by typical case sampling were conducted. (See Table F7, Appendix F and Figure H1, Appendix H). Observations are an effective method of data collection because the researcher can see the phenomenon of interest in a natural setting as well as the context. Observations also allow the researcher to see details that are missed and elements not shared in other data collection procedures (Duggan & Lester, 2006, slide 29). This researcher conducted 72 hours of observation and observed one student at each site on three

separate occasions ($N = 9$). The observations provided an opportunity to witness what occurs in a typical day of clinical internship for phlebotomy students at the beginning (day 5), middle (day 10) and end (day 15) of their 120-hour clinical internships. During the observations, behaviors and environmental factors that impact student learning were documented through descriptive and reflective notes. Observations were reactive, described by Angrosino (2005) as being "... associated with controlled settings and based on the assumption that people being studied are amenable to interacting with the researcher only in response to elements in the research design..." (p. 732). As a peripheral member researcher with an insider's perspective, the researcher did not participate in those activities that constitute the core group of membership (Angrosino, 2005, p. 733). (See Appendix P for field note protocol)

Data Analysis

Data analysis collected during the documents review, focus groups, and observations includes four steps: data organization and transcription; reviewing and coding the data; theme development using the coded data; and data validation. Data was organized by unit of analysis. Patton (2002) explains that, "[w]hen more than one object of study or unit of analysis is included in fieldwork, case studies may be layered and nested within the overall, primary case approach" (p. 298). Each of the following components were considered an individual case: documents review; clinical coordinators; each clinical affiliate subgroup; affiliates selected by typical case sampling; and observations (See Table G8, Appendix G and Figure H1, Appendix H). The collected data was compiled into a Word document for analysis. Audiotapes of focus groups and interviews were transcribed into Microsoft Word documents and

reviewed for accuracy and completeness by the researcher and then by the participants. Field notes taken during observations were compiled into a Microsoft Word document. Once reviewed, the data as Word documents was entered into NVivo, a qualitative data analysis software program produced by QSR International, for analysis.

Case Analysis

Data analysis began with each case. The documents review and clinical coordinator case studies were analyzed first, followed by a within-case analysis of data collected by maximum variation and typical case sampling (See Figure H1, Appendix H). Merriam (1998) described that within case analysis, " ... each case is first treated as a comprehensive case in and of itself. Data are gathered so the researcher can learn as much about contextual variables as possible that might have a bearing on the case" (p. 194). Additionally, sites selected by typical case sampling were analyzed as a separate case. Yin (2003) described a representative or typical case where the "objective is to capture the circumstances and conditions of an everyday or commonplace situation... The lessons learned from the cases are assumed to be informative about the experiences of the average person or institution" (p. 41).

Upon the completion of data analysis for each subgroup, a macro case analysis was completed to make the findings of the units of analysis described above more robust. Merriam (1998) explains "[o]nce analysis of each case is completed, cross-case analysis begins. A qualitative, inductive, multicase study seeks to build abstractions across cases" (p. 194). The method for a cross-case analysis is similar to that used in within-case analysis. Yin (2003) notes that "... the technique does not differ from

other research syntheses – aggregating findings across a series of individual studies" (p. 134). Merriam (1998) concurred:

> Ultimately, cross-case analysis differs little from analysis of data in a single qualitative case study. The level of analysis can result in little more than a unified description across cases; it can lead to categories, themes or typologies that conceptualize the data from all the cases; or it can result in building substantive theory offering an integrated framework covering multiple cases (p. 195).

As described by Yin (2003) and Merriam (1998), the data within each case was analyzed individually and then inductively across cases.

Coding the Data

In theory-driven code development, the researcher develops a theory and then codes data relative to that theory. The encoded data will support, negate, or expand the theory (Boyatsis, 1998). Research findings in the literature review served as the theories for the theory-driven code development used to code and interpret the data in this study. Theories used to code the data for each case included phlebotomy clinical internship experience will increase student knowledge and skill; the role of the clinical preceptor is integral to student learning; and traditional and cognitive apprenticeship frame the methods employed by preceptors improve or expand student learning. Text segments within the data were coded based on the theories listed above.

Codes contributing to the theory of increased student knowledge and skill were comprised of text segments related to the variability of procedural and non-procedural experiences and reality shock. Codes assigned to the preceptor's role in facilitating

student learning included text segments related to positive and negative preceptor characteristics. The conflicted role of the preceptor was explored through comments related to the pace and unpredictability of the environment. Data was also coded based on the six components of cognitive apprenticeship. Once the data was coded within each case study, the data was compiled into themes. Data unrelated to one of the expected themes was coded separately. For example, responses categorized under the codes "changes in instructional practice" and "recommendations for improvement" led to the theme of learning being time and place bound based on learning domains.

Theme Development

Creswell (2005) explained that "[t]hemes (also called categories) are similar codes aggregated together to form a major idea in the database" (p. 239). Within each case, similar codes were aggregated into themes, and the themes were used to generate results of the study. Once data analysis was completed, an analysis of the macro case study was conducted and the results compared. Additionally, data that did not support one of the themes mentioned above was coded using a grounded theory approach. Creswell (2005) described grounded theory as a "systematic, qualitative procedure used to generate a theory that explains ...a process, an action, or interaction about a substantive topic" (p. 396). Grounded theory was used to develop unexpected themes when data could not be assigned to one of the expected themes.

Strengths and Weaknesses

The strengths of this study include an unprecedented, comprehensive examination of the locus of student learning in the clinical environment. Data was collected from three different sets of stakeholders: clinical coordinators, preceptors

and students. Additionally, data was triangulated as a result of three data collection methods: focus groups / interviews, documents review, and field observations. Following data transcription, study participants were asked to review the transcripts for accuracy and completeness. Corrections recommended by study participants, few in number and editorial in nature, were made prior to data analysis.

The results were sent to clinical coordinators for review and comment. Specifically, the clinical coordinators were asked to corroborate the essential facts as presented in the results chapter. One clinical coordinator commented that, "[the results chapter] looks very accurate." Additionally, this was a nested case study composed of several individual cases providing an opportunity to determine if replication of data occurred across case studies. Data replication occurred across cases with surprising consistency. For example, the pervasive use of traditional apprenticeship elements as an instructional tool was strongly evident in all of the case studies. Missing information was also consistently absent across cases. For example, the preceptors in all of the case studies, while highly committed to providing a positive learning environment for the students, did not equate their efforts with student learning and development nor did they seem to understand the vital role they played in the process. This was in direct contrast to the students' and clinical coordinators' perspectives, who clearly and consistently documented the essential role the preceptors played in the students' clinical learning experience. This gap was consistently found across all of the case studies.

Weaknesses of this study include the limited scope of the project. The bounded case was only one program and included just one program of study. Additionally, the

program is a certificate program which is narrow in scope. In spite of the limited scope of the project, the data generated was voluminous and mired in professional cultural artifacts, vocabulary, and jargon which made data analysis very challenging. The challenges associated with data collection and analysis suggest a possible explanation for the lack of studies on preceptor-led clinical learning experiences reported in the literature.

Bias

Because this researcher has worked in the phlebotomy program for more than twenty years, the question of bias must be addressed. When writing the proposal for this study, the forthright nature of program stakeholders was noted. The forthright nature of the study participants was consistently and strongly evident in the data across all of the cases included in the study. Participants gave honest, open, and direct answers to the questions asked during the focus groups and follow-up interviews. They did not change their answers in any way because of relationships. Every interview and focus group ended with, "You have known [the researcher] for at least a year. How much did you adjust your answers as a result of that relationship? In what way"? One clinical coordinator stated, "I didn't – uh-uh. Nope. You'll get similar answers from phlebotomists tomorrow" (Clinical Coordinators, Reference 1, p. 1[1]). Another clinical coordinator stated, "I have not adjusted my answers. If anybody else was sitting here I would tell the same thing. These are all goals we're working on for all of our programs, whether it be Moraine Valley [or another school]. My relationship with [the researcher] didn't have any effect on what I said to her today" (Clinical Coordinators, Reference 1, p. 2). One of the preceptors stated:

[1] Citations are formatted in this manner to maintain confidentiality.

> ... I did not adjust my answers to accommodate [the researcher] or anyone from Moraine Valley. The bottom line is: I am one of the preceptors and even to make better phlebotomists and make even the precepting portion on my end to make it better, you have to be honest. You can't sugar coat it. It is what it is. Even like with you. (Recently Added Case Study, Reference 3, p. 2).

The students responded similarly. One student stated, "... You have known me for a year, and I say what I feel (we both do) and I respect that" (Outpatient Case Study, Reference 1, p. 1). Another student noted:

> ... if I don't give you the accurate information, how can you better the system? One. Two, ... if I can help to make a change then I need to let you know exactly what I experienced. I think that's my way of saying, "Look, I need to put everything out on the table". I could tell you much more, but it's not what you asked. I tried to be as "Say it as I see it". That's the only way we're going to learn. That's the only way things are going to be improved. Just say it as you see it. (Out of District Facilities, Reference 1, p. 2).

Additionally, "In a qualitative research study the investigator is the primary instrument for gathering, and analyzing data ..." (Merriam, 1998, p. 20).

Reflexivity

As the researcher and therefore the research instrument in this study, I must also critically self-reflect and consider how my roles associated with this program affect what I am able to see, hear and understand as an observer and an analyst, a process termed *reflexivity* (Creswell, 2005; Patton, 2002). The standard is to report any personal and professional information that may have affected data collection, analysis,

and interpretation. Patton (2002) identifies four ways an observer can impact the findings of the study (p. 567). They are listed and addressed below:

Predispositions, selective perceptions, and / or biases of the inquirer.

I am a medical technologist and have a unique and expansive history in performing phlebotomy in the clinical setting. Without my in-depth understanding of the profession, I would not have been able to focus on the elements of cognitive apprenticeship because I would have been distracted by the environment. Stake (2005) states, "... when the researcher finds the case obscured, extending into too-distant regions or beyond his or her comprehension... that researcher conceptualizes the case differently" (p. 455). My clinical knowledge allowed me to focus on student learning and limit distractions from the unpredictable, highly variable and fast-paced environment.

Reactions of those in the setting.

In my role as Internship Coordinator of this program, I strive to create a culture of continuous quality improvement and continually engage program stakeholders in conversations related to program improvement. Because of the trust established between the program stakeholders and the researcher, study participants were willing to share their thoughts in an honest, open and direct fashion. Patton (2002) describes: "An I-Thou perspective ... acknowledges the humanity of both self and others and implies relationship, mutuality and genuine dialogue (p. 64). Based on past experiences involving a genuine dialogue resulting in program initiatives leading to positive changes for program stakeholders, study participants trusted me to use

information provided by them to improve the program and specifically clinical education for community college students.

Changes in the field worker.

I was granted a sabbatical, which I planned to use to analyze the data collected for this study. As a result of faculty union leadership changes at the college, the resulting political fall-out required me to withdraw my sabbatical request. Consequently, I conducted data analysis while maintaining my full-time position and providing leadership within my subdivision during a transition that included abrupt and substantial organizational changes. The data collection methods generated 800 pages of data, making data analysis complicated and challenging. I tried to code data even when I was very fatigued, but that resulted in some 'starts and stops' in data analysis. Also, as a result of the organizational changes, I was often forced to delay data analysis because of my work responsibilities. The quality of data analysis was not impacted but it took very long to complete, further complicating an already complicated task.

Researcher incompetence.

I felt well prepared to complete this complex study as a result of my experience with the qualitative research course I completed for this program (ECI 890 - Qualitative Research). When I became overwhelmed with the task of organizing and coding the data, I recognized that limitation and purchased a software program to assist me with those tasks. To insure my skill, I attended several on-line training sessions, which prepared me to use the software effectively. I was honest, open, and direct in reporting the outstanding opportunity for me, as Professor and Internship

Coordinator, in the lack of consistent cognitive development in students during clinical internship, particularly in developing critical thinking skills. My willingness to reveal that deficiency, examine it, and offer potential methods of improving it demonstrates my analytic and innovative approach to the findings of this study and honesty in reporting the results. Because of the personal nature of qualitative data and my personal association with the program studied, a strong ethical framework for the study was defined.

Ethical Protection of Participants

The proposed study was reviewed and approved by the Moraine Valley Community College Human Subjects Review Board and the Old Dominion University Institutional Review Board (see Appendix I). All students, clinical supervisors, and clinical preceptors were invited to participate and informed of the purpose of the qualitative study at the start of data collection using the Research Consent Form (see Appendix J). Focus groups, interviews, and observations were conducted entirely with volunteer participants. To begin the focus group or interview, the Research Consent Form was read and explained to the participants to insure the participants understood the nature of the study at the start of the focus group or interview. Participant consent was obtained and before the focus group or interview began, the participants were reminded participation was voluntary, and they could discontinue participation at any time. Additionally, participants were reminded information obtained in the focus group would remain confidential. One set of preceptors declined to participate in a focus group or individual interviews. Following transcription, each participant was given a transcript of the focus group or interview and invited to review it for accuracy.

Since the transcript included the Research Consent Form and explanation, the participants were reminded again they could withdraw at any point of the study. Observations were conducted at three different sites with permission of the clinical coordinators, preceptors, and students. Consistent with focus group procedures, clinical supervisors, preceptors, and students were reminded participation was voluntary and could be discontinued at any time. One student declined to participate in an observation. Confidentiality of patient identity and health information was formally addressed in the Institutional Agreement of Affiliation and in compliance with the Health Insurance Portability and Accountability Act (HIPAA) and reinforced at the beginning of each observation. Additionally, students were contacted via email to request permission to use their comments on the Discussion Board and in the exit survey as part of this study. (See Appendix J for the Research Consent Form)

Summary

The goal of this study was to determine how internship as a learning experience improves or expands student learning. Research questions about student construction of learning during the internship framed the study. The elements of the nested cases were defined based on participants selected by purposive sampling, maximum variation sampling, and typical case sampling. Data collection was completed using document review, focus groups and interviews, and observation techniques. Data analysis included four steps: data organization and transcription; reviewing and coding the data; theme development using the coded data; and data validation. Data was analyzed individually and then inductively across cases. Ultimately, data results were synthesized into a final, macro case study. The study was validated using the strategies

of member checks, peer examination, and triangulation (Merriam, 1998, p. 204). The study was reviewed and approved by the Moraine Valley Community College Human Subjects Review Board and the Old Dominion University Institutional Research Board and conducted within a strong ethical framework articulated using the Research Consent Form.

CHAPTER 4 - RESULTS

Christina's Story: A Community College Student's Clinical Learning Experience

Christina represents the typical community college student participating in a preceptor-led clinical internship experience. Like most students enrolled in allied health community college programs, she carries significant family and work responsibilities in addition to her academic work load. Christina is an African American single mother, 38 years old with three children, including a special needs daughter. Christina works full-time as a teacher's aide at her youngest daughter's grammar school. She elected to participate in her clinical learning experience during the summer session because her work schedule included the same summer vacation as the students she serves. The schedule allows Christina to complete the 120-clock hour clinical assignment in three 40-hour work weeks of five 8-hour days each while on summer vacation.

Each 8-hour clinical day followed a characteristic pattern beginning very early in the morning, usually at 5:00 a.m. The phlebotomists and students spend the first 15 minutes obtaining their patient assignments, or "stacks" and stocking their phlebotomy trays in preparation for “morning draw", the collection of blood specimens from patients very early in the morning when patients are in basal state. Organization of the work flow and maintaining the pace of the work environment is an ongoing activity and is critically important for morning draw because the results must be available for the physicians when they arrive for their morning patient rounds. Preceptor 1 explained her approach to morning draw to Christina: “We don’t want to rush through, but we have to get the morning draws done. We have 17 people. I’ll do the first half

just to be on time, and you can do the second half". During an episode of down time, two of the phlebotomists shared strategies with Christina for increasing her speed in completing blood collection procedures. Efficiency and expediency are highly respected and prized by the phlebotomy team. The phlebotomists respectfully recognized, "No one on the phlebotomy team is as fast as [Preceptor 1]!". Characteristically, students work with a variety of preceptors and Christina worked with at least nine different preceptors over the course of her clinical learning experience.

Today, Christina is assigned to Preceptor 6. Preceptor 6 personifies typical instructional strategies to improve and expand student learning. She is an African American woman, approximately 50 years old, with at least 15 years of phlebotomy experience. She is patient, knowledgeable, and her demeanor is confident and professional; she is in clear command of the day's tasks. Preceptor 6, like all of the phlebotomists observed at this facility, takes great pride in her work and values efficiency in collecting blood specimens from patients. Preceptor 6 never stops explaining clinical tasks and patient situations to Christina. She also gently and consistently coaches Christina out of her comfort zone, challenging her to try new techniques and attempting increasingly difficult draws, such as using butterfly needles to access smaller veins located in a patient's hand or wrist. Christina and Preceptor 6 worked together to complete the tasks assigned to them, via their stack on morning draw.

Christina and Preceptor 6 are assigned to an inpatient medical surgical care area, commonly referred to as a "med / surg floor". Med / surg floors accommodate

patients with a wide array of diagnoses. The wide spectrum of patient diagnoses and range of patient acuity results in the multiplicity of patient circumstances characterizing the inpatient clinical learning environment. Unlike Preceptor 1, Preceptor 6 does not share with Christina how many patients are in the stack nor is Christina oriented to the level of patient acuity on the floor to which they are assigned. Christina and Preceptor 6 must be prepared to complete the specimen collection procedures requisitioned by the physician in any patient circumstance they encounter at the patient's bedside.

The opportunity to interact with a variety of patients in a diverse set of circumstances, requiring a wide range of blood specimen collections, is the core of the clinical learning experience. Over 24 hours of observation, Christina interacted with 80 patients, mostly African American (54%), and Caucasian (45%), and with a small segment of Hispanic (1%) populations. Patient ages ranged from newborn to 85 years of age, and approximately 56% of the patients encountered were age 65 or older. Seventy-one per cent of patients were female, and 29 percent were male. The opportunity to interact with these patients represents learning that cannot be recreated in college classrooms because patients' circumstances are highly variable and reaction to their circumstances is unpredictable. However, patients are predictably unhappy to see the phlebotomists arrive at their bedside, which was surprising to students. Christina explained: "At school, everyone willingly participates in getting their blood drawn, but in the clinical setting, the patients are not always happy to see the phlebotomists and say things such as 'Oh, no! Not again!'" Christina and Preceptor 6 are not forewarned of the patient circumstances they will encounter until they arrive at

the patient's bedside, when they must assess the patient's clinical circumstances before approaching the patient to complete the specimen collection procedures.

Early in the course of the student's clinical assignment, the preceptors spend considerable time modeling how to interact with patients consistent with patient age, physical limitations, and clinical circumstances while students observe. For example, one preceptor modeled how to approach an unresponsive patient by leaning in and talking directly into the patient's ear using a low voice. As the student became more skilled and confident in approaching patients, the preceptor simply coached her regarding patient circumstances, and the student responded appropriately. To illustrate, one elderly patient was hard of hearing, and the preceptor pointed out, "He has a hearing aid." Christina adjusted her approach, looked the patient in the eye, and nodded in response to his questions. She held up the needle and tubes so the patient understood this was a blood draw and used a thumbs-up gesture to be sure she had the patient's permission to proceed with the invasive portion of the procedure.

The invasive portion of the procedure begins with site selection and is one of the most difficult learning challenges students face during their clinical rotation. The challenges of site selection were described by Christina while pointing to her forearm, wrist, and hand on both arms: "It's different, you know… because in the classroom you kind of get used to the veins and know where they are. Here, you need to hunt for them." Site selection is complicated and restricted by the variety of indwelling lines used to support patient treatment as illustrated by the following coaching exchange. Preceptor 1 said to Christina: "There's an IV in [the patient's] forearm. You can go below the IV or go in the other arm." Coaching segued into scaffolding as Preceptor 1

realized Christina was making the patient anxious by taking too long to locate a vein. She interceded and assisted Christina with efficiently completing site selection. Also, preceptors consistently employ scaffolding and fading to rescue a draw initiated by a student. For instance, Christina and Preceptor 6 were assigned a 75-year old African American female patient who had ports in her right wrist. Christina had difficulty locating the vein in the patient's left antecubital area and asked Preceptor 6 for help. Preceptor 6 suggested using a butterfly in the hand. She palpated the hand vein and showed Christina the site she recommended. Christina palpated and confirmed the direction of the vein with Preceptor 6. Christina inserted the needle in the patient's left hand using the butterfly and was unsuccessful. Preceptor 6 instructed: "Don't come out [with the needle]," donned gloves, and rescued the draw. Following the draw, Christina reflected on her lack of success on the way to the next patient.

While walking to the next patient, Christina initiated the conversation regarding the previous draw. Christina prompted Preceptor 6: "You said that was a funny angle ...". Preceptor 6 nodded and said, "You were a little too deep [with the needle]." Christina clarified, "I was under it [the vein]?". Preceptor 6 confirmed, "Uh-huh". By the end of the clinical learning experience, Christina was making adjustments in procedure to rescue her own draws with minimal preceptor input. To further illustrate, by week three of her clinical rotation, Christina was authorized to collect a blood specimen from a patient while Preceptor 9 was in the same room collecting a different blood specimen. Christina was experiencing trouble with her draw and asked Preceptor 9 to assist. Approximately five seconds later, Preceptor 9 left her patient and went to assist Christina, who had already made the appropriate

adjustment to obtain the specimen. Christina stated she felt more skilled at anchoring a vein and redirecting the needle after a venipuncture to rescue a draw than she was at the beginning of her rotation.

Over the course of Christina's clinical, she developed a unique set of skills that reflected a compilation of techniques learned from her preceptors, including her approach to patients, employing a "tapping" technique to locate a vein, labeling specimen tubes, and intervening immediately and appropriately when an outpatient began to feel faint. Christina also began to grasp the structure of the work flow as evidenced by her ability to articulate work load management and organization. Higher order critical thinking skills used by phlebotomists to confirm physician orders and track work flow to prioritize and manage specimen collection were generally not explained to the student, so learning these tasks was driven primarily by student interest and motivation.

Themes

The thesis for this study is authentic situated clinical learning experience improves and expands student learning. To determine how Christina expanded her knowledge and skill, cognitive apprenticeship is used to frame the study and guide data analysis. Christina significantly expanded her knowledge and skill as a result of her clinical learning experience, evidenced by the increased confidence in her demeanor and success in securing quality blood specimens. She clearly reified and expanded classroom learning. At first glance, the variety of patients in diverse circumstances requiring a range of blood specimen collections in a frenetically paced and unpredictable environment may obscure solid and consistent instructional

practices characteristic of the clinical environment. However, a review of the data generated three themes which informed the research questions.

The first major theme supported the thesis and proved that clinical education improved and expanded learning in phlebotomy students. Three minor themes support the finding about improved and expanded phlebotomy student learning as a result of clinical internship and include: the clinical provides a unique set of learning resources used by preceptors to improve and expand student knowledge, skill, and confidence; preceptors play a crucial role in student learning; and students experienced reality shock as they transitioned from the classroom to the clinical. The second major theme described how the cognitive apprenticeship model supported student learning and included two minor themes. The ordinary minor theme described the traditional apprenticeship model to operationalize situated learning theory. The three basic elements of traditional apprenticeship (modeling / observation, coaching and scaffolding / fading) were consistently applied to student learning in the clinicals. The cognitive apprenticeship model (articulation, reflection, and exploration) is inconsistently applied to student learning in the clinical. The third major but unexpected theme indicated student learning was time and place bound and the locus of student learning was geographically determined based on learning domains. Three unexpected minor themes corresponding to learning domains developed. Student learning in the cognitive domain occurred primarily in the classroom. Student learning in the psychomotor domain initiated in the classroom but was reified and significantly expanded in the clinical to the level of entry level professional. Student learning in the affective domain occurred in the classroom where values clarification and

internalization occurred. Student values learned in the classroom were challenged in the clinical learning environment.

Improved and Expanded Student Learning

Creswell (2005) identifies several types of themes including ordinary and unexpected themes (p. 243). Ordinary themes are expected and the first ordinary theme substantiated the expected result: student participation in a clinical improved and expanded learning. Within this major theme, three minor themes emerged: the clinical is uniquely suited to increasing student knowledge, skill, and confidence consistent with entry level into the profession; preceptors play a crucial role in student development while in clinicals; and students experience reality shock as they transitioned from the classroom into the clinicals. The unique context for student learning is the clinical setting.

The Clinical Setting as Learning Environment.

Student learning was improved and expanded as a result of clinical experience and sufficient time on task. The most crucial aspect of a student's experience was the opportunity to interact with patients. The clinical provides an authentic situated learning environment allowing students to apply classroom knowledge and skills while interacting with patients. Stakeholders acknowledged adequate clinical time was essential because it provided students a wide variety of patient contact and extensive patient interaction. The clinical offers tremendous variability and unpredictability at a fast pace.

The locus of student learning occurred in a variety of patient locations, under the supervision of a variety of preceptors, while interacting with a variety of patients.

Orientation to the environment involved a significant student learning curve and required them to adjust to a multi-faceted physical environment while maintaining the workload in a variety of interpersonal interactions. The clinical coordinators described the clinical learning environment:

> Unfortunately, it's not by the book and it's not scheduled and it never goes the way it's supposed to (Reference 4). ... the other piece is that this is not a controlled environment that we're in. On a given day you don't know if you're going to have 100 patients or if you're going to have 10. (Clinical Coordinators, Reference 2, p. 53).

The coordinators take pride in providing a highly varied clinical experience for students and associate a high degree of variability with a robust learning experience. One clinical coordinator explained her viewpoint:

> . . . as an employer, I would hope that a student has at least, if not drawn a pediatric patient, they've observed. If they haven't drawn an infant, they've at least observed. They're familiar with the things that you have to do that are a little bit different [including] the style, the approach that you would use with a different age group. Otherwise, you think the clinical didn't give enough... You like to take that as the ... base knowledge and expand on it ... (Clinical Coordinators, Reference 2, p. 62).

The preceptors agreed and also equated a varied clinical experience with a robust learning experience. One preceptor described it as follows:

> They get a lot of challenges here... We deal with all types of patients, ICU, ER.... [including] different situations, different issues, dealing with picc

> [peripherally inserted central catheter] lines, drawing above and below IV's, foot sticks. They get quite a bit of experience... You get nursery. We draw babies, newborns out of the arm. We do blood cultures out of newborns. We do arterial line draws up in nursery, which is the nurse, they do that. They [the students] get quite a bit. (Typical Case, Reference 3, p. 70).

The unpredictable and highly variable nature of the clinical served as the fundamental nature of students' education during their clinical experience and as the catalyst for expanding students' learning beyond the boundaries of the classroom.

The fast pace in the clinical laboratory was an essential element contributing to student learning. One clinical coordinator noted: "They're busy, busy, busy - some students come back [to the lab] sweating. One [preceptor] in particular is a power walker!" (Clinical Coordinators, Reference 1, p. 52). A student concurred: "The day you work your eight hours, you get a good workout. If you're working, you're running!" (Typical Case, Reference 7, p. 58). The average distance walked in an eight hour day was 2.5 miles, as documented using a pedometer during the student observations. The fast pace of the clinical laboratory was part of the students' learning curve and may be a difficult adjustment for students.

Student perspective regarding the pace was captured in the documents review case study. One student posted, "[I] did not realize how fast pace [sic] this was trying to meet schedules and deadlines" (Documents Review, Reference 7, p. 8). Another student reacted, "... once I got in clinical, I realized the pressure of having to take all of this blood within a specific amount of time" (Out of District Facilities, Reference 1, p.

32). A preceptor agreed with student assessment of the learning environment and offered this perspective:

> I learned how to draw blood 35 or 40 years ago. It's very fast paced now. In the beginning, they were giving more time to the student to learn how to draw and it was very slow learning but now it is very fast. We expect the student to learn everything as if they have been born with the education. We have to give the student time to learn because everybody doesn't come here with experience. (Outpatient Facilities, Reference 1, p. 3).

The preceptors recognized managing the pace of the clinical environment is a learned behavior.

The preceptors coached students in techniques for efficiently collecting blood specimens, as collected in field notes taken during the observations. One preceptor instructed the student, "We can talk while [the hand held computer patient identification system is] loading" (Observation, Clinical Site 2, Reference 1, p. 2). A second preceptor coached the student: "[We can] save time by moving from patient room to patient room [so we can] draw all of the patients on one side of the hall and then on the other side instead of crisscrossing from one side of the hall to the other" (Observation, Clinical Site 2, Reference 1, p. 62).

This preceptor also demonstrated efficiency of movement by walking extremely fast from one patient room to another. In field notes during an observation, this researcher documented how two staff phlebotomists took advantage of an episode of down time and shared various insights with the student on how to increase speed while performing venipuncture (Observation, Clinical Site 1, Reference 1, p. 16). Fast

and efficient collection of blood specimens was a point of professional pride and a characteristic of professional excellence, as highlighted in Christina's story. Students and preceptors acknowledged the pace of the work may be challenging for students, but low workload volume was perceived by students as an inferior learning experience.

Occasionally, clinical experiences occur during times when the workload is lighter than usual. Students reacted disapprovingly to slowly paced clinicals and equated a heavy workload and wide variety of experiences with a robust clinical. One student commented that "[i]t wasn't as busy and I feel like I missed out on what other people [who] went there [experienced]" (Documents Review, Reference 1, p. 9). Sometimes, external factors reduced the workload which was perceived negatively by students: "[The clinical site] is slow working, but they just lost a big doctors [sic] group ...I've gone 2 hours with two full-time phlebs and no draws, or a full shift were [sic] all together there are only 15 draws" (Documents Review, Reference 9, p. 8). Student learning in the authentic clinical environment was highly variable, framed by patient location and circumstance and driven by an unpredictable workload.

Student learning occurred at the interface of specimen collection and the locus of learning constituted the student's clinical classroom. The location of specimen collection varied because it occurred proximal to the patient and was driven by patient circumstances. Every time a preceptor and a student approached a patient prior to specimen collection, they entered a new learning environment which became the classroom. A clinical coordinator observed that "[w]hen the phlebotomist walks into the room, they [sic] need to look at the whole picture; the patient, the medicine, the

accessibility, and that each time they walk into a room it's different. The same, but different..."(Clinical Coordinators, Reference 2, p. 52). Over the course of a 120-hour clinical, students characteristically completed approximately 200 successful blood collection procedures. Student learning occurred in the equivalent of approximately 200 distinctive classrooms. The preceptors facilitated learning while maintaining the workload and, therefore, played a crucial role in student development, representing the second minor theme related to the improvement and expansion of student learning.

Preceptors as Facilitators of Student Learning.

The results of this study identified the essential contributions of the preceptors to student learning and recognized the preceptors had the greatest impact on the quality of the students' clinical experiences. Like Christina, students worked with a variety of preceptors and all preceptors had their own, unique approach to assigned clinical tasks. Preceptors expected students to adhere to each preceptor's individual approach to clinical responsibilities. This variety in approach presented a tremendous learning curve for the student because the student may be assigned to a wide range of preceptors. This researcher documented three students' interactions with seventeen different preceptors. Working with a variety of preceptors presented both benefits and challenges to student learning.

Variety of preceptors - benefits.

In spite of individualized approaches to phlebotomy tasks, the preceptors' goal was the same: to obtain a quality specimen obtained safely and professionally. One clinical coordinator noted that:

> ...it's important to send [the students] with multiple people throughout their time with you just for the personality aspect and different techniques and things like that. It's good for them to see that because my line that I always say is, 'As long as the end result is the same, from a to z, everybody's going to have their own little personality traits or ways of doing it. But if z is the same, as long as you're not doing anything [against policy]'. (Clinical Coordinators, Reference 1, p. 102).

One of the clinical preceptors concurred:

> ... when I started working, and I got students, I thought you can't go right or left from that straight line. You have to do it the way they said. In the meantime, I learned that no, you can do this a different way, too, if you do it right. But if not – I remember telling them, 'No, don't do that. This is how we do it.' And there actually is a different way if you get the same result. (Recently Added Clinical Facilities, Reference 3, p. 81).

Learning various approaches from different preceptors was value added to the student's experience from the preceptors' perspective. One preceptor explained the value added this way:

> ... [the lead phlebotomist] purposely puts them [students] with different phlebotomists so they can see the different ways each one of us draws, even though we have basically the same technique. There are a little [variations] - someone's right handed someone's left handed. Some holds a baby's foot this way. Someone feels for a vein with this hand better than their right hand. Someone switches with their left instead of their right. I really think we give

> them all the options and all the different things that they can have. (Typical Case, Reference 10, p. 131).

Another advantage of sending students with multiple preceptors was the availability of additional preceptors to reassign students to if there was a personality conflict between a student and a preceptor. One clinical coordinator described the variation in preceptor personalities:

> I think it's real important because just different personalities. You have somebody that's - you know - the go, go, go; push, push, push get it done, get it done, get it done and you send a student with that person and they may come out of it going, 'Oh! This is not my thing!' Then you send them with somebody who has a much more laid back approach and is calmer, then they start to see all the different varieties of just handling different combative residents or difficult sticks. (Clinical Coordinators, Reference 1, p. 102).

Students agreed that seeing a variety of techniques added to their clinical experiences. One student posted that "Ive [sic] been surprised how all the phlebs. ive [sic] worked with, they all have their own techniques but the end result is the same" (Documents Review, Reference 4, p. 104). Another student commented that "I think if the student is with different people they will learn more and ... learn different techniques. There is really no faster way" (Typical Case, Reference 1, p. 72). However, working with a variety of preceptors also presented challenges to student learning.

Variety of preceptors - challenges.

Students described confusion when working with multiple preceptors in every aspect of specimen collection, including selecting, preparing and organizing

equipment, order of draw, and specimen labeling. One student described her confusion:

> ...One of the frustrating things for me when I was at my site was the fact that every day was a new person. For the first week, I would have a new person with a different style and a different way of doing things. She wants you to do it that way because that's 'the way'. By the time you're into your second week, that's the way of the site. By the time you're into your second week, you're confused because you're sitting there and you say, 'OK, I learned the order of draw this way. This is where I'm going to go.' And here somebody goes, 'No! No! No! This is the way you do it here because we use this color and we don't use that color'. ... I remember calling the supervisor and I said to her, 'Why don't we have one or even two of your top senior phlebotomists liaison ... go with the students as they go do their internship?' They [the students] would profit and they would learn more from that. [She said], 'Well, we think you can learn a lot from everyone and you would get a lot out of that.' (Out of District Facilities, Reference 3, p. 80).

Students tried to rely on the equipment, policies, and procedures they learned in the classroom but struggled to reconcile new ideas and techniques presented by the preceptors with classroom techniques:

> ... zip your mouth - that's the way. You would go to do something how you learned at Moraine Valley and you might get corrected on it. 'You should do this. You should do that.' After you're told that, the next day you go in thinking, 'This is the way I should do it' and then that phlebotomist had a

> different way of doing it. It would be, 'This is how you do this'. I would just say, 'OK, I learned this in school [and then] somebody does this. Now you want me to do that'. I would just think it in my head; just go along with what they say. (Typical Case, Reference 6, p. 138).

Student confusion associated with working with multiple but unique preceptors and differences in classroom and clinical protocols was a consistent finding. Clinical preceptors are not specifically hired or trained to serve as preceptors for phlebotomy students, which may add to the confusion and frustration.

Clinical coordinator perspective on the role of preceptors.

Staff phlebotomists who met accreditation standards for clinical instructors were eligible to serve as preceptors. Beyond that basic requirement, selection of preceptors was not criterion based, and the approach was highly variable. One clinical coordinator noted that

> ... we need to find the right people for those one-on-one situations...there are people out there that want to do it and people who do not. A lot of times when you're hired in a laboratory, part of the job - if you are associated with any type of school - is that you will teach. What we find is not everybody wants to... (Clinical Coordinators, Reference 1, p. 102).

Selection of clinical preceptors was often voluntary as described by another clinical coordinator. "Number one is people will volunteer. They will say, 'You know I love working with a student'. They're usually the ones that are the best teachers. That's probably the biggest factor right there is letting them volunteer to be a teacher" (Clinical Coordinators, Reference 2, p. 102).

Sometimes, preceptors are selected in a more strategic fashion as described by a third clinical coordinator:

> That's why also these individuals were picked because I went from the highest of seniority to [Preceptor 3] who is the most sensitive and hands-on to [Preceptor 2], who is the one who will challenge you and push and even if they get afraid and stuff, she's just pulling out the best of them to [Preceptor 7], who is one of the youngest and came from a program and wanted to learn and develop and now sits here precepting .... (Typical Case, Reference 3, p. 131).

As illustrated above, the process for selecting clinical preceptors was highly variable. Moreover, preceptors are not specifically trained to serve phlebotomy students.

The lack of formal training for preceptors may add to confusion and frustration, as identified by the clinical coordinators. Only the clinical coordinator case study directly addressed the lack of training available for clinical preceptors. One clinical coordinator noted,

> ... my [approach] to clinical [precepting] ...was based ... on my recollection of what my clinicals were like way back in the day. Things have changed a lot since then and I am aware of that. It would be nice if there was somebody who could give us some guidelines to go by. I think that would help a great deal. Some pointers - maybe stuff you learn from other facilities that do clinical trainings. (Clinical Coordinators, Reference 2, p. 99).

Another clinical coordinator concurred,

> I think it might be helpful, and I don't exactly know how we would go about doing this ... If a preceptor class or workshop could be held for them ... I can

> tell them from my experience that it might be helpful for something like that and also to go over our review with them-how to be a preceptor. What are some tips? What are some techniques? Because basically they have not had any experience with that. It's just you have a student assigned to you and these are the expectations. I think some type of two or three hour internship program, workshop, or in-service would be good for them. (Clinical Coordinators, Reference 2, p. 98).

In spite of no formal selection or training for the role, the clinical coordinators praised and acknowledged the importance of the preceptors' work with students.

The clinical coordinators appreciated the efforts the preceptors made on behalf of the students. One clinical coordinator acknowledged the preceptors' efforts to insure a quality learning experience for students and described the preceptors' autonomy in guiding students:

> I have seen the preceptors here actually showing the students, in many cases, more than they really need to know. I think they do that because they know that the students have an interest in what occurs in the laboratory ... beyond the actual phlebotomy experience. For instance, one of the things that they may show them is our specimen processing area, where we get specimens ready to send out to reference labs.... (Clinical Coordinators, Reference 1, p. 72).

Another clinical coordinator acknowledged the lack of recognition for phlebotomists in general and preceptors in particular and described an approach recently implemented at her facility:

> ... we have to get it across in clinicals how important it [being a phlebotomist] is... We ... are starting to adapt [Quint Studer's] philosophy... the five fundamentals of service which ...have an acronym, ... AIDET... it stands for acknowledge, introduce, duration, explanation, and thank you... We're teaching ...these five fundamentals of service because we want the phlebotomist to not only use the customer service, but we want them to realize how important they are .... (Clinical Coordinators, Reference 1, p.8).

The clinical coordinators recognized the challenges for preceptors as they worked diligently to provide clinical education to phlebotomy students and appreciated their efforts, a viewpoint shared by the students.

Student perspective on the role of preceptors.

Like the clinical coordinators, students recognized the essential role preceptors played in the improvement and expansion of student knowledge and skill as a result of the clinical experience. The students appreciated the knowledge, skill, and speed of the preceptors and recognized professional interaction with patients required skill and insight as one student described: "... I could not ask for a better worker to train me. She is excellent at her job and takes it very seriously. She is also wonderful with the patients" (Documents Review, Reference 1, p. 106). The pivotal role of the preceptor in expansion of student learning was described by another student:

> ... because [the preceptor] can either make that person or break that person. You can either have [the students] come out of here screaming and crying because some people have that kind of personality where they are intimidating and intimidation doesn't really open anyone up. If they're scared, they might

> end up doing something, let's say in phlebotomy, if they're in there by themselves or taking blood they might be too scared to ask and they're going to do something and miss a test because they're too afraid to ask. (Outpatient Facilities, Reference 7, p. 60).

Moreover, students appreciated preceptors who were patient and understanding. One student described it in this manner:

> The phleb's [sic] were extremly [sic] patient and helpful. These ladies had all worked there for 20+ years. One in particular had taught phlebotomy and helped me a great deal. I watched this woman draw from a three month old like it was nothing. I knew I could learn a lot from her. She also did a heel stick on a three day old and collect the specimen as if it was as easy as changing a diaper. (Documents Review, Reference 10, p. 94).

Students appreciated feeling welcomed and encouraged as described below:

> Everyone that works in the hospital was very nice (all departments.) ... I felt very comfortable with everyone and I was made to feel like I belonged on the team and was not just a visitor. Everyone had patience with me and I felt at ease the first day. ... is a good place to do clinicals because most of the people on the second shift were once students at Moraine and remembered what it was like to be a student.... (Documents Review, Reference 21, p. 95).

The clinical coordinators and students clearly acknowledged and appreciated the critical role the preceptors play in improving and expanding student learning. However, the preceptors did not recognize or articulate the impact of their actions on student learning.

Clinical preceptor perspective on their role as preceptors.

The complete absence of preceptor comments regarding the impact of their efforts on student learning was remarkable. The preceptors seemed to consider the students guests on their daily journey to complete the workload. Most preceptors were gracious hosts, who generously shared their time, talents, and hard earned knowledge with students, but they did not associate the impact of those efforts with student achievement of learning objectives defined for the experience. When clinical preceptors were asked why the clinical learning experience was scheduled and organized the way it was, most preceptors could not provide any rationale and some guessed at possible explanations. One preceptor stated, "I'm not really sure about the hours or the sticks because I trained a long time ago and that wasn't required. I think sometimes ... with the hours and stuff ... is probably just a state guideline" (Typical Case, Reference 1, p. 5). The preceptors acknowledged the additional work load associated with teaching students, but they did not correlate their efforts with student development into entry level professionals or the pivotal role they played in facilitating that development.

Preceptors were asked to provide one-word descriptors to characterize providing clinical education to phlebotomy students. The most frequent responses characterized the experience as challenging, frustrating, and time consuming. Several preceptors described the teaching experience as hard work. One preceptor commented, "It can be very tiring when you start with a new student that's never been in a hospital setting before and they're doing their clinicals for the first time". Another observed, "At times it's a little bit frustrating with things that we have going on in the lab ...". A

different preceptor characterized working with the students as cumbersome and still another preceptor explained, "You have to be patient... and let them finish and then deal with what they didn't do right". As indicated by the preceptors' comments, teaching a student while managing the patient workload is complicated, but preceptors characterized the experience positively.

Preceptors described the experience of working with students as fulfilling. One preceptor elaborated, "It's fulfilling - teaching, showing, sharing. Sharing my experience and I've been doing this for 19 years" (Nontraditional Scheduling Facilities, Reference 4, p. 31). Another preceptor stated, "I love to be able to train new students and ... give them the knowledge that was passed on to me and be able to pass it on to them" (Outpatient Facilities, Reference 1, p. 19). Other positive adjectives used by preceptors include exciting, interesting, great, and positive. Several preceptors characterized the experience as educational, but applied it to themselves as well as the student. One preceptor stated, "There are so many words I could use [to describe the experience]. One word - I think it's learning - on both sides!" (Recently Added Clinical Facilities, Reference 1, p. 23). Some of the most challenging aspects of student learning, facilitated by the preceptors, is bridging the gap between the classroom and clinical learning experience.

Reality Shock

Students experienced reality shock as a result of the gap between classroom and clinical learning. When students approached patients, they immediately recognized a gap in their knowledge and skill. Additionally, students were surprised at the level of patient acuity. The majority of time spent with a patient during blood

collection was devoted to patient approach and site selection. The uniqueness of these experiences based on the patients' acuity and the amount of time required to complete these tasks created reality shock in students.

Patient approachability.

A significant portion of the time students spend in clinical is devoted to patient interaction. One coordinator estimated 60 percent of the collection procedure is dedicated to patient interaction, making it a significant component of the daily work load. The level of patient cooperation students encountered was significantly different from the cooperation they enjoyed with their classmates. As one clinical coordinator observed,

> Is there a gap? It's like about an ocean! It's about like from Chicago to Alaska! For one thing, ... in the classroom setting is that everybody's there to learn. Everybody's helping. No one there is sick ... everyone has the ability to straighten out their arm. Everyone has the ability to follow verbal commands. "Can you make a fist? You can relax your hand". When you come into the real world patients may not be able to hear. You're talking, they're not following. I've seen students stare like, "What do I do?".... (Typical Case, Reference 1, p. 91).

A preceptor described the gap between school and clinical this way:

> You'll have a patient that's combative. You'll have a patient in restraints. You could have police in the hallway. Patients handcuffed. You run into so much. Run into patients who tell you that you can't draw their blood because they're afraid of the aliens (Recently Added Clinical Facilities, Reference 8, p. 37).

Student reaction to uncooperative patients was described by one clinical coordinator:

> ... sometimes [the students are] taken back because the arm talks back. The patient passes out and also becomes uncomfortable with you taking a long time because of your own insecurities and lack of experience. I think that sometimes it surprises [the students] that somebody could actually be mean to them and say, 'I don't want you'. They don't get that at school ... They are all there for the same purpose and want the same thing so nobody says, 'No!' to anybody else. I think that's a big deal, especially to the younger people .... (Clinical Coordinators, Reference 5, p. 58).

Moreover, patients are in the hospital because they are ill, and people are not always at their best during those circumstances, as one preceptor described, "... I think [the students are] a little surprised that when people are sick they can be kind of crabby. Their disposition isn't always the best. [The students] can be surprised by that, too" (Recently Added Clinical Facilities, Reference 2, p. 39). Another preceptor recognized that students will encounter, "... different emotions, confused patients, happy patients, angry patients" (Typical Case, Reference 3, p. 66). In addition, patients exhibited a variety of reactions to illness and hospitalization. One clinical coordinator expanded on the point:

> ... not to mention the whole personality perspective dealing with patients, somebody who doesn't speak English and there's nobody to translate. Trying to find a way to put them at ease to have this done. There's just so much ... being out there with the real human beings and different human beings is ... there are not enough books in the world that could prepare you for that. Watch

> a mom pass out while she's holding little Johnny and you're trying to get his blood! (Clinical Coordinators, Reference 9, p. 59).

Raising students' awareness about patient circumstances, emotions, and attitudes as well as teaching critical thinking skills to process all of the environmental cues was daunting. A preceptor described her strategy for assisting students with patient approach:

> What do I do to help ... Asking the students to pay attention to signs posted up on the bed. If it says that the patient is hard of hearing then maybe you need to lean in a little. If it says that this person is blind, you need to tell them everything you are doing. Who you are, where you're from, what you're going to do because they may not see but they hear. When they feel this tourniquet on their arm, "I'm placing the tourniquet on your arm. I'm going to look at your name band". In the classroom, you don't get that. This is a big gap and it is a major adjustment. (Typical Case, Reference 6, p. 8).

Critical thinking skills are necessary during the patient approach to assess the patient's situation and decide on the best way to proceed with the blood collection while taking into account the patient's medical history and other restrictions. One preceptor explained it this way:

> Of course, you're going to find out the person's medical history. If the person's diabetic, you're definitely not going to stick in the foot. This is something that you tell the student that is not atypical. There are instances where you have to draw wherever there's a vein - if a patient has had a mastectomy, you definitely never draw from that area without permission from a physician.

> Sometimes we have patients that are here that our clintecs [A job title specific to this facility; duties include starting IVs] do an I.V. start on. You're definitely not going to draw above that area. Patients that have had lymph nodes removed. You're not going to draw that area at all. (Out of District Facilities, Reference 5, p. 36).

The descriptions of patient interactions described by coordinators and preceptors were documented in the observations.

During the observations this researcher noted that patient comments to the students were consistent with the clinical coordinators and preceptors' descriptions. Patients commonly referred to the phlebotomists as "vampires" and regularly made complaints about the frequency of having their blood drawn. For example, one patient greeted the phlebotomists with the statement, "OK, this is startin' to get crazy now. This is about the sixth time [the patient had blood drawn]" (Observation, Clinical Site 2, Reference 9, p. 13). Another patient commented, "I hate having my blood drawn. I hate doctors, tests, everything. I have no veins" (Observation, Clinical Site 3, Reference 3, p. 14). In addition to dealing with unwelcoming comments from patients, students were required to approach patients within the context of the patient's clinical condition, which oftentimes was quite grave.

Patient acuity.

The inpatients students encountered during their clinicals were frequently seriously or critically ill. One of the clinical coordinators observed that

> ... [the students] get up to floors ... that's when they realize how bad that patient really is and then they see [what] the phlebotomist has to do to retrieve that

> blood, to get that result from that patient. I think by seeing this, this is when they get a better understanding of what it's really like... (Clinical Coordinators, Reference 1, p. 60).

The preceptors described student surprise at the severity of some of the patients' illnesses and the ability of the preceptors to obtain blood specimens from critically ill patients. One preceptor reiterated the difference between the experience students had in the classroom and the reality of drawing on critically ill patients:

> ... When you're doing your class at the school, you're basically limited to the same people and those are the same people you're sticking. You're really not getting much of a variety. There's just going to be maybe a small handful of people that are going to be a little difficult to draw. When you come to the clinical at the hospital, the variety of patients that you meet from big veins, little veins, no veins, dialysis patients-very hard to get or the children are amazing for them. The fact that we stick these children, and we get them in the arm or leg or the foot or the finger, that part is something. [It] puzzles [the students] how we're able to do that. Yeah, the gap is basically the amount of people that we stick per day, the type of people we stick every day. Stuff like that. (Out of District Facilities, Reference 3, p. 36).

Student reaction to patient acuity verifies the comments of the clinical coordinators and preceptors.

The students described the impact of interacting with critically ill patients. One student stated, "Like I said, as a whole, I was pretty happy. It's just not like it is in school. You have sick patients, very sick. Their bodies, they're destroyed" (Typical

Case Sampling, Reference 2, p. 98). Another student described the emotional impact of the reality of situations she encountered:

> ... I would think more about, not so much about what I did and how I palpated for the vein or anything, but just about the patients I saw. If in the ER we saw a 16 year old boy and he cut off his fingers or something. That would be what I would be thinking. Those things are more out there. It was usually the ER. Stuff was happening there. People going crazy. Police officers have to come in. Obviously compared to palpating, that caught my eye. I would go home and be like, 'Wow! This really happened'! If I had a patient that I had to draw that was chained to a bed I was like, 'Whoa, this is not TV. This is real. This stuff happens. He's probably going to jail after this'. It was stuff like that that was really eye opening. (Nontraditional Scheduling Facilities, Reference 3, p. 65).

A different student described one particularly disturbing patient scenario she encountered:

> There was a ... young girl that was brought in, 20 years old. I don't know what happened to her. My guess would be she was in some kind of an accident. Her eyes were moving. They were running some test on her. I have no idea what these tests were. All this equipment around her. All these tubes. The woman I was with had to do an ABG on her. I just stood there and watched and looked up and I saw her face. She was beautiful. Just beautiful. I couldn't look her in the eye. I thought to myself, 'God! You're 19 years old, 20 years old. What happened to you? Where's your family'? .... this young girl, I thought, 'Is she going to live'? It's a rude awakening. (Typical Case, Reference 5, p. 98).

The serious level of patient acuity and the importance of laboratory results needed to manage critically ill patients was another element of reality shock for students.

Student impact on patient care.

One clinical preceptor described the phlebotomist's role this way, "We may not necessarily write the book, but we start the chapter" (Typical Case, Reference 6, p. 114). "Starting the chapter" was a scary reality for most students. In the classroom, specimens collected by students are discarded, which obviously does not have an impact on laboratory results and by extension patient care. One clinical preceptor described the disconnect this way:

> ...they're [students] working with real patients and not fellow students in a classroom or family member, but they're actually on site. The specimen that they draw is not going to be thrown in the garbage like in the classroom, but it is actually going to the laboratory. It's actually being analyzed. Those results are actually going to a physician and treating the patient. (Typical Case, Reference 2, p. 92).

A student concurred and described her reaction: "That was scary because ... that's the person's life you're dealing with that you have in your hands. To me, it was scary. It was different" (Nontraditional Scheduling, Reference 2, p. 65). A clinical preceptor expressed how students make the connection between specimen collection and patient care:

> I think for the first time they [the students] realize ..., 'Wow! What I'm doing is really important because look at how sick these people are and we give the doctor the results so they can treat these people and how important it is to be

> accurate'... they suddenly realize - WOW! (Recently Added Clinical Facilities, Reference 4, p. 56).

Once the students realized the connection between the specimens and patient care, the values internalized in the classroom regarding specimen collection were challenged, thus presenting an opportunity to use higher order cognitive skills.

Procedural variation - classroom vs. clinical.

Students were reluctant to deviate from classroom procedures and more specifically, "the book", which caused frustration for the clinical coordinators and preceptors. One clinical coordinator described it this way:

> The issues we've seen is [sic] students come sometimes and they get concerned when a procedure is not exactly done like it is in the textbook. It's not that there's anything wrong with the method that we're using. It's just that in the clinical setting a lot of times, this is how you do things. I think that's the biggest hurdle for some of them. They say it's not exactly like it was in the book. When you're actually in a clinical practice, things are handled a little bit differently and even differently between phlebotomists. It's not that something is being done wrong, it's just, their well, competency. It's just a matter of how they do things. (Clinical Coordinators, Reference 1,p. 65).

The preceptors were not as gentle: "Sometimes when you are in school you learn a theory, but when you get out in the real world you can throw the book away" (Recently Added Clinical Facilities, Reference 3, p. 56). Another preceptor described the clinical urgency of physician-ordered laboratory analyses and the importance of being able to adapt:

> ... Phlebotomy is [that] you're constantly adapting to a situation. Every room you go into creates a new situation and you have to be able to adapt. You have to be able to make the best of any situation and if you can't adapt, that's where they're [the students] having a hard time. There's nothing wrong because they've been taught this in school. This has been drilled in their heads for, what's a semester? 16 weeks or whatever. Then they come and spend the day in the hospital and they're being told to adapt to things that they never thought would be possible. It's almost like the classroom and the work force-they have to be closer together ... The books are always going to be on the safest end of everything. The reality is that doctor needs a blood test ... he needs it now and he's not going to worry if you're going into a bruised area or not. That's not going to make a difference because someone's life might be on the line right there and then. (Typical Case, Reference 1, p. 75).

Another preceptor provided some specific examples of the appropriate alterations to standard procedure and the rationale:

> If one patient wants one arm over another arm, it's ok as long as there's no IVs and there's no procedural things being done. Finger sticks, the patient wants this finger. The book says this finger is the best preferred, but the patient is insisting on this. I give them these different scenarios and to let them see that yes, the book says this. Yes, this is what is preferred, but you need to also listen to the patient. They might be a diabetic. They might have had so many sticks in that finger that it's so tender. It's ok. You've collected your specimen. You've left with a satisfied customer and yet you collected a good, useable,

> quality specimen for analysis for results for the doctor. (Typical Case, Reference 1, p. 73).

Student response to the directive to "throw the book away" or to "forget what you learned in class" was confusion and anxiety producing. Perhaps the aspect of phlebotomy that caused the most confusion among the students was the order of draw. One of the students expressed her confusion:

> Every phlebotomist has their [sic] own unique way of doing order of draws and what not. In the ER most of the patients only had maybe the order, the patient's order was only for CBC [Complete Blood Count] and maybe like another test where most of the phlebotomists there would do every color tube because they're like, 'This patient is most likely going to be admitted. They're going to want to do more tests'. They were like, 'We don't want to have to draw the patient again so we'll have extra tubes on the side'. I thought that was a nice idea but I didn't know if that was actually-maybe it's more money or it would cost more. I don't know. (Recently Added Clinical Facilities, Reference 2, p. 86).

The preceptors also acknowledged the confusion regarding order of draw, and one gave a common example:

> ... if the patient is a harder stick, we don't follow the tubes like which color is coming next with the additive. We follow whatever is on the label [requisition] ... We try to explain to the student, it's not always you have to follow the rules... ER doctor request is first before order of draw for multiple tube collection. This is just for hard stick patients so you don't have to stick them

> again. You try to get whatever we [sic] need first before the other. And sometimes it may confuse the students a little bit. (Recently Added Clinical Facilities, Reference 1, p. 45).

During observations, this researcher did not witness a single instance of explanation to students such as those cited above. Moreover, it does not appear explanations are consistently provided to students because there was a tremendous amount of confusion surrounding this protocol. One student described the direction she received contradictory to what she learned in the classroom:

> Order of draw, they pay no attention to that. I did multiple draws on a couple patients and I automatically lined up my tubes in the proper order. [The preceptor asked], 'What are you doing? You're taking up time'! I said, 'I know... this one first, this one second'. [The preceptor responded], 'You don't have to pay any attention to that. Those are all these little things'! Is it important or is it not? (Typical Case, Reference 1, p.79).

Still another student expressed her anxiety when classroom protocols were not followed in the clinical setting:

> I think about - not also what I do wrong - but what my coworkers did wrong sometimes. The order of draw. I would just keep thinking to myself, 'Oh my God! What if this patient was dying and somehow it messed up the results'? It was just stuff that bothered me and I knew they were wrong. I just kept thinking how to correct them. Obviously, you're a student you really can't do much. (Nontraditional Scheduling Facilities, Reference 3, p. 83).

A different student insisted on performing the order of draw the way she learned in the classroom:

> ... there's an order of draw and I follow it. When I was there [at the clinical site] they really never followed the order of draw. They're like, 'Oh no, it depends on the test and we know what test it is'. I was like, 'OK'. Then I had a situation where she told me to use one of the tubes before the other. I was like, 'It's ok. How about I do it my way'? She's like, 'OK, if you want to keep learning the order of draw, if you feel comfortable go ahead'. Thank God they let me do that! (Nontraditional Scheduling Facilities, Reference 5, p. 53).

As highlighted above, student reality shock occurred as a result of a gap in knowledge and skill as they transitioned from the classroom to the clinical. A theoretical framework to structure student learning in the clinical was not clearly articulated and higher order thinking skills associated with rationale for deviating from standard protocols did not appear to be addressed in a systematic manner.

Cognitive Apprenticeship

The second major theme described how cognitive apprenticeship supported student construction of learning during the clinical learning experience. Two minor themes described the use of cognitive apprenticeship to operationalize situated learning theory and included the components of traditional apprenticeship (modeling / observation, coaching, and scaffolding / fading) were consistently applied to construct student learning experiences in the clinical learning environment, and elements of cognitive apprenticeship (articulation, reflection, and exploration) were inconsistently applied to construct student learning in the clinical setting. As expected, the traditional

apprenticeship was strongly evident in the data, but with surprising consistency. In contrast, cognitive apprenticeship was inconsistently applied and in evidence only in response to assignments made by college faculty.

Traditional Apprenticeship

Traditional apprenticeship is task-oriented. The efforts of the clinical preceptors are focused on completing the work of the phlebotomy department while concurrently providing clinical training to students. The students learned tasks through activities involving observation, coaching, and the scaffolding and fading dichotomy. Through the authentic situated learning experience, students observed the contribution of clinical laboratory professionals to patient care and developed a conceptual model of the workflow in the clinical laboratory and the role of the phlebotomist within that context. Through observation, students also absorbed the culture of the facility to which they were assigned. Preceptors coached phlebotomy students using directives and heuristic strategies or "tricks of the trade" for completing various tasks assigned to phlebotomists. For example, Christina described "tricks that I'm learning" such as "withdrawing the needle a little bit brings blood into tube". Initially, students required tremendous support from their clinical preceptors; e.g., scaffolding. The support of the preceptor faded as the student's skill developed and they became more autonomous in completing clinical tasks and duties. Strong evidence across all of the case studies documented preceptors employed modeling / observation, coaching, and scaffolding and fading to assist community college students to construct learning while in the clinical situated learning environment.

Modeling / Observation.

Modeling / observation was consistently and commonly practiced and often articulated as a teaching method employed by preceptors. As highlighted in Christina's story involving interactions with deaf patients, student clinical experience usually began with observation as the preceptors modeled behaviors and techniques. As one student described it, "I only observed the first two days" (Documents Review, Reference 3, p. 69). Another student also noted, "... I spent the day in outpatient lab where I observed for the first two hours" (Documents Review, Reference 2, p. 68). Initially, students observed the preceptors' approach to the patients. One of the preceptors described the situation:

> ...we have to tell them [the students] to watch us when we talk to the patient. They have to learn there are certain manners for us when the patient comes to register in the reception area, so we watch the receptionist on to communicate with the patient so they have to learn how they talk to the patient. They have to learn the technique ... Then, when you take them in [to the draw station], that's a different talk. Then you tell the patient that you have to have a blood test and you tell them what you are going to do so that patient has some comfort and confidence in that phlebotomist. So they have to learn the technique of how to talk to the patient and build that technique – that's how they learn. (Outpatient Facilities, Reference 3, p. 49).

In addition to observing patient approach strategies, students observed the preceptor's technique in performing blood collection procedures. Often student observations are

accompanied by coaching: the preceptors' descriptions of procedures employed at the facility. One clinical coordinator described the situation:

> ...[explanations occur] pretty much all the time. We have certain practices. For example, when we go into ICC [Intensive Coronary Care], CVU [Cardiovascular Unit] we always check with the nurse. We always double check in case they are adding something or there is something else going on in there. As you are working along there are things, small things, like blood culture bottles on this floor are always in this supply room and this is where you find this and ice is over here. I think it's constant dialogue really. Maybe in behavioral health or PEDS, OB, nursery, there might be where you get buzzed in or buzzed out. There's just certain things and we explain that. Why this is a controlled environment. This is secure area. When I think about it, going up the elevator you are telling them things .... (Clinical Coordinators, Reference 2, p. 90).

Preceptor descriptions of the observation phase also included a description of the modeling performed by preceptors and the coaching that often occurred simultaneously. One preceptor described,

> ...When I first have the student for the first few days, I do everything. I don't really let them stick. I'll show them the veins that I'm going to use, and the tube. I'll prep the site and everything else. I'll explain to them what I'm doing and everything. ... I teach to my fullest ability the way that I do all my sticks. As far as the pediatric sticks, when I stick a baby my preferred way - and the way I've always done it - is syringe with a butterfly and then I try to get them

> to the tubes from there ... the fact that you're not always going to get that full tube. Sometimes instead of getting 3mLs you're going to get 2mLs in this tube and not enough chemistry in this tube. Especially, tiny babies with veins can't handle the suction of the tubes so when I do teach a student how to do it, I always show them use a syringe and then that explains a lot. (Nontraditional Scheduling Facilities, Reference 2, p. 77).

The preceptors structured the students' learning experiences which began in most instances with observation accompanied by copious amounts of coaching. The students also recognized the powerful impact of the modeling / observation phase.

Students were characteristically allowed to observe until they felt confident enough to begin blood collection procedures. During data collection, this researcher asked students what they did to promote their own learning, and one student replied, "Simply observed my preceptor" (Out of District Facilities, Reference 1, p. 68). Another student provided a more detailed description:

> I always watched, always. If I wasn't drawing, I was watching. Just the way they opened the gauze and alcohol together to save time. How they took down the bars on the beds, make sure everything was put back. There's a lot more than just going in there and sticking somebody ... I went back inside the lab and looked around there. Got to look through a microscope. (Nontraditional Scheduling Facilities, Reference 1, p. 77).

In addition to observing, students often assumed responsibility for their own learning by asking questions. Another student described the process:

> I pretty much paid attention. Paid attention to everything they were doing. Trying to memorize what I learned. I ask a lot of questions. I ask everything. How do I use the computer? How do I do this? How do I assess a patient? How do I make sure the patient is not double drawn or drawn on time? In my down time I would say, 'Hey help me with the computer here. I want to know how to get it to the system and know who's when. Who's a stat? In what order do we go to? Do we go to ER first or do we do stat right away'? I would ask them all these questions. They would say, 'Why do you ask me all these questions? You're only going to be in [for 3 weeks]'? I want to know ... I did ask tons and tons of questions. (Out of District Facilities, Reference 5, p. 69).

By observing laboratory processes and procedures, the student developed a conceptual model of the laboratory function and the role specimen collection played in the laboratory workload and consequently delivering quality patient care. Students had the opportunity to observe laboratory processes and procedures during down time.

Observation and down time.

Down time is student presence when they were not actively participating in clinical tasks or activities. However, down time may be a misnomer, as explained by one of the clinical preceptors: "Even then [during down time], they're learning what departments to take samples to, different things like that. I don't know if that can even be considered down time because they're still learning different departments, what tests are what" (Typical Case, Reference 2, p. 27). The clinical coordinators, clinical preceptors, and students indicated down time was rare, but they recognized it often

occurred at certain times of the day, specifically in the late morning (8:00 a.m. or later) and in the afternoon.

Down time was described by one student: "Depending on what time I started, if I started at 5 a.m. it was usually pretty busy, but then a few times I started at 8 a.m., so I did have quite a bit of down time" (Nontraditional Scheduling Facilities, Reference 2, p. 20). Another student stated, "I really never had down time" (Out of District Facilities, Reference 2, p. 17). Still another student succinctly stated, "... down time - you can't pin point when it's going to happen" (Recently Added Clinical Facilities, Reference 3, p. 17). The availability of down time is highly unpredictable and somewhat variable, but was used to contribute to student learning.

Instructional strategies employed during down time included observation of specimen processing and delivery to the clinical laboratory departments, review of the procedure manual, and a debriefing session with the student and preceptors, all of which were witnessed during student observations and documented in field notes. One clinical coordinator observed:

> There are times where they [the students] will just sit with the rest of the group and discuss things as far as theories. Or a lot of times, the students will ask questions [about] what they see and what the phlebotomists do or they don't do. It does open up kind of a defragging moment for all of them. (Clinical Coordinators, Reference 2, p. 24).

A student described, "Sometimes I picked other phlebotomists' brains, everything from their first experiences to tricks of the trade" (Outpatient Facilities Reference 1, p. 11). Occasionally, during down time, the phlebotomists provided

students with an opportunity to review and practice such low volume phlebotomy techniques as blood smear preparation and heel sticks. The preceptors and students also took advantage of down time to document student progress using the student's clinical evaluation and identified tasks specified on the clinical evaluation the students had not completed. Observation was a powerful and widespread instructional practice providing students with a conceptual framework for collection techniques in the clinical setting and a perception of the role of the clinical laboratory in delivering patient care. Student skill was advanced by preceptors who used coaching strategies to assist students with successful collection of patient specimens.

Coaching.

Like the instructional practice of preceptor modeling and student observation, the term coaching was rarely articulated specifically by coordinators and preceptors as an instructional strategy even though it was widely employed across all of the case studies. As noted in Christina's story, the preceptors never stopped explaining clinical tasks and patient situations to the students. Two types of coaching were evident. The first type of coaching involved instruction, when preceptors simply directed students what to do in a particular instance. The second type of coaching involved heuristic strategies used by the preceptors to complete phlebotomy tasks. The preceptors were remarkably generous in sharing their hard-earned knowledge and "tricks of the trade" with the students regarding effective strategies in completing phlebotomy tasks while working in the clinical environment, uniformly characterized as the "real world." Many of the coaching strategies discussed by study participants were presented within the context of specimen collection procedures, and spanned the steps in the standard

blood specimen collection procedure: patient approach, select, prepare and organize equipment, site selection, needle/lancet insertion, collection of specimen, specimen labeling and transport, and safety and infection control. Coaching strategies employed by preceptors involving the site selection step are highlighted below. Also, the clinical experience is often highly charged emotionally for students and preceptors also coach students through managing their emotions, also highlighted below.

Coaching site selection.

The preceptors coached students in the selection of sites for venipuncture; one clinical preceptor described it:

> I'll let them pick a vein and if it's something I feel isn't a good vein, then I'll tell them, 'I would not go there if I were doing a stick'. I'll explain to them 'that vein isn't a good vein'. (Nontraditional Scheduling Facilities, Reference 3, p. 73).

Sometimes the preceptors and students did not agree on a venipuncture site, but the preceptor allowed the student to take the lead as part of the learning curve. One preceptor explained that

> If I have a student in the room with the patient and ... they will say to you, 'Well I feel I want to go to this vein'. I don't contradict them because eventually they are going to be on their own. I will let them do the vein. I felt that maybe the other vein would have been better but they said, 'No I'm comfortable with this one'. I let them do the stick but they missed it. It's a learning technique and it gives them the experience to see that just because you

> think it looks good doesn't always necessarily mean it is.... (Recently Added Clinical Facilities, Reference 3, p. 79).

In addition to providing direction and opportunities for learning by trial and error, preceptors also generously shared heuristic strategies for site selection as described by one preceptor: "Maybe someone [a patient] is retaining a lot of fluids and then they [the students] feel that they can't find anything. I would show them little techniques where if you hold the skin down, that vein will be there" (Nontraditional Scheduling Facilities, Reference 2, p. 72). Another preceptor described it this way:

> Then, when they are ready to go stick the patient ... we can always show them, 'OK, you can hold this vein this way'. Just give them our experience ... because they never saw this before. When the student is with me, I am always trying to tell the student, 'Just try this way ... maybe it is more comfortable for you to hold the needle this way'. Each person has a different way to do it but just try to point them to find the best way for the student. (Recently Added Clinical Facilities, Reference 2, P. 60).

From the student's perspective, it was a powerful learning experience to follow a preceptor's suggestion or heuristic strategy, as described by one student:

> ... From experience you should use touch ... look away ... to the side don't make it obvious by closing [your] eyes. Anyways you would be surprised that you more often than not cannot see the vein. Also just because you see the vein does not mean you will get blood" (Documents Review, Reference 1, p. 10).

Another student explained,

> ... I would really listen to what they would say. Go back out in hall when we were done and say, 'You told me to do this and I thought I was doing it. Why didn't I get the vein'? This was the good part because the phlebotomists I worked with - they seemed right away to know what I was doing wrong and could tell me again. You would try to keep all this in your head but again everybody's anatomy is different. The veins don't line up in the same place. You have those hematomas and it can be difficult. (Typical Case, Reference 4, p. 109).

Finding a vein was the most difficult aspect of the phlebotomy clinical experience, for both students and preceptors, and represented the steepest learning curve for students throughout their clinical experience. However, some of the most noteworthy coaching students received from their preceptors was how to handle their emotions.

Coaching student emotion processing.

Working in the clinical environment exposed students to a wide variety of patients and patient circumstances. The clinical experience was emotional for students, and the preceptors employed coaching strategies to assist students with processing emotions framed by a stressful learning environment. Initially, students were nervous about performing a blood collection procedure on a "real" patient. One student said that "I was nervous at first, but i [sic] am becoming more relaxed day by day" (Documents Review, Reference 48, p. 156). The preceptors waited until the student "feels comfortable" before encouraging them to stick. One preceptor explained that

> First of all when they come in, they are very nervous. Some of them already have the experience in drawing – in other words they know the techniques –

> but they don't have the experience in drawing on a real patient. Actually draw blood from and process it. We try to comfort them and tell them that they're the ones in control. They have to prove to the patient that they know what they're doing and they are going to have a successful draw. (Outpatient Facilities, Reference 1, p. 47).

If students seemed too reluctant or were having difficulty engaging in performing phlebotomy procedures, the preceptor encouraged them to get started, as one preceptor talked about,

> I won't ask. I'll just tell them, 'Well, you're going to stick that patient'. Once they get that first stick in, if that stick is successful then, wow, you see that student go awesome throughout the day. They're like, 'I'm going to go and check and see if there're any more patients'! They're excited to draw. You see the confidence level boosting not just in the blood draw area but other things that are going on in the laboratory. They become very inquisitive. Oh what is this area? I've read about this or I was taught this in school. (Out of District Facilities, Reference 3, p. 64).

Seeing patients in such difficult circumstances was very upsetting for students as explained by one of the clinical coordinators:

> We just had an incident where a student that went to one of the nursing homes was so overwhelmed and sad because of what she was encountering. She did break down into tears and although it didn't interfere with the work flow, I did have to pull her to the side and explain that was just not appropriate behavior and you know you're supposed to be a professional at all times. There was no

> problem with anybody in the facility. My phlebotomist came back and told me what happened. [The student] took off for a couple days from the nursing homes and then decided herself that she wanted to give it another try. I'm pleased to say that it was very successful. She hated every moment she was in those homes but she held it together and she did it. (Clinical Coordinators, Reference 1, p. 88).

Additionally, students were sometimes not successful in securing a blood specimen, and it was very upsetting to inflict pain on a patient and not successfully complete the draw. The preceptors assisted the students with processing their emotions and putting their experiences in perspective. One of the preceptors opined,

> ... I try to tell them, 'Don't feel bad. You're still learning and sometimes even the best of us miss. You're not going to get every patient every single time. Just don't feel bad. It's just the nature of phlebotomy beast. You're not going to get everybody, every time, in one stick'. (Nontraditional Scheduling Facilities, Reference 1, p. 75).

The students appreciated the coaching they received from the preceptors and recognized the gradual withdrawal of preceptor support over the course of their clinical learning experience, which is the third element of the traditional apprenticeship model, scaffolding and fading.

Scaffolding and fading.

Like the instructional practices of modeling / observation, and coaching, the terms scaffolding and fading were not articulated specifically by clinical coordinators and preceptors as an instructional strategy even though it was widely employed across

all of the case studies. Preceptor support (scaffolding) ranged from preceptor completion of assigned tasks and student observation to autonomous student completion of assigned phlebotomy tasks and preceptor observation. Student movement along the continuum varied from patient to patient and the student role changed, based on patient circumstances and preceptor assessment of the patient's circumstances and student skill.

One of the clinical coordinators described the use of scaffolding and fading, consistent with the focus on customer service:

> Our typical approach - because they do miss - everybody does occasionally! Our typical approach is to try to have them retrieve it themselves. If we're seeing that a patient is tensing up, sit up straight like 'I don't think so' ... then the phlebotomist with them will step in and say, 'Let's remove it and let me take a look'. That kind of thing. Even with staff phlebotomists, I think one of the challenges is you're doing your task but you've got to watch that patient. You have got to look at the look on their face ... and see if there's a wince. There's more to it than just looking at the arm, sticking, and getting a specimen. You have got to keep assessing that patient and what their reaction [is] to you and the procedure as well. (Clinical Coordinators, Reference 2, p. 94).

Sometimes, the needle was readjusted by the preceptor to access the vein, saving the patient an additional puncture. In the classroom, adjustments to rescue a draw are described but rarely performed, so the student's first introduction to adjusting the

needle to rescue a draw occurred in the clinical setting. One student explained her experience:

> They [the clinical preceptors] have all been patient with me and are very good about explaining what might work better. If I stick a patient and am not quite right, they take the needle and then feel where it needs to be. Before they finish the adjustment, they make sure I feel so I will know the next time exactly where I need to be and what I am feeling for. (Documents Review, Reference 2, p. 87).

The clinical preceptors recognized the ability to rescue a draw is a learned skill. One preceptor expanded on her rescue ability: "If you see that they are doing something wrong, you might redirect and tell them they're pulling the needle up or something to make sure they keep it anchored. It's just a learning experience" (Recently Added Facilities, Reference 1, p. 79). The preceptor assessed the situation and decided on the appropriate course of action as illustrated below:

> If the student misses the vein, I don't have them remove the needle. I try to talk them through the re-directing, not probing because that's when they're putting it [the needle] all over the place. Basically, where they are and feeling where they want to be and directing the needle to that location. If they're unable to redirect the vein, in most cases one of us will take over and get that vein unless we absolutely can't figure out why they went to that specific spot. Then we'll have them pull the needle and then the preceptor will stick the patient. Unless, the patient agrees to let [the student] try again. (Out of District Facilities, Reference 4, p. 73).

The use of scaffolding and fading was easiest to identify when a preceptor rescued a draw following an unsuccessful phlebotomy procedure performed by the student, and it is in this context of individual phlebotomy procedures most of the data related to scaffolding and fading was generated. However, scaffolding and fading also occurred across the three week rotation.

As students moved through their 120-clock hour clinical assignment, they transitioned from an observer to working autonomously. At the beginning of the clinical learning experience, the majority of students' time was spent observing and by the end of the rotation, students characteristically worked autonomously, under the supervision of their preceptors, to collect patient blood specimens. This shift was never referred to as scaffolding and fading, and the transition from observer to active participant was approved on an individual basis at the discretion of the individual clinical preceptors. Traditional apprenticeship was strongly evident in all of the case studies, even though not articulated as an instructional practice, in contrast to cognitive apprenticeship.

Cognitive apprenticeship.

Traditional apprenticeship, while clearly in evidence but minimally articulated by participants in the study, served as the foundation for the expansion of student knowledge and skill during the clinical learning experience. Cognitive and metacognitive student development was studied using cognitive apprenticeship. Cognitive apprenticeship is based on teaching processes experts use to handle complex tasks, and situating factual and conceptual knowledge in the contexts of their use. Cognitive apprenticeship is operationalized in three ways: articulation, reflection, and

exploration. Traditional apprenticeship was clearly embedded in the data and consistently applied across all of the case studies, but cognitive apprenticeship was not.

Articulation.

Students interacted with 264 patients over nine days (72 hours) of student observation in the clinical. Articulation was documented only three times in 264 patient interactions. Consistent with the lack of articulation in observation, evidence of student articulation was not in the coordinator case study or in the case studies defined by type of facility. However, data supporting articulation was uniquely discovered in the documents review case study, representing the student's viewpoint. The documents review included student posts as a part of their clinical experience. Multiple examples of articulation were found in the data originating from Discussion Board assignments. (See Table L9, Appendix L). Evidence of articulation was found in student responses to Discussion Boards addressing First Clinical Impressions; Patient Identification; Cultural Diversity; and Demonstrating Compassion. Students articulated learning in the patient approach and patient identification aspects of specimen collection.

Students articulated insights gained by working with patients and posted comments regarding patient approach to the Discussion Boards addressing "First Clinical Impressions" and "Demonstrating Compassion." Students described their insights when approaching patients and demonstrating compassion while accomplishing work tasks compassionately, efficiently, and effectively. One student wrote about her approach to patient interaction:

I ... realized that most of the patients who are there may be very sick and also

> tired of being stuck therefore, don't take it personal when they may be cranky or upset. Just imagine how you may feel just with a cold or the flu, and put yourself in their shoes and multiply that by one hundred. (Documents Review, Reference 1, p. 10).

Students also learned that how a phlebotomist approached a patient is important to the success of the procedure, as this student stated: "I believe that just taking a few minutes to calm him down and talk with him and show some compassion made all the difference" (Documents Review, Reference 5, p. 11). Students also wrote about their knowledge and reasoning related to delivering culturally competent care.

When presented with the scenario in Discussion Board about "Cultural Diversity," students were asked to explain the most surprising information they learned as a result of course assignments and to indicate how their approach to patients changed as a result of the knowledge gained. One student articulated the diverse meanings of nonverbal cues:

> ... I was most surprised to learn how differently non-verbal gestures can be interpreted by cultures. Eye contact is meant as a sign of respect for our culture, while in others it is disrespectful. Shaking hands is customary for us, but not for others. Patting a child on the head is a sign of affection in our culture, but others believe it can bring bad luck. (Documents Review, Reference 9, p. 14).

Students also described how they applied or planned to apply knowledge of various cultures, health, disease, and pain expression when interacting with patients in the clinical setting. One student explained it this way:

> I learned that in Arabic cultures ... talking loudly and close to the other person is common and not meant like a confrontation like how most people in AMerica percieve [sic] it as. I learned not to judge people by their ethnicity, like not automatically assume a person cannot speak english [sic] or believe the stereotypes. (Documents Review, Reference 11, p. 15).

Immediately after approaching the patient while respecting cultural differences, the student must identify the patient, the most important step in the blood collection procedure.

When presented with the scenario in the Discussion Board titled "Patient Identification", students compared the scenario to standards of practice learned in the classroom and identified breaches in protocol presented in the scenario. One student wrote:

> The procedure began to break down when this phlebotimist [sic] assumed that the older woman was even related to the patient and took her word on where the patient was. She should have first checked with the nurses [sic] station as to where the patient was and questioned who the visitor was. After coming back the second time and noticing the age difference she should have immediately begun the identification process. Ask the patient to state and spell their last name, date of birth, and check the requisition. ... [If the] information given is correct proceed to check the patients ID band to verify information again. As well as match the medical record number. Finally after finding the identification error she should have immediately notified the nurse and charge nurse. (Documents Review, Reference 52, p. 29).

Students also compared the Discussion Board scenarios and their clinical experiences. One wrote, "When I was doing my clinical, 1st [sic] thing we looked at was his/her bracelet and always, always matched the name, DOB [date of birth], MR [medical record] number, and always double checked the room number before we entered the room" (Documents Review, Reference 56, p. 30). Students applied critical thinking skills to identify the source of the identification error, within the context of health care worker accountability.

Students commonly identified the breakdown in procedural protocol, but they did not situate the error within the context of the health care facility. The following student's description of accountability is characteristically limited in scope: "The procedure broke down when the new phlebotomist checked the ID of the Pt. that she was going to draw and noticed that the D.O.B and MR# don't match to the Pt's ID band" (Documents Review, Reference 58, p. 31). When asked to explain strategies associated with patient approach, students were able to describe the course of action they would select and the rationale, but they were rarely asked to do so by clinical preceptors. Articulation occurred almost exclusively in Discussion Board assignments led by community college faculty.

Reflection.

The reflection component of the cognitive apprenticeship model addresses student critical thinking skills in problem solving applications by comparing student problem solving abilities with the experts. During the observation day used as the basis for Christina's story, Christina reflected problem solving strategies when interacting with 10 percent of the patients observed. One example was included in

Christina's story following a missed draw. Christina reviewed the problem with her preceptor, who determined Christina was under the vein with the needle. Most problem solving strategies related to the psychomotor aspects of performing a specimen collection procedure and focused on developing the psychomotor skills required to obtain quality blood specimens.

The reflections identified in the observations conducted with two other students were similar to those seen in Christina's story in both quantity and topic and included problem solving associated with patient approach and site selection. In addition, consistent with the profession's emphasis on speed and efficiency, one facility directly assessed one student's marked inefficiency in completing phlebotomy procedures, a source of concern for her preceptors. This researcher's field notes confirm this:

> [The student] is to compare her technique with [one of the preceptors] and find ways to adjust her technique to become more efficient. [The student] adopted the preceptor's method of seamless patient identification and efficient method of assembling equipment into her technique. (Observation, Clinical Site 2, Reference 1, p. 60).

In all cases, the student processed reflection individually and internally on a case-by-case basis, given the patient circumstances the student encountered and opportunities for improvement in individual student skill sets.

Clinical preceptors provided little input or oversight in directing student reflection and students conducted reflection activities individually and internally. The level of individual student motivation determined the scope of reflection conducted.

One of the clinical coordinators observed that

> ... people who go into phlebotomy are looking for instant gratification and they are high performing achievers. They want to do well every single time and they want to see blood. They push themselves and they pride themselves on it. If they don't get it, I don't think we have to do anything with them, they themselves think about why it didn't work for them. It must be part of the personality of people who are drawn to this field. They are like that. I have a student right now who got a 'can't get' from a seasoned phlebotomist who didn't get it and she [the student] got the 'can't get'! Don't you think she was at my office door saying, 'I got his 'can't get'? By nature they are people who want to do well. I think it makes our jobs easier because I've never had a person who doesn't care about "can't gets" or unsuccessful sticks. (Clinical Coordinators, Reference 2, p. 93).

The drive to obtain blood specimens successfully seemed to be part of the professional culture as another clinical coordinator stated: "One of the things that's always amazed me about phlebotomists are that [if] they do have a can't get, when somebody else goes up and gets [it] they're like, 'Where did you get that'"? (Clinical Coordinators, Reference 3, p. 93). However, the motivation to improve student performance was internally driven and began and ended with the student.

During data collection, this researcher asked students if they reflected on their clinical experiences after each clinical day and if their reflections resulted in subsequent a behavior changes (See Question 8, Table N11, Appendix N). Students consistently expressed a desire to improve, but the specifics of skill improvement were

highly individualized and variable. This student compared her technique to her preceptors as a source of inspiration for improvement:

> I would think about it all day after I would leave that day. I would just re-live the hard stick patients in my mind and what not. For those that I couldn't get, or I actually knew without even putting the needle in them that ... I wasn't going to get them ... I would look at the phlebotomist and see exactly what she did. I would just re-live it and keep it fresh in my mind. That way for the next day, if I did happen to get déjà vu again I would still have it fresh in my mind ... that's the way the phlebotomist did it, that's the way I should do it. (Recently Added Clinical Facilities, Reference 1, p. 77).

Another student used current technologies to assist her with accurate and comprehensive reflection:

> I did that [reflection] every day. I have my Blackberry-I would go on my break and I would record the whole first period of my session and the things that I would want to change. Then ... I would listen to it [on my way home]. The next day I would say, 'OK, this is what I think I can do better. I can get out of this room within a period of time. With a geriatric patient that's begging me stay, I can cut that and say, 'I really have to go now'. I would try to retrace my steps and see how I can better. (Out of District Facilities, Reference 1, p. 71).

Consistent with the reflection of this student, often times the student's reflection would involve learning how to be more efficient. Sometimes student reflection had a spiritual component as one student described: "... just positive talk actually I would pray before that I remain humble and teachable" (Out of District Facilities, Reference 1, p. 72).

Student reflection was a solitary activity, limited in scope to successfully obtaining a specimen for analysis and captured only as part of data collection for this study and not as part of an assignment or curriculum. Moreover, critical thinking strategies required for work load management were not shared with students by the preceptors.

Critical thinking skills are used to manage the work flow required a significant amount of the phlebotomist's time and effort, but the thought processes associated with those activities were not shared with the student. This researcher's field notes taken during one observation, recorded that "There is a tremendous amount of ordering, paperwork and order confirmation that goes on. The techs use that information to prioritize specimens. However, the decision making process is not explained to the students" (Observation, Clinical Site 1, p. 13). Further field notes recorded similar findings and observations at a second hospital regarding the prioritization of patient specimen collection, "[The preceptor] directed [the student], 'Before you tube [pneumatic tube system] this stat, we will go down the hall and get the next stat and tube them both together'. She did not provide the rationale". I also noted the absence of explanation for workload management and patient prioritization during my observations at a third hospital, where the preceptors were frequently summoned by page for various blood collection procedures ordered while away from the lab. "[The preceptor] was paged multiple times during the days of observation and never shared the contents of the page or the impact of the information on the work flow" (Observation, Clinical Site 3, p. 59). The demeanor of the phlebotomists at all three facilities during work flow organization was very focused with a high degree of concentration. They did not exhibit exclusionary behavior to the student or to the

researcher but seemed engrossed in structuring the work flow. Providing an explanation for the decisions made, the factors considered, or the critical thinking involved was not done. The preceptors did not incorporate the articulation and reflection elements of the cognitive apprenticeship model into the student's clinical learning experience. However, they worked to assist students with developing their own, unique professional approach to phlebotomy.

Exploration.

The exploration component of cognitive apprenticeship addresses student development of a personalized mode of problem solving concurrent with gradual withdrawal of preceptor support. Students are expected to develop their own style of performing entry level phlebotomy skills by the end of their clinical rotation. Christina developed skills and techniques attributable to the preceptors with whom she worked like the tapping technique. During an observation conducted early in Christina's clinical learning experience, one of the preceptors demonstrated a tapping technique which involved gently tapping on a vein to facilitate assessment of the vein's size, depth, and direction. In a subsequent observation, Christina applied the tapping technique and smoothly, without support from her preceptor, applied the technique in challenging site selection situations, indicating it was part of her skill repertoire. Exploration was also in evidence during a second student observation, but not observed in a third student's technique, suggesting it is inconsistently encouraged and developed in students across the program. Assessment procedures documenting student development of a personalized method for performing phlebotomy procedures for each student were not found anywhere in the data. As with reflection, the impetus

for the development of a unique professional style was internally driven by the individual student's motivation level.

Student comments posted to the Discussion Board assignments described how students developed their own, unique approach to phlebotomy tasks. First, they distinguished what contributed to their success in completing phlebotomy procedures, as one student stated, "I soon developed my own sense of the way things worked ... so I was able to get comfortable in no time" (Documents Review, Reference 1, p. 40). Students also learned what prevented success, "[I] don't blind draw that got me in trouble a few times [sic] but I learned my lesson " (Documents Review, Reference 3, p. 40). Students also commented on developing a personal style related to delivering culturally competent care. One student developed her own set of rules for interacting with a diverse patient population in spite of a conflicting personal value set:

> I, as a Muslim, was raised and taught that you can have eye contact with the same sex person but not with the opposite. It should be less eye contact with the opposite sex. One day, a male patient came in, he was around 27 i believe.As i [sic] was getting the equipment ready, he kept asking me questions and was looking at my eyes directly. I knew this person was trying to make himself feel better! Of course, for that moment I had to put my religion aside and look this person in the eye as much as possible, or at least until i [sic] felt he was comfortable for me to draw his blood. Because of this, i [sic] did realize that some cultures you have to have good eye contact. Of course i [sic] will always do that when i [sic] feel it is a need! (Documents Review, Reference 20, p. 47).

In addition to developing skills related to delivering culturally competent care during patient approach, students used exploration to develop their unique method of patient identification, as comprehensively described by one student:

> I will always do the 2 step identification first. To aviod [sic] identification, and labeling errors I would walk up to the patient and say hi my name is ... and im [sic] from the lab and your name is _____ then I will check the patients id [sic] band. After drawing the patents [sic] blood I will label the specimen as follows; Patients [sic] first and last name, Patients [sic] identification number (if applicable) or date of birth, date and time of collection, Phlebotomists [sic] initials, pertinent additional info such as fasting. Before I leave the patient I will compare the info on each labeled tube with the patients Id [sic] band and the requisition. (Documents Review, Reference 54, p. 58).

Students also developed a personal style of demonstrating compassion to patients. One student described her technique for allaying a patient's nervousness:

> I would talk to the nervous patients the way I would want someone to talk to me if I was scared, with sincere compassion. When someone told me they were nervous I'd tell them the amount of tubes needed and I'd also use a smaller needle if possible to minimize pain. Using a smaller needle always helped because the patient would tell me I did a great job because they [sic] did not feel it! (Documents Review, Reference 10, p. 43).

Development of techniques related to patient communication was most frequently described by students in the Documents Review Case Study, but evidence also existed in the subgroup case studies from the perspective of the preceptor and also from the

students' perspective. (See Table G8, Appendix G and Figure H1, Appendix H)

The clinical preceptors recognized development of unique professional styles in students as a goal of the clinical learning experience. One preceptor observed " ... [clinical training] gives [the students] the opportunity to go with various phlebotomists which also is where the phlebotomist can give their various ideas, techniques and help develop them so that they can develop their own style" (Typical Case, Reference 1, p. 116).

A challenge in identifying each student's individual style was hindered by the practice of having the students work with a variety of preceptors. One preceptor explained,

> Sometimes I don't see it [exploration]. Sometimes I'm not with them all the time. I may take a student for so many days and then someone else may get the student - so they're not following me through their whole clinical. So, do I get to see that they did it? Maybe not. I can only hope that ... it's a technique and everybody has to develop their own ... what works for them ... their own technique. (Recently Added Clinical Facilities, Reference 1, p. 75).

The preceptors assumed the students would develop their own style but did not express a commitment or recognize a responsibility to insuring its development in each student. One preceptor commented: "The students do incorporate it and some don't catch on" (Typical Case, Reference 1, p. 116). In summary, while there was evidence to suggest students worked to develop their own unique style of collection procedures, a systematic, comprehensive approach insuring each student developed an individualized approach to phlebotomy tasks was not in evidence. Moreover, the locus of student learning across learning domains was clearly delineated in the data.

Learning Domains and Clinical Education

The third unexpected major theme discovered student learning related to clinical internship experiences was time and place bound and student learning was geographically determined based on learning domains. Students transferred knowledge-in-waiting gained through classroom experiences to knowledge-in-use during their clinical learning experience. One clinical coordinator explained that

> [The students] need to understand that when they go into a rotation that they are continuing their learning. You have ones that feel they've passed the class, and the book, so all they're there for is experience. They need to realize that this is where they're going to learn how it really works. They've learned the important things. They've learned their fundamentals now they need to understand. (Clinical Coordinators, Reference 2, p. 64).

The students described the shift from knowledge-in-waiting to knowledge-in-use as a powerful learning experience.

This researcher asked students to describe their clinical learning experience using only one word. Most students were fascinated by their learning experience and characterized the experience as exciting, interesting, and amazing. As fascinated as students were with the experience, they were just as frequently overwhelmed and used such words as challenging, exhausting, and scary. They described the clinical experience as a powerful learning experience by using such descriptive words as informative and educational. As one student stated, "It's a good thing to start putting everything that we learned in action" (Documents Review, Reference 6, p. 5). Student learning, categorized by learning domains, was clearly delineated. Classroom

instruction served as the source for student learning in the cognitive domain and manifested as knowledge-in-waiting in the student. The clinical reified rudimentary psychomotor skills introduced in the classroom and advanced student psychomotor skill to a level consistent with entry into the profession. Students clearly developed a strong set of internalized values as a result of their classroom experience, which were sometimes challenged in the clinical.

Classroom Preparation for the Clinical Learning Experience.

Clinical coordinators, preceptors, and students indicated students had good preparation in the classroom prior to their clinicals. The coordinators indicated students had adequate background and sufficient laboratory practice to begin clinical training. One coordinator noted: "Your program is excellent... You send them with the right ammunition. It's what they do with it" (Clinical Coordinators, Reference 3, p. 77). The preceptors agreed with the coordinators and considered the clinical experience an extension of the students' classroom learning. One preceptor succinctly described transferring knowledge-in-waiting to knowledge-in-use: "...we're going to take what you've learned in the classroom, we're going to bring it in here and we're going to use it here" (Typical Case, Reference 2, p. 73). The students also agreed they were well prepared for their clinical training. One student explained that

> ... [the student's classroom teacher] did teach us what the lab requires, which draw, how it should be drawn, when it should be drawn. The techniques to use. I had it mentally in my head, and I was able to apply it. (Out of District Facilities, Reference 4, p. 49).

Even though the clinical coordinators and preceptors characterized the students as well

prepared for the clinical learning experience, the preceptors noted some deficiencies in the students' ability to think critically.

Cognitive Domain - Critical Thinking Skills.

The clinical preceptors noted deficiencies in student knowledge associated with specimen types and suitability and critical thinking skills. Insuring a suitable specimen requires knowledge of each type of evacuated tube, the volumes and additives in each tube, and why a specific evacuated tube is best suited for a particular analysis. One preceptor described the gap this way:

> I wish in the phlebotomy program there was more learning about the tests and what kind of disease a patient has. So it's more like ... the patient has disease because something happened and this is why we have to take this test. Like more relation between the sickness and why you have to take BMP, CBC, or the PT because something is going on .... (Recently Added Clinical Facilities, Reference 2, p. 43).

Another preceptor concurred and recognized students do not associate specimen suitability taught in the classroom with patient conditions:

> They don't really know what a troponin is for. They don't know it's a cardiac enzyme that needs to be run right away and this patient's either having a heart attack or not ... I know Moraine Valley teaches it because I remember! ... I think the students need to know that it is important. It's not just a test that you're getting. This is something that you're going to bring on and take with you. You're going to use it all the time. It's not something just for school. A

> lot of them think that way, it's a test .... (Outpatient Facilities, Reference 2, p. 41).

The preceptors identified the student's inability to connect specimen suitability with the laboratory test ordered within the context of the patient's condition; they also recognized the clinical setting provided a unique opportunity for the student to make the necessary connections between evacuated tube additives, specimen suitability guidelines, and patient clinical conditions. One preceptor explained the situation:

> ... when I was a student you have so much information in a short time. It's hard to connect everything when you start to work in the clinical then you try to think, 'OK, I'm taking CMP because something happened to the patient or CPK troponin is being taken every 6 hours because something is going [on] with heart failure and that's why they have to check every 6 hours.' Then you understand more how everything is connected. In school it's hard; it's like there is no connection. I remember myself in the clinical I started to understand more than some theory. It's always like that. (Recently Added Clinical Facilities, Reference 3, p. 50).

In spite of the importance assigned to critical thinking skills to assess specimen suitability and correlate laboratory analyses with patient conditions, students' abilities to employ critical thinking skills was not assessed or documented. The preceptors also recognized the challenges students experienced during their clinical learning experience with techniques introduced, but not mastered, in the classroom.

Psychomotor Domain - Clinical Setting.

The data indicated students struggled most with techniques they did not have

the opportunity to practice extensively in the classroom, especially alternative site selection and venipuncture with a butterfly needle. This challenge for students was exclusively related to the psychomotor domain and associated with developing advanced phlebotomy skills required to successfully obtain quality specimens from very sick patients using specialized equipment. One student noted that

> I wish so much that I had a lot more practice with the hand and butterfly needles as much as we drew from the arm. I feel prepared to draw from the arm but I feel very unprepared to draw from the hand as much as they do [at the clinical site]. (Documents Review, Reference 10, p. 2).

Another student concurred and explained advanced site selection techniques: "... I've seen blood come out of all different areas of the forearm, hand, and foot just over the past week" (Documents Review, Reference 6, p. 160).

A different student described specialized equipment required for difficult draws,

> ... I certainly wasn't prepared for the butterfly draws. I understand that the butterfly needle is expensive and is more of a risk for a potential needle stick, but I felt totally unprepared for that procedure. As we all know in a hospital most patients are very ill, elderly, handicapped, dialysis, dehydrated, etc ... more times than not we used a butterfly, and I only practiced twice with that type of needle [in class]. I had such a hard time with it, but as with most things in life, practice and knowledge makes a better prepared person. (Documents Review, Reference 2, p. 167).

The preceptors also identified the gap between student classroom skills and the advanced phlebotomy skills necessary to meet the tasks of standard clinical

phlebotomy work. One preceptor stated that

> Most of the patients are really sick, ... with cancer, their veins are very dehydrated, and with old people, their skin is different, and sometimes, like in ICU units, their hands are really swollen, and it's different things like that ... It's good to learn. It's a little more difficult for them, but it's better. (Out of District Facilities, Reference 4, p. 37).

Students internalized a value for completing tasks and procedures taught in the classroom, which sometimes differed from approaches taken in the clinical setting.

Affective Domain - Student Values Internalization.

The documents review included data indicating student values internalization was learned in the classroom. Students reacted to scenarios related to a procedural error associated with patient identification, delivering culturally competent care, demonstrating compassion, and the ethics of mixing samples collected in two different types of evacuated tubes post-phlebotomy (See Table L9, Discussion Boards 2 - 5, Appendix L). The students posted strong opinions regarding patient identification and clearly placed a high value on accurate patient identification, "Patient identification is most important in [sic] any procedure" (Documents Review, Reference 10, p. 146). One student explained a strong commitment to the two-step patient identification procedure based on what was learned in the classroom: "I would have done a two part i.d. check and if it did not match I would have contacted the nurse who's [sic] patient it was and informed her of this. Because that is what I was taught" (Documents Review, Reference 1, p. 145). Another student judged the head phlebotomist as unethical because she demonstrated a cavalier attitude once the error was discovered:

> Kudos to the phlebotomist who caught the error. Shame on the head phlebotomist who not only didn't do her job, but her obvious lack of caring about the situation says more about her character than the fact that she drew the wrong person. (Documents Review, Reference 4, p. 145).

In addition to illustrating a high degree of commitment to accurate patient identification with each procedure, students also expressed a strong value and commitment to providing culturally competent care.

In the classroom, students received orientation in how to deliver culturally competent care to patients and were expected to transfer the classroom knowledge-in-waiting to clinical knowledge-in-use. One student expressed an appreciation for the knowledge-in-waiting gained from the classroom:

> I also think that just coming to Moraine was good for me to meet so many wonderful people in different cultures. Its [sic] one of the things that I liked the most about this school. It has given me new perspectives on people from different cultures. I have enjoyed them all (Documents Review, Reference 6, p. 140).

The students expressed a high level of commitment to providing culturally competent care to patients. One student explained that "I think that every patient should be treated with respect, tolerance, and patience regardless where she or he is from" (Documents Review, Reference 29, p. 145). Consistent with their high commitment to providing culturally competent care, students were also highly committed to providing compassionate care. Students demonstrated value internalization for providing compassionate care based on the clinical experiences they shared on the Discussion

Board related to "Demonstrating Compassion". One student wrote

> While doing my clinical rotation I felt that compassion is the key in getting patients to trust you. Some patients come to get blood work so often that they only wanted a select few to draw their blood. When they told me this I didn't get mad or upset. The main thing for me was to always have a smile on my face. With every patient I tried to make conversation so they wouldn't be thinking so much about the needle stick. Believe it or not making small talk with patients relaxes them more and helps let them know you do care. (Documents Review, Reference 12, p. 43).

Consistent with a high level of commitment to accurate patient identification and delivering culturally competent and compassionate care, students expressed a high level of commitment to ethical professional behavior.

Using the Discussion Board, students responded to a scenario involving a lead phlebotomist combining blood samples from two separate evacuated tubes into one tube, which is against protocol (See Table L9, Discussion Board 5, Appendix L). Students described how they would approach the situation. One student indicated a good idea would be to reiterate the rationale for redrawing the patient based on what she learned in the classroom:

> When we left the room I would tell the other phlebotomist that the one thing that was impressed on me was how important that when drawing a blue tube that you get a full tube - period. There are no other options. I would tell her that she needs to throw away the 2 tubes she mixed together because the results will be wrong based on wrong blood/additive ratios. (Documents Review,

Reference 6, p. 121).

The overwhelming response from the students included a strong adherence to protocols for the safety of the patient, even if it meant losing their job: "the job of my dreams are [sic] not more important than someone's life" (Documents Review, Reference 2, p. 138). Another student pragmatically commented, "Dream job or not, there may be some tension between you and the other phlebotomist, but this to [sic] will pass. Doing the job correctly will not get you fired, but comprimising [sic] results certainly will" (Documents Review, Reference 8, p. 138). Clearly, students demonstrated values internalization related to phlebotomy procedures and professional behavior learned in the classroom and transferred that knowledge / values in waiting to knowledge / values in use in the clinical learning experience.

Summary

The goal of this study is to determine how preceptor-led clinical internship improves or expands student learning. The thesis for this study is that the authentic learning experience improves and expands student learning, and the data confirmed the thesis. One major theme supported the thesis and documented that a clinical internship improved and expanded learning in phlebotomy students. Three minor themes supported this finding and revealed the clinical setting provided a unique set of resources used by preceptors to improve and expand knowledge, skill, and confidence. The clinical preceptors played a crucial role in learning and used the unique learning resources available in the clinical to sustain student construction of learning in the environment. The gap between the classroom and the clinical setting was a source of reality shock for students.

The second major theme described how the clinical preceptors consistently and seamlessly employed traditional apprenticeship to improve and expand student learning in the clinical. The teaching strategies included modeling, coaching, and the dichotomy scaffolding and fading. The elements of traditional apprenticeship, while not specifically defined or articulated by preceptors, were strongly evident and consistently applied in the clinical. However, the elements of cognitive apprenticeship were rarely applied by preceptors in the clinical to improve and expand student cognitive and metacognitive processes. The cognitive apprenticeship includes articulation, reflection, and exploration and, when evident, was employed by faculty to assist students with constructs of learning using Discussion Boards, which were limited in scope. The elements of cognitive apprenticeship, while asynchronous and flexible, did not provide just in time learning and did not address higher order critical thinking skills required to manage workflow.

The third unexpected major theme about learning as a result of clinical was that it is time and place bound. The locus of student learning was geographically determined based on learning domains. Three unexpected minor themes corresponding to learning domains developed. Student learning in the cognitive domain occurred primarily in the classroom. Rudimentary student learning in the psychomotor domain initiated in the classroom, but it was reified and significantly expanded in the clinical learning environment. Student learning in the affective domain occurred in the classroom, where values clarification and internalization occurred.

CHAPTER 5 - DISCUSSION AND CONCLUSIONS

Allied Health is like a 1,000 piece puzzle.

It is assumed that all the pieces will go together, but it's challenging finding sufficient information on the big picture. (Harris et al., 2006)

The purpose of this study is to describe how clinical internship improves or expands student learning. Specifically, legitimate peripheral participation of students in a particular community of practice, phlebotomy, is studied to determine how students construct didactic, psychomotor, and affective learning within an authentic learning environment, the clinical setting. The orientation of this study is from the constructivist perspective and is framed by situated learning theory operationalized through cognitive apprenticeship. Chapter five discusses the findings of the study within the context of current research. The findings are used to draw conclusions and make recommendations for future practice and research.

Empirical studies on student learning in clinical education are scarce, and the development of a substantive body of knowledge related to clinical learning for allied health students is virtually non-existent (Hammel, et al., 2001; Healey, 2008; Scully & Shepard). The increasing knowledge base of allied health professions and the increasing complexity of patient care require a clinical experience where students can learn by peripheral participation in patient care within a particular allied health discipline. While there is evidence in the nursing literature about the effectiveness of preceptor internships for student nurses, there is no similar data about the impact of clinicals for learning, socialization, and professional development of allied health students in general and community college students in particular. Additionally, the

empirical studies using a cognitive apprenticeship framework are fragmented and inconsistent. This study identified the interface of the student, phlebotomy preceptor, and patient as the locus of student learning in a complex social context. The study is conducted to determine how phlebotomy students learn within that context and the results provide insight into learning in a clinical internship experience.

Discussion of Results Concerning the Research Questions

The data was voluminous and difficult to analyze because it included copious, detailed descriptions of daily work load and professional challenges using field-specific vocabulary and jargon. Additionally, data was obtained from three different perspectives, clinical coordinators, preceptors, and students, further complicating data analysis. At first glance, the wide variety of patients in diverse circumstances requiring a wide range of collection procedures within a quick and unpredictable environment masked consistent instructional practices that used the clinical as a resource to improve and expand learning. However, data review generated three themes which informed the research questions: cognitive apprenticeship supported student construction of learning; student learning as a result of clinical learning experiences was time and place bound and also geographically determined based on learning domains; and clinical education improved and expanded learning in students. A detailed review of each theme is presented within the context of the relevant research questions.

Research Question 1: What are the constructions of learning that emerge in the community college student allied health preceptor-led clinical internship experience?

Traditional apprenticeship.

The elements of traditional apprenticeship were consistently applied to learning in the clinical. Student learning consistent with traditional apprenticeship, as defined initially by Collins et al. (1989) and later by Collins et al. (1991), was strongly evident across all of the case studies representing the stakeholders. Moreover, the components of traditional apprenticeship were clearly and robustly documented as mechanisms for contributing to student learning. Clinical coordinators and preceptors described actions they took to promote student learning consistent with traditional apprenticeship, but they never indicated why they employed a particular practice from a pedagogical perspective. The terms associated with traditional apprenticeship, when used, were descriptors of specific activities and not terms referring to a learning theory.

The absence of language regarding the use of traditional apprenticeship as an instructional strategy was remarkable within the context of the overwhelmingly consistent and pervasive use of traditional apprenticeship to support learning. The absence of language describing the rationale associated with the traditional apprenticeship model in the face of consistent employment of the traditional apprenticeship model supports the premise that formal learning theories rarely frame educational practices in internships, and the clinical learning environment closely approximates a traditional apprenticeship. As reported in the results of the study, when

preceptors were asked why the clinical was scheduled and organized the way it was, most could not provide any rationale or merely guessed at possible explanations. The results of this study imply clinical training, like traditional apprenticeship, is historically grounded and based on the best teaching practices of just plain folks (Lave, 1988, p. 4). Early in the course of the clinical students spent much of their time observing.

Observation.

During observation, learners watch the masters as they execute skills and knowledge to complete a particular task *in situ,* and this represents an important component of traditional apprenticeship for three reasons. Observation provides learners with an opportunity to conceptualize the final product or activity goal; a frame of reference for instructor feedback and critique following learner initial attempts to complete a task or a procedure; and immersion in a learning environment with continuous access to skilled professionals, thereby providing an opportunity to internalize procedures and standards of excellence prior to independent practice of complicated skills and procedures (Collins et al., 1989; Collins et al., 1991). Observation activities provided an opportunity for students to view the work of the clinical laboratory and develop a concept for the role laboratory science plays in delivery of patient care. Additionally, preceptors consistently allowed students to observe their techniques, thereby clearly establishing a reference for student performance. Immersion in the clinical learning environment provides students with a unique opportunity to absorb the culture of the profession, including professional standards of excellence, speed, and efficiency. Consistent with the literature, students

participating in this study spent a significant amount of time in the clinical and initially much of that time was spent in observation activities.

A significant amount of instructional time is spent in clinical internship. The literature acknowledges this significant time commitment and suggests the structure is inefficient, and students may not be spending most of their time in active learning activities (Berry et al., 2004; Healey, 2008; Page & Ross, 2004). The possibility that a significant component of time was spent in non-active learning activities was explored in this study as down time. Down time refers to student presence in a clinical when not doing clinical tasks or activities. In direct contrast to the data described by Page and Ross (2004), the data in this study strongly demonstrated the effective use of down time by the preceptors who employed observation strategies to improve and expand learning. Observation strategies employed during down time included specimen processing and delivery to various clinical laboratories, review of the procedure manual, and opportunities for students to debrief with preceptors. The results of this study do not conform to the information reported by Page and Ross (2004), but are consistent with the position of Collins et al. (1989) "Observation plays a surprisingly key role" (p. 456). The data from this study shows effective use of observation during down time to improve and expand student learning.

Coaching.

In this study, the expert coached the learner through the learning process by employing a variety of teaching methods including selection of activities, providing constructive criticism of skills and tasks, evaluating progress, and identifying and troubleshooting barriers to success and progress, consistent with the descriptions

provided by Collins et al. (1991). Additionally, consistent with Collins et al. (1991), the preceptors offered encouragement, provided challenges, and assisted learners in improving weaknesses. The term "coaching" was rarely used by coordinators and preceptors as an instructional strategy, even though it was widely employed across all of the case studies. Many of the coaching strategies were presented within the context of specimen collection procedures and spanned the steps in the standard collection procedure.

Two types of coaching were evident and included instruction when preceptors simply directed students what to do in a particular instance and shared heuristic strategies to complete phlebotomy tasks. Collins et al. (1989) described heuristic strategies as "effective techniques and approaches for accomplishing tasks that might be regarded as 'tricks of the trade'..." (p. 478). Consistent with this characterization of the learning environment described by Collins et al. (1989), the preceptors in this study magnanimously shared heuristic strategies to improve and expand student skill in performing tasks. The generosity of the preceptors in sharing their hard-earned "tricks of the trade" was a constant finding across all of the case studies, and the profound level of munificence in sharing heuristic strategies was remarkable. The preceptors evaluated student progress, identified barriers to student success and progress, and applied coaching strategies to improve and expand student knowledge and skill. A unique finding in this study related to preceptor use of coaching strategies to assist students with processing powerful emotions experienced as a result of their clinical experience.

Similar to findings reported in the nursing literature, the preceptor-led clinical

learning experience was an emotional experience for the students participating in this study. Ohrling and Hallberg (2000) reported nursing students felt emotions in action, resulting from clumsy novice attempts concurrent with such bodily sensations as tiredness. Consistent with these findings, students participating in this study also demonstrated nervousness, and the preceptors used coaching strategies to move students out of their comfort zone and initiate using their rudimentary skills with patients. Students also reported being tired, due to the physical demands associated with the clinical and also frequently expressed shock and disbelief at "how sick the patients are", requiring the preceptors to coach students in the use of coping strategies effective in dealing with the sometimes shocking human condition.

While the nursing literature acknowledged the emotional nature of the clinical, strategies for assisting nursing students with processing emotions were not reported. In contrast, the preceptors participating in this study continually assessed the students' comfort level and promoted student learning within that context, a constant finding in all of the case studies and within each participant group. Initially, the preceptors worked to make the students feel welcomed and when the students seemed comfortable with approaching patients, the preceptors allowed them to begin drawing patients. The preceptors also nudged the students out of their comfort zones by suggesting alternative patient approaches and phlebotomy techniques. Lofmark and Wikblad (2001) suggested the lack of time available for teaching and learning in the nursing clinical setting and the resulting stress of the hospital ward were contributing factors to obstruction of nursing student learning in the preceptor-led clinical learning environment, which was not consistent with the findings of this study. The pace of the

clinical experience was hectic, but the preceptors made a consistent effort to coach students through their emotions, often while in transit from one patient to another. In addition to coaching students through procedures, techniques and emotions, the preceptors employed scaffolding and fading techniques to improve and expand student learning.

Scaffolding and fading.

Scaffolding was first described by Vygotsky, consistent with his theory of proximal development (Lave, 1988; Lave & Wenger, 1991; Rogoff & Lave, 1999). The zone of proximal development described the use of language and cultural artifacts to scaffold learning between actual student development and maximum student potential for learning within a particular environment (Cole & Wertsch, 2002; Daley et al., 2008; Kolb, 1984; Rogoff & Lave, 1999; Spouse, 1998). Consistent with Vygotsky's zone of proximal development involving intrapersonal and interpersonal socially-mediated learning, the students in this study were engaged in learning while employing language and cultural artifacts as the conduits for learning. Cultural artifacts, such as butterfly needles, and language specific to the task, "in the vein properly," are examples of learning conduits. Like the instructional practices of observation and coaching, scaffolding and fading was not articulated specifically by clinical coordinators and preceptors as an instructional strategy, even though it was widely employed across all of the case studies.

The observed practice of scaffolding and fading is consistent with scaffolding and fading described by Collins et al. (1989); Rogoff and Lave (1999); and Spouse (1998). Students in this study transitioned from observer to active participant, and

their progress was approved on an individual basis at the discretion of individual preceptors. Student movement along the continuum varied from patient to patient and the student role changed, based on patient circumstances and preceptor's assessment of the patient's circumstances and student skill level. Students initially required strong support or scaffolding as they began to complete clinical tasks. As knowledge and skill expanded, the level of scaffolding required for the safe and efficient collection of blood decreased or faded until ultimately the student was performing clinical tasks autonomously with minimal support from the preceptor. Scaffolding and fading, like observation and coaching, constructed student learning in visible and observable behaviors, easily documented using such empirical measures as numbers of draws and success rates. In contrast, the elements of cognitive apprenticeship address constructs of cognitive and metacognitive development in students, which is not readily visible and not easily measured.

Cognitive apprenticeship.

In contrast to the traditional apprenticeship described above, the elements of cognitive apprenticeship (articulation, reflection, and exploration) were inconsistently applied to construct student learning in the clinical setting from a pedagogical standpoint. Data documenting student problem solving rationale or other higher order thinking skills was not evident in the coordinator case study or the case studies defined by facility and was minimally represented during observations. Collins et al. (1991) described strategies for making cognition and metacognition visible including reading, writing, problem-solving, and verbalizing. Similar to the practices for making cognition and metacognition visible described by Collins et al. (1991), student

cognitive and metacognitive development was captured in this study through the Discussion Board assignments and included writing, problem-solving, and verbalization. The assignments were developed on course learning outcomes. In cognitive apprenticeship, learning tasks vary from routine to diverse, and learners are encouraged in "real time" to reflect on the learning tasks and use their experiences to articulate elements common across all of the tasks (Collins et al., 1991).

Articulation.

In this study, student articulation was limited in scope and confined to responses corresponding to specific prompts assigned as Discussion Board topics to meet learning outcomes. Articulation requires the learner to demonstrate knowledge, reasoning, or problem-solving within a situated learning environment and to critique aspects of task completion (Collins et al., 1989). The results of this study placed student articulation almost entirely outside of the clinical and specifically conducted on web-based discussion boards facilitated by college faculty. Articulation processes completed by students were asynchronous, separate from their activities in the clinical and completed in response to assignment deadline dates. The locus of articulation rests solely in the learner, who provides rationale for a decision or problem-solving strategy. In contrast, the reflection element of cognitive apprenticeship requires students to compare their problem solving strategies with the experts (Collins et al., 1989).

Reflection.

Based on the findings of this study, preceptors provided negligible input or oversight in directing student reflection. Additionally, faculty did not provide web-

based or other forums for reflection to occur. The level of individual student motivation determined the scope of reflection conducted. Highly motivated students reflected on their clinical learning experience more consistently and comprehensively than less motivated students. This finding is consistent with Healey (2008), who noted three levels of student learning approaches: in a surface manner, focused on context rather than the task at hand, and deep learning. Student reflection activities were captured only as part of data for this study, not as a pedagogically-based assignment or curriculum component. Moreover, student reflection was a solitary activity and generally limited to successfully obtaining a specimen for analysis and addressed such topics such as improving their techniques and efficiency and finding inner strength.

Reflection requires a comparison of student problem solving with expert problem solving, but the data in this study suggested this was a solitary activity conducted individually by students. Healey (2008) described a similar finding, and associated "deep learning" in physical therapy students who actively sought to integrate learning experiences into a "complete whole", the learning approach correlating to higher quality learning outcomes (p. 49). Data related to student reflection was recovered solely as data for this study and there was a wide degree of variability in quality, quantity, and topic of the reflection activities described by students. Direction from coordinators, preceptors, or faculty in intentionally leading students through reflection activities was completely absent in the data. However, coordinators and preceptors aspired to support development of an individual professional style by the end of the clinical in a process called exploration.

Exploration.

Exploration is the third element of cognitive apprenticeship. During exploration, students' skill and knowledge serves as the foundation for unique student problem-solving strategies (Collins et al., 1989). Achieving exploration is the end result of the scaffolding and fading continuum (Brandt et al., 1993, Collins et al., Cope et al., 2000, Nickle, 2007, Page & Ross 2004, Wong & Matsumoto, 2008, Wooley & Jarvis, 2006). In this study, there was evidence to suggest students worked to develop their own professional style of collection procedures. However, a systematic, comprehensive approach designed to insure each student developed a particular professional approach was not evident. Assessment procedures of a personalized method were absent in the data.

In contrast with reflection processes recovered only through data collection, evidence of student achievement in the exploration phase of cognitive development was captured in discussion board assignments related to selected steps in the phlebotomy procedure, including patient identification, demonstrating compassion, and delivering culturally competent care. Student comments related to these topics indicated their development of unique, individualized professional identities through their own approaches to phlebotomy tasks and issues presented as asynchronous Discussion Board assignments. The data also indicated preceptors assumed the students would develop their own style but did not express a commitment or recognize a responsibility to insure its development in each student. Infrequent references to exploration were found in each of the participant groups and across all of the case studies, suggesting development of individual professional styles in each student is at

least an informal goal of the student's clinical. However, development of exploration in each student was not defined as a student learning objective of the clinical by faculty. A lack of clarity associated with student development expectations was reported also in the nursing literature, but termed "learning objectives for the clinical practicum" (Hart & Rotem, 1994).

The results of this study are consistent with literature findings documenting expanded learning as a result of situated learning theory operationalized by the cognitive apprenticeship model in traditional education settings (Brown et al., 1989; Collins et al., 1991; Darabi, 2005; Evanciew, 1994; Hendricks, 2001; Mayer et al., 2002). Also consistent with the literature, the data recovered in this study documented the sporadic application of the components of cognitive apprenticeship: articulation, reflection, and exploration. For example, the three seminal studies reported by Brown et al. (1989) and Collins et al. (1991) incorporated reflection and articulation as instructional strategies, but exploration was reported in only two of the three original studies. Page and Ross (2004) used the cognitive apprenticeship method to survey the time physical therapy clinical instructors spent using each of the instructional strategies in cognitive apprenticeship: observation, coaching, scaffolding / fading, articulation, reflection, and exploration. The findings suggest that the physical therapy preceptors indoctrinated students into the physical therapy profession and assisted them with mastery of clinical skills consistent with the tenets of the traditional apprenticeship model, but did not ask students to provide theoretical rationale for clinical tasks performed and included in cognitive apprenticeship in a consistent manner. The findings of this study are consistent with the findings reported by Page

and Ross (2004). In summary, the six components of cognitive apprenticeship, as defined by Collins et al. (1989), were not expressed by clinical coordinators or preceptors as instructional methods developed from learning theory designed to improve and expand learning. However, in spite of the lack of expressed pedagogy, the clinical was clearly and consistently framed using the traditional apprenticeship component of the cognitive apprenticeship model. The components of the cognitive apprenticeship model, which develop cognitive and metacognitive processes in students, were not clearly nor consistently demonstrated but were sporadically present and linked specifically to assignments related to course learning outcomes.

Research Question 2: How do community college students reflect on their classroom / laboratory experience during their allied health preceptor-led clinical internship experience?

Prior to the 1960s, nursing and allied health schools were in hospitals, and student learning was experience-based and strongly rooted in traditional apprenticeship (Graham, 1996; Starr & Conley, 2006; Taylor & Care, 1999; Wooley & Jarvis, 2006). As the knowledge base and demand for higher order thinking skills in the professions grew, these programs moved out of the hospitals and into academic facilities (Graham, 1996; Starr & Conley, 2006; Taylor & Care, 1999). The migration from hospitals to academic facilities resulted in a location change for student learning. Cope et al. (1999) reported the shift in emphasis of student nurse experiences by comparing the number of weeks allocated to clinical instruction. The amount of time allocated to theoretical instruction shifted from 20% in 1982 to 40% in 1992, and time allocated to clinical instruction shifted from 80% in 1982 to 60% in 1992 (p. 852).

Consistent with the separation of theoretical academic instruction and clinical instruction reported in the nursing literature, student learning was clearly time and place bound. Surprisingly, student learning was geographically separated by learning domains.

Cognitive and affective learning domains.

Formal education in nursing and allied health education characteristically initiates in academic institutions. Student learning in the cognitive and affective domains is introduced in lecture halls and psychomotor skills are introduced and practiced in academic laboratories. Students are required to apply classroom and laboratory learning in apprenticeship-like clinical learning activities, where the focus of student development is expansion of psychomotor skill. This common practice is based on the assumption that student academic learning would accumulate as knowledge-in-waiting and transfer as clinical knowledge-in-use. The first phase of development is knowledge-in-waiting, located in the learner, and created through past experiences including formal didactic, affective, and psychomotor instruction in the academic setting. The literature shows nursing and physical therapy students clearly formed connections between real time learning and past experiences (Chapman, 2006; Cope et al., 2000; Graham, 1996; Prowse & Lyne, 2000). Study participants, including coordinators, preceptors, and students, consistently acknowledged classroom instruction as the source for learning in the cognitive domain which manifested as knowledge-in-waiting in the student. This pervasive finding is dramatically and empirically documented by one clinical site included in the Recently Added Clinical Facilities Case Study. This particular clinical site recently centralized its phlebotomy

team, requiring phlebotomists hired for the centralized phlebotomy team to attend a NAACLS-approved phlebotomy program and obtain phlebotomy certification by challenging the certification examination offered by the ASCP Board of Certification as a condition of hire. The preceptors from this particular site had a unique perspective regarding the power of knowledge-in-waiting obtained as a result of learning from the college classroom. The preceptors correlated increased patient satisfaction scores with the expanded knowledge base of the phlebotomists gained through classroom instruction of a NAACLS-approved program.

In spite of a solid NAACLS-approved and standardized curriculum, variations between the classroom and clinical setting presented challenges for students, preceptors, and coordinators, and was a constant finding in the data. Discrepancies between classroom and clinical procedures manifested as a values clash between preceptors and students. The data clearly indicated students internalized the value for performing classroom procedures. For example, occasionally and for a variety of valid clinical reasons, preceptors would deviate from the classroom order of draw. This variation in technique, and the students' strong, internalized value for the classroom order of draw, served as a source of frustration for the preceptors and anxiety for the students. A consistent framework or mechanism for student reflection activities was absent in the data. The absence of a formal pedagogically-based mechanism for debriefing students on advanced clinical decisions as well as the rapid pace of the environment created a values clash between students and preceptors. Students learned professional values in the classroom, as captured in Discussion Board assignments. Moreover, the data clearly and strongly demonstrated that students internalized values

related to procedures and professional behavior learned in the classroom. No infrastructure or pedagogy emerged in the data to assist students with developing cognitive and metacognitive skills to explore exceptions to the standard classroom procedures and appropriately used in the clinical environment.

Limited findings in the literature reported an increase in nursing and physical therapy student problem-solving ability as a result of instructional strategies based on cognitive apprenticeship (Daley et al., 2000; Graham, 1996). In contrast, the preceptors in this study described a gap in student learning related to such critical thinking skills as the student's inability to connect specimen suitability with the laboratory test for the patient's condition. The preceptors acknowledged the clinical as a unique learning environment, providing an opportunity for students to make the necessary connections between evacuated tube additives, specimen suitability guidelines, and patient clinical conditions. However, the onus for directing the development of critical thinking skills in the cognitive domain was absent in the data. Despite the importance assigned to critical thinking skills to assess specimen suitability and correlate laboratory analyses with patient conditions, student critical thinking skills were not assessed or documented in the clinical setting or supported asynchronously by faculty. However, asynchronous, web-based discussions emerged as a vehicle that effectively diminished the barriers of time and place, allowing college faculty to lead student discussions regarding values clarification associated with clinical practices correlating to course learning outcomes.

Psychomotor learning domain.

In the clinical, knowledge-in-waiting is transferred to knowledge-in-use. During the initial stages of the student's clinical experience, knowledge-in-use is located almost entirely in the clinical preceptor who has reified theoretical knowledge into clinical practice through his or her experience (Cole & Wertsch, 2002; Spouse, 1998). In this study, clinical coordinators and preceptors strongly viewed the clinical as an extension of the students' classroom learning and recognized classroom learning as knowledge-in-waiting and the clinical learning experience as the catalyst for transferring knowledge-in-waiting to knowledge-in-use. The data clearly and consistently documented coordinators and preceptors valued a strong classroom foundation prior to clinical training. Therefore, the focus on learning in the clinical was principally entrenched in the psychomotor domain.

Student learning in the psychomotor domain was visible and documented through the logs of completed blood collection procedures and calculated success rates. As a result of preceptors' skillful and consistent application of traditional apprenticeship strategies, student skills in performing phlebotomy tasks markedly increased over the course of their clinical learning experience. Student problem-solving abilities were limited to completing tasks as part of the daily workload: effectively communicating with patients, selecting an appropriate venipuncture site, transporting specimens, etc. As demonstrated in the data, students struggled most with psychomotor techniques they did not have the opportunity to practice extensively in the classroom. Common learning challenges reported by clinical coordinators, preceptors, and students were exclusively related to the psychomotor domain and

associated with developing advanced phlebotomy skills required to successfully obtain quality specimens from seriously ill patients using specialized equipment. The preceptors worked tirelessly and consistently to expand students' psychomotor skills, particularly in association with advanced venipuncture techniques.

Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health preceptor-led clinical internship experience on community college student learning?

The findings of this study documented preceptor-led clinical education improved and expanded student learning and are consistent with studies reported in the nursing literature (Chapman, 2006; Charleston & Happell, 2005; Hart & Rotem, 1994; Lofmark & Wikblad, 2001; Ohrling & Hallberg, 2000; Starr & Conley, 2006). The nursing literature studies were limited and presented from the student's perspective. The findings of this study included the perspectives of clinical coordinators and preceptors, as well as the student perspective. The data of this study identified three unique elements of the clinical learning experience contributing to the expansion of learning. Components of the clinical learning experience that significantly impact student learning are the clinical setting; clinical preceptors; and reality shock.

Clinical setting.

The clinical setting was widely regarded by all of the study participants as a learning environment equipped with a unique set of resources employed by preceptors to improve and expand student knowledge, skill, and confidence. Consistent with this belief, clinical coordinators and preceptors were highly committed to providing as

robust and varied a clinical learning experience to students as possible. As noted in the work with medical students completed by Dolmans et al. (2002), "The learning experiences of students during rotations in hospitals and out-patient clinics are characterized by variability, unpredictability, and lack of continuity" (p. 735). Consistent with the characterization noted by Dolmans, et al. (2002) participants of this study also documented the variability, unpredictability, and lack of continuity of the clinical. Additionally, study participants valued the unpredictable and highly variable nature of the clinical as the foundation of student learning during the clinical and as the catalyst for expanding student learning beyond classroom boundaries. Student learning in this variable and unpredictable environment was insured by sufficient time on task.

Student learning as a result of sufficient time on task was a robust finding in the data. This finding was consistent with nursing literature from the students' perspective, documenting time on task and experience in the clinical improved nursing student problem solving abilities and clinical confidence (Lofmark & Wikblad, 2001; Charleston & Happelle, 2005). Clinical coordinators, preceptors, and students acknowledged adequate time in the clinical setting in combination with extensive access to a wide variety of patients as essential to the development of entry level professional skills in students. The clinical experience, characterized by the tremendous variability of the unique environment provides an inimitable learning opportunity for students. Preceptors and students moved from patient to patient throughout the health care facility. Consequently, learning continually shifted throughout the day, representing a continual change in learning environments. Every

time a preceptor and a student approached a patient prior to specimen collection, they entered a new learning environment which served as an unfixed and unique classroom.

This study's participants acknowledged sufficient time on task was necessary for learning as a result of the unique environment and diversity of patient circumstances. Additionally, the results of this study demonstrated the clinical provided students an opportunity to transfer classroom knowledge-in-waiting to clinical knowledge-in-use. This finding is consistent with constructivist theory: learners construct knowledge based on experience, integrating new knowledge and experiences with previously learned knowledge and experience through legitimate peripheral participation within a community of practice (Brown et al., 1989; Collins et al., 1989; Kerka, 1997; Lave, 1988; Lave &Wenger, 1991; Rogoff, 1990; Wenger, 1998). Clinical coordinators, preceptors, and students recognized the students' authentic team participation interacting with patients and contributing to their care as essential to the development of entry level professional skills in students. Additionally, the findings of this study support reports in the nursing literature recognizing the preceptor-led clinical learning experience contributes to increased self-confidence in student performance of clinical duties and the development of student ability to independently assume professional responsibilities as part of the health care team (Byrd et al., 1997; Hood & Youtsey, 1997; Lofmark & Wikblad, 2001; Ohrling & Hallberg, 2000; Starr & Conley, 2006). Student learning was guided through the volatile and unpredictable situated learning environment by preceptors.

Clinical preceptors.

The absolute absence of data in this study regarding the contribution of the preceptors to student learning from the preceptors' perspective was startling. Data regarding the impact of the preceptors on student learning from the preceptor's perspective was nonexistent. The preceptors did not correlate their efforts with student development into entry level professionals or the pivotal role they played in facilitating that development. The student's clinical day is structured and organized by the preceptor, who continually balanced the learning needs of the student with heavy work load demands. The preceptors served as facilitators of student learning within the ever changing clinical. In spite of the significant responsibilities for student learning assumed by the preceptors, the preceptors seemed oblivious to the importance of their role in student learning.

In stark contrast to the absence of preceptor acknowledgement of the pivotal role they play in student learning, coordinators and students strongly identified the essential contributions of the preceptors to student learning and recognized preceptors had a tremendous impact on the quality of the student's clinical learning experience. In this study, the evidence emphatically indicated the greatest impact on the quality of learning was determined by the preceptor and directly correlated to the preceptor's ability to role model professional behavior and skill. This finding is consistent with the nursing literature (Byrd et al.,1997; Chapman, 2006; Hart & Rotem, 1994; Ohrling & Hallberg, 2000) and also with traditional apprenticeship (Collins et al., 1991). Contributing to the variable nature of the learning is the conflicted role of the preceptor, who is responsible both for maintaining the pace of the work and for

supervising the students' experiences. Congruent with the nursing literature, time limits and the absence of compensation for the additional teaching responsibilities contribute to a range of preceptor skill and preparation (Bain, 1996; Byrd et al., 1997; Chapman, 2006; Lofmark &Wikblad, 2001; Ohrling & Hallberg, 2000). Students characteristically worked with a number of preceptors throughout their clinical learning experience, adding to the variability of instruction.

The opportunity to work with a variety of preceptors was perceived as value-added to the students' learning by coordinators and preceptors. The benefits of working with a variety of experts, in this case preceptors, is consistent with situated learning theory operationalized by cognitive apprenticeship as described by Collins et al. (1989). The student participants in this study, however, often had a distinctly different viewpoint. Preceptors expected students to adhere to each preceptor's individual approach to clinical responsibilities. This variety created confusion for the students, who frequently were assigned to a wide range of preceptors and, therefore, were required to remember a wide variety of individual approaches. Student confusion resulting from working with multiple preceptors, each with a unique approach to performing phlebotomy, was a consistent finding.

Consistent with the nursing preceptor model, phlebotomy preceptors are not specifically hired or trained to serve as preceptors for students, which may add to the confusion and frustration for both students and preceptors. In this study, preceptor selection was widely variable ranging from volunteer mechanisms to selecting the most suitable phlebotomist for a particular clinical learning situation. Consistent with reports in nursing literature, preceptors participating in this study accept responsibility

for training students in addition to their work-related duties. The variability of preceptor selection mechanisms and the lack of training results in a range of student clinical learning experiences. Additionally, the clinical coordinators recognized the need for preceptor training and preparation for their complex roles and responsibilities.

From the nursing student perspective, a positive association with staff led to increased professional confidence and self-assurance, and a negative association with a nursing clinical supervisor led to stress and damaged self-esteem (Lofmark & Wikblad, 2001). The results of this study were consistent with the findings in nursing literature. Additionally, this study clearly identified the gap in training and preparation for preceptors as also consistent with findings in the nursing literature (Bain, 1996; Byrd et al., 1997; Hart & Rotem, 1994). Students participating in this study acknowledged and respected the knowledge, skill, and speed of their preceptors. The students also appreciated being welcomed and encouraged by their preceptors and valued preceptors who were patient and understanding. A positive relationship between preceptors and students eased student transition through reality shock, experienced as anxiety in students beginning a new role with limited knowledge and experience (Bain, 1996).

Reality shock.

Reality shock was a major finding from study participants and was consistent with reports from nursing literature (Bain, 1996; Byrd et al., 1997; Lofmark & Wikblad, 2001; Ohrling & Hallberg, 2000; Starr & Conelly, 2006). The rapid pace of the laboratory, maintained by the preceptors while providing learning opportunities for

students, was part of the students' learning curve and a difficult adjustment for them. In addition, learning in the clinical environment required students to adjust to a lack of patient cooperation and rude behavior with a very diverse patient population. circumstances. Students were also overwhelmed by the vital impact of their work on patient care. As a result, students heavily relied on their classroom learning to navigate these sometimes overwhelming new realities.

The gap between classroom learning and the clinical setting is consistent with the findings in nursing literature (Byrd et al., 1997; Ohrling & Hallberg, 2000; Starr & Conelly, 2006). A consistent finding in the data documented student reluctance to deviate from procedures learned in the classroom and more specifically, the book, which caused frustration for the clinical coordinators and preceptors. Student response to preceptor directives to "throw the book away" or to "forget what you learned in class" was confusion and anxiety. Reality shock for students, as defined by Kramer (1974) and reported by Bain (1996), occurred in this study as a result of a gap in students' knowledge and skills as they transitioned from the classroom to the clinical learning environment. Cognitive and metacognitive development in students associated with rationale for addressing the gap between classroom and clinical techniques and procedures was not addressed by coordinators, preceptors, or college faculty in a systematic manner. Additionally, the results of this study did not document systematic assessment of student cognitive and metacognitive development as a result of transitioning from classroom to clinical by program stakeholders.

Conclusions

This study advances current research and practice in four important ways. First, the results and conclusions of this study expand current research to include allied health preceptor-led clinical education for students, in addition to findings currently reported predominantly in the nursing literature. Second, the results of this study contribute to the fledging collection of research based on situated learning theory as a framework for authentic learning experiences, documenting the connection between knowledge-in-waiting and knowledge-in-use. Third, this study generates unprecedented insights into how students construct learning in a clinical setting using cognitive apprenticeship. Last, the results of this study document student learning is time and place bound, based on learning domains.

Preceptor-led Clinical Education

This study expands research on preceptor-led clinical education reported in the predominantly nursing literature to include allied health clinical education for students. Additionally, many of the studies reported in the nursing literature were limited in scope, collecting data and findings predominantly from the perspective of nursing students. This study includes the community college student perspective, but also expands the data to include the perspectives of clinical supervisory personnel. The findings in this study are consistent in many ways with nursing literature, documenting the preceptor learning experience improves and expands student learning. Additionally, this study identifies three unique elements of the clinical learning experience contributing to student learning: the clinical learning environment; preceptors; and reality shock.

Consistent with a study conducted with medical school students (Dolmans et al., 2002), the findings of this study confirms the variable, unpredictable, and quick pace of the clinical environment uniquely serves to improve and expand student learning. Because of the inimitable and chaotic nature of the environment, this study documents sufficient time on task is required to develop student competency to the equivalent of an entry-level professional. Additionally, preceptors play a pivotal role in the expansion of student learning, a finding consistent with the nursing literature. However, the preceptors participating in this study, while highly committed to student learning, appear to have no concept of the impact of their role on improving and expanding student learning.

The study's preceptors report conflicting roles of patient responsibilities and supervising student experience, consistent with the nursing literature. This study documents student reality shock as a consequence of their clinical learning experience, also a finding consistent with the nursing literature. However, in this study, when students experience reality shock, they characteristically revert to procedures learned in the classroom, leading to a values clash between students and preceptors. The nursing literature reported reality shock as the result of a gap in standards used in the classroom and clinical setting, causing stress for nursing students, but did not correlate student reliance on classroom learning as a result of values internalization. The preceptors' approach to student learning in the clinical appears strongly rooted in traditional apprenticeship, but is not articulated as situated learning theory.

Situated Learning Theory

This study represents the first study framed by situated learning theory conducted on preceptor-led clinical education for community college students. The zone of proximal development is a two-stage theory of development employing language and cultural artifacts to scaffold learning between actual student development and maximum student potential for learning within a particular environment (Cole & Wertsch, 2002; Daley et al., 2008; Kolb, 1984; Rogoff & Lave, 1999; Spouse, 1998). This study's results document the theory of proximal development is congruent with the learning process of the allied health student in the clinical. The first phase of development is knowledge-in-waiting, located in the learner and created through past experiences including formal didactic and psychomotor instruction. Participants, including clinical coordinators, preceptors, and students, consistently acknowledge classroom instruction as the source for learning in the cognitive domain which manifests as knowledge-in-waiting in the student. Additionally, participants in this study acknowledge highly developed knowledge-in-waiting in students as a foundation for student learning in the clinical setting. This is empirically demonstrated by one set of participants (Recently Added Clinical Facilities) who report significant increases in patient satisfaction scores directly as a result of a classroom learning experience. This unique group of participants directly correlate the dramatic increases in patient satisfaction scores with the recently expanded knowledge base of the phlebotomists, providing empirical data for a pervasive finding in this study.

The second phase is knowledge-in-use. During the initial stages of the student's clinical experience, knowledge-in-use is located almost entirely in the

clinical preceptor who has reified theoretical knowledge into clinical practice through common experience (Cole & Wertsch, 2002; Spouse, 1998). In this study, coordinators and preceptors view the clinical experience as an extension of the students' classrooms. Phlebotomy preceptors consistently employ language and cultural artifacts to transfer knowledge-in-waiting to knowledge-in-use. The clinical serves as the catalyst for making knowledge-in-waiting in the student visible as knowledge-in-use. The preceptor serves as the change agent, vital to reifying knowledge-in-waiting in students. Student construction of learning is documented in this study using the cognitive apprenticeship model.

Cognitive apprenticeship.

The guidelines of traditional apprenticeship (observation, coaching, scaffolding / fading) are strongly evident and consistently employed to improve student knowledge and skill. The use of a traditional apprenticeship, while consistently and effectively applied in this study, is not based on pedagogy, but on best training practices developed over time by just plain folks (Lave, 1988). The use of cognitive apprenticeship (articulation, reflection and exploration), consistent with a study conducted with physical therapist students (Page & Ross, 2004), is not strongly evident in the data. The fast pace of the clinical with its focus on the work of the department impedes discussions required to direct student cognitive and metacognitive development simply because sufficient time is not available during the work day to address the cognitive components of student learning. Preceptors do not routinely provide an explanation for the decisions made, the factors considered, or the critical thinking involved to prioritize work tasks. Immediately upon completion of work load prioritization, completion of clinical tasks is initiated. However, evidence of the

elements of cognitive apprenticeship is found in student responses posted to Blackboard Discussion Boards, suggesting cognitive and metacognitive development, consistent with the separation of academic and clinical education, is relegated to college faculty and simply not addressed by clinical preceptors, who focus their efforts on the psychomotor learning domain.

The results of this study strongly suggest the elements of cognitive apprenticeship are suitable to establish a pedagogical foundation for clinical experiences for students. Traditional apprenticeship is widely employed as instructional strategies used to promote student learning, although not credited by study participants. Inconsistent use of the elements of cognitive apprenticeship is evident in the data. When cognitive apprenticeship is evident in this study, it is initiated most consistently by faculty and students and much less frequently and sporadically by clinical preceptors and coordinators. In spite of intermittent use, web-based tools provide an opportunity for college faculty to guide asynchronous instruction and lead students through cognitive and metacognitive development concurrent with their clinical internships. The use of cognitive apprenticeship as instructional pedagogy framing allied health student clinical learning experiences designed to develop cognitive and metacognitive processes in students has tremendous potential and represents a significant finding of this study.

Locus of Student Learning

One of the most surprising findings of this study was the clear and consistent demarcation of student learning across learning domains. The migration of nursing and allied health programs from hospitals to academic facilities in the 1970s and

1980s, resulted in a location change for student learning and a shift in emphasis in instruction (Cope et al., 1999) Consistent with the separation of theoretical instruction housed in academic settings and clinical instruction located at clinical facilities reported in the nursing literature, student learning is clearly time and place bound. Surprisingly, student learning is geographically separated by learning domains.

This study documented student learning across the cognitive, psychomotor, and affective domains. Responsibilities for student instruction are clearly delineated among program stakeholders. Student learning in the cognitive domain is informally acknowledged by study participants as the responsibility of college faculty. While college faculty introduce basic psychomotor skills in college laboratories, the most significant learning in the psychomotor domain occurs in the clinical setting, where the preceptors use the unique characteristics of clinical learning to improve and expand student learning, including reification of theories and principles taught in the classroom. Student learning in the affective domain originates in the college classroom, and is challenged in the clinical setting, often clashing with the values of efficiency, speed, and "saving the patient a stick" internalized by preceptors. Students participating in this study are socialized to embrace professional values for speed and efficiency as a result of their clinical experience and internalized those values to various degrees.

This clear delegation of duty across learning domains is inconsistent with the use of cognitive apprenticeship as an instructional method because "... our term, cognitive apprenticeship, refers to the focus of the learning-through-guided experience on cognitive and metacognitive, rather than physical skills and processes" (Collins,

Brown, Newman, 1989, p. 457). The preceptors in this study did not consistently strive to develop cognition or metacognition in students, possibly due to a lack of time within the constraints of their work load. Study participants clearly assign responsibility for student cognitive and metacognitive development to faculty, including higher order thinking skills required in the clinical setting. However, strategies for making cognitive and metacognitive development visible involve reading, writing, and speaking in real time. In the preceptor-led clinical education model, allied health students are frequently assigned to multiple clinical sites at once, under the indirect supervision of one faculty member. For example, the program used for this study commonly assigns as many as 14 students simultaneously to various clinical affiliate sites for clinical internships. It is obviously impossible for one faculty member to provide instructional support for real time cognitive learning for 14 different students in a 14 different locations simultaneously!

Web-based technologies are effectively used to break the barriers of time and place for student learning. Interestingly, this study demonstrates the effective use of Blackboard Discussion Boards to promote cognitive development in students. The topics included in this study for web-based, asynchronous discussion are topics selected based on course learning outcomes: patient identification, cultural competency, specimen quality, etc. Student posts to Discussion Board assignments successfully document critical thinking skills used by students in response to scenarios related to course learning objectives. These findings suggest tremendous potential for using technology to break the barriers of time and place for faculty responsible for cognitive and metacognitive development in allied health students.

Implications for Practice and Research

Implications for Practice

Several implications for practice are immediately apparent based on the results of this study. First, this study uniquely documents the importance of the clinical learning experience for allied health students. This finding, while congruent with the reports in the nursing literature, is specific to allied health and is extremely important for community college leaders, who are increasingly required to supply data to support decisions regarding instructional practices. The data in this study strongly reinforces and documents the necessity of requiring the significant number of contact hours students spend in the clinical learning environment. The purpose of the clinical is to allow students to develop entry-level professional skills. The preceptor leads and directs the students' transition from classroom to entry level professional, as a result of the clinical experience.

In spite of the crucial role the preceptor plays in student development, the preceptors in this study are seemingly unaware of their significant contributions to student learning. Therefore, the second implication for practice is associated with preceptor training. The first task in providing preceptor training is to raise their awareness of the critical role they play in student development. Certainly, student development is important from the students' perspective, but it is also critically important from a human resource perspective. Developing a strong, highly skilled human resource pool ultimately results in providing quality care to the community. The data in this study overwhelmingly indicates the preceptors require orientation to

the critical role they play in community health care delivery as a result of providing clinical training to students.

To assist preceptors with the task of reifying knowledge in students, a pedagogy for structuring the clinical learning experience must be established. Cognitive apprenticeship, including both traditional and cognitive components, will provide instructional pedagogy for a learning environment that currently has none. In this study, the preceptor played a pivotal role in student learning during the clinical learning experience, but preceptors have very little foundation to work from simply because none exists. When preceptors were asked how instructional practices have changed over the several years, they referred exclusively to procedural changes and did not reference instructional practice. By establishing a pedagogical framework for the clinical experience, allied health preceptors can be intentional about how they approach clinical training with students. By defining instructional strategies and providing preceptors with language consistent with the instructional practices, continuous quality improvement strategies may be developed and implemented to assist the preceptors with the very difficult and complex task of reifying knowledge-in-waiting in students.

Training of clinical preceptors charged with providing clinical leaning experiences for allied health students is one of the recommendations made at the National Consensus Conference titled, "Pioneering Allied Health Clinical Education Reform" (Little & Harmening, 1999, p. 172). The findings of this study are an important first step in providing a set of instructional strategies based on situated learning theory and facilitated by cognitive apprenticeship for use by clinical

preceptors. In addition to providing clinical preceptors with theoretically-based instructional strategies, training for preceptors is necessary to develop a conceptual framework for student learning within the clinical learning environment (Little & Harmening, 2000). Training preceptors on instructional strategies associated with traditional apprenticeship would validate instructional strategies already consistently and effectively employed by phlebotomy clinical preceptors, but unrecognized and unnamed as instructional strategies. The use of cognitive apprenticeship to develop cognitive abilities in students is less well developed.

The elements of cognitive apprenticeship (articulation, reflection, and exploration) are inconsistently applied to construct student learning in the clinical learning environment. The impetus for cognitive development occurs primarily in the students, with preceptor and faculty-driven support ranging from minimal and inconsistent to none at all. The most consistent development of student cognitive processes was documented in student remarks posted to the Discussion Board assignments. This is a powerful insight because technology is a common instrument used in current educational systems to break the barriers of time and place for student learning.

Learning in the clinical environment occurs in real time and concurrent with work load completion. The quick pace of the environment requires the student and preceptor to be in a state of constant movement, travelling from one patient situation to the next. The nature of the work flow prevents predictable, continuous preceptor led conversations allowing students to debrief or process learning that occurred as a result of the student's experience with patients. Adding to the disjointed context, cognitive

development of the students in phlebotomy is not clearly and specifically articulated as a learning outcome of the experience, a deficiency also noted in the nursing literature (Hart & Rotem, 1994; Lofmark & Wikblad, 2001). The basic inability to clearly and consistently measure student cognitive development given the unpredictable and inconsistent nature of the learning environment leaves a gap in articulated learning outcomes and consequently a deficiency in student cognitive and metacognitive development.

This deficiency represents an opportunity to initiate dialogues with clinical site personnel to identify the higher order thinking skills and problem solving strategies currently not being addressed. Once deficiencies are defined, instructional strategies employing articulation, reflection and exploration techniques may be developed and implemented. In spite of the confusion associated with cognitive learning objectives for the clinical learning experience, this study documented Blackboard Discussion Board as effective tools for supporting and directing student cognitive development. When students were assigned topics related to their clinical experience, they were able to consistently articulate rationale and problem-solving strategies related to the assignments. The effectiveness of web-based asynchronous discussion tools albeit in a limited way suggests untapped potential for this resource.

One exciting possibility for applying the findings of this study to practical applications is the use of simulation exercises. The results of this study respond to the question, "Can new models such as technology solutions/computer simulations... facilitate clinical education?" (Little & Harmening, 2000, p. 174). Once higher-order thinking and problem solving skills are established for students, learning outcomes can

be created and simulation exercises developed. College simulation laboratories could be used to mirror clinical situations requiring higher order thinking and problem solving skills and students would have the opportunity to develop and practice cognitive and metacognitive strategies in a controlled environment before going to the clinical setting.

Implications for Future Research

The results of this study strongly suggest situated learning theory using cognitive apprenticeship may serve as an excellent pedagogical foundation for student learning in the clinical environment. However, this study is limited in scope and includes one certificate-level program in one community college. While the program studied is large, in terms of student population and number and variety of clinical sites, the study should be repeated using another certificate-level program similar in scope and content. Also, phlebotomy is an entry level health care skill developed through completion of a certificate program over two semesters and students at this level are often academically underprepared. Therefore, higher order thinking skills may not be consistently developed at this level of education. For that reason, the study should be also be repeated at an associate degree level that also deliver clinical education in a preceptor-led format. Such programs as respiratory therapy, radiology, or health information technology may be used to determine the extent of cognitive development at the associate degree level, using the cognitive apprenticeship model as an instructional strategy. Without future research, as outlined above, the ability to generalize the results of this study is limited.

In continuation of the seminal research conducted by Collins et al. (1989), empirical studies of student learning should be conducted to determine the impact of a defined pedagogy on student learning. Once preceptors are oriented to the traditional apprenticeship framework, which is already strongly in evidence but not articulated, the impact of a defined and articulated set of instructional strategies for the students' clinical learning experience should be studied. Additionally, once developed, the impact on student learning when the instructional strategies of cognitive apprenticeship are applied should be examined. The encouraging preliminary findings related to the positive impact of web-based asynchronous discussions on student cognitive development and the potential for breaking the barriers of time and place for cognitive development using these tools represents an opportunity for additional research. The use of simulation labs to support student learning in critical care situations is currently being implemented in community colleges and may be expanded to simulate clinical conditions to develop higher order cognitive development in students prior to clinical assignment. As a controlled environment, the clinical simulation may be stopped and articulation, reflection, and exploration strategies employed to develop student critical thinking skills, thereby achieving real time learning in a controlled environment, possibly reducing the gap between classroom and clinical documented in the nursing literature and confirmed by this study. Student cognitive development in the clinical setting can be further developed as a result of student clinical experiences through web-based asynchronous discussions.

One rationale for this study is to attempt to discover a mechanism for making student learning in the clinical environment more efficient. The premise is to discover a pedagogy for the clinical learning environment and once a pedagogy is defined, it could be employed to move students through learning paradigms more efficiently, possibly through more effective use of down time. The results of this study did not indicate inefficiencies, in spite of a largely unrecognized pedagogical structure. Instead, the results of this study document the need for expert led student cognitive development based on student clinical learning experiences. The pace of the work environment examined in this study simply did not allow the preceptors to provide the kind of feedback and discussion necessary to promote cognitive and metacognitive development in the students. The effective, albeit limited, use of web-based asynchronous discussions in this study represents unchartered potential in the use of modern technologies to improve and expand student learning, particularly in student cognitive and metacognitive development.

Summary

The results of this nested case study provides important, initial conclusions regarding how students construct learning in a preceptor-led allied health clinical learning setting. The data generate three themes, which informed the research questions: preceptor-led clinical education improves and expands learning in community college phlebotomy students; the components of cognitive apprenticeship support student construction of learning; community college student learning as a result of clinical internship experiences is time and place bound and the locus of student learning is geographically determined based on learning domains.

Based on the results of the study, several conclusions are made. First, in spite of a lack of reference to pedagogy, traditional apprenticeship is widely used as instructional strategies employed by clinical preceptors to promote student learning. The results of this study provide previously undocumented charts and maps for a well-traveled path. The use of cognitive apprenticeship is not as readily apparent and is documented primarily as a result of web-based asynchronous discussions and data collection for this study. However, the results suggest the tenets of cognitive apprenticeship may provide a compass for navigating new opportunities to provide intentional, robust development of cognitive and metacognitive processes in students. As with all literature related to cognitive apprenticeship, more research is necessary, and recommendations for further study include the exploration of using cognitive apprenticeship as an instructional framework in other phlebotomy programs as a comparison to this study as well as comparisons to associate degree allied health programs. Additionally, the untapped resource of web-based asynchronous discussions must be explored and expanded. Studies on the use of simulation labs to promote cognitive and metacognitive development in allied health students consistent with the tenets of cognitive apprenticeship are needed. Web-based and computerized simulation technologies, like the automobile in the early 1900s, represent a new vehicle for transporting learning for students in clinical learning experiences.

Sir William Osler once said, "To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all" (Brainy Quote, 2009).

The clinical learning environment is fast-paced, unpredictable, emotionally charged, and framed within a complicated social network. The results of this study provide an emergent map for navigating the well traveled, but unchartered seas of the clinical learning environment for students.

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APPENDIX A

PHLEBOTOMY PROFESSION DESCRIPTION

NAACLS (2008) described the phlebotomy profession:

> Phlebotomists are proficient in:
>
> a. collecting, transporting, handling and processing blood specimens for analysis;
>
> b. recognizing the importance of specimen collection in the overall patient care system;
>
> c. relating the anatomy and physiology of body systems and anatomic terminology to the major areas of the clinical laboratory, and to general pathologic conditions associated with body systems;
>
> d. identifying and selecting equipment, supplies and additives used in blood collection;
>
> e. recognizing factors that affect specimen collection procedures and test results, and taking appropriate actions within predetermined limits, when applicable;
>
> f. recognizing and adhering to infection control and safety policies and procedures;
>
> g. monitoring quality control within predetermined limits;
>
> h. recognizing the various components of the health care delivery system;
>
> i. recognizing the responsibilities of other laboratory and health care personnel and interacting with them with respect for their jobs and patient care;
>
> j. demonstrating professional conduct, stress management, interpersonal and

communication skills with patients, peers and other health care personnel and with the public;

k. demonstrating an understanding of requisitioning and the legal implications of their work environment;

l. applying basic principles in learning new techniques and procedures;

m. recognizing and acting upon individual needs for continuing education as a function of growth and maintenance of professional competence.

Upon graduation and initial employment, the phlebotomist will be able to demonstrate entry level competencies in the above areas of professional practice.

(http://www.naacls.org/docs/Guide_Approval-section1b-Phleb.pdf., p. I-1)

APPENDIX B

TRADITIONAL APPRENTICESHIP

Table B1

Aspects of Traditional Apprenticeship

Aspect	Description
Modeling	The apprentice observes the master demonstrating different components of a task.
Scaffolding	Refers to the support a master gives the apprentice as the apprentice carries out a task
Fading	The master slowly removes ... support, [and gives] the apprentice more autonomy in completing the task
Coaching	The master oversees every aspect of the learner's learning and a wide range of activities, including selecting tasks, providing hints and troubleshooting student problems.

(Collins et al., 1991, p. 2)

APPENDIX C

COGNITIVE APPRENTICESHIP

Table C2

Aspects of Cognitive Apprenticeship

Aspect	Role of model	Role of learner	Description
Modeling	Model real-life activity that learner wants to perform satisfactorily. Model states aloud the essence of the activity and can include tricks of the trade	Observe performance of total activity, not merely the individual steps. Develop a conceptual framework for how a task will look when performed competently.	Provide a conceptual model of the processes required to accomplish a particular task; requires externalization of usually internal (cognitive) processes
Coaching	Provide coaching to the learner. Provide hints, scaffolding, feedback, modeling, and reminders when needed	Approximate doing the real thing and articulate its essence. Reflect on the model's performance. Use self-monitoring and self-correction	Scaffolding, coaching
Scaffolding and Fading	Teacher provides support to the learner in attempts to complete a task.	Continue to approximate the real thing. Operate in increasingly complex, situations. Work individually or in groups	Completes parts of a task the learner cannot yet manage and fades support as learner skill increases
Articulation	Question learners to lead them to articulate their reasoning or problem-solving. Encourage learners to verbalize their problem solving	Articulate knowledge, reasoning or problem-solving within a situated learning environment. Critique aspects of task completion.	Externalization of cognitive processes

	strategies as they complete a task. Ask learners to critique aspects of cooperative activities.		
Reflection	Replays a process and provides a skillful SWOT analysis of the learner's performance consistent with a cognitive model of expertise.	Compares their problem-solving processes with those of another expert and internal cognitive model of expertise.	Provides learners with a 'gap analysis' of the expert level of problem-solving and the learner's level of problem solving.
Exploration	Push learners into autonomous problem solving.	Develop strategies for problem-solving unassisted.	Natural culmination of fading or supports

Brandt et al. (1993); Collins et al. (1989); Cope et al. (2000); Nickle (2007); Page & Ross (2004); Wong & Matsumoto (2008); Wooley & Jarvis. (2006)

Table C3

Goals of Cognitive Apprenticeship

The goal IS to help individuals learn:	The goal is NOT to:
What works acceptably	Give learners opportunities to figure out on their own what will work acceptably
How to understand and deal with specific types of tasks, problems, or situations	Teach unsituated knowledge and principles
The use of appropriately integrated practical and theoretical knowledge	Teach theoretical and practical knowledge in isolation from each other
Acceptable performance	Teach simplified skills that foster novice performance

Source: Brandt et al., 1993, p. 71.

APPENDIX D

SUMMARY: SEMINAL STUDIES USING COGNITIVE APPRENTICESHIP

Table D4

Three Success Models Using Cognitive Apprenticeship

Author	Subjects	Elements of cognitive apprenticeship used in the study	Results
Palincsar and Brown (1984)	Reading to 7th and 8th grade students	Employed modeling, coaching, reflection, and scaffolding on four essential reading skills. Students ultimately act as critics, articulating knowledge about quality reading processes providing an opportunity for learning to become generalized to other contexts.	Comprehension scores increased from 15% to 85% after 20 training sessions
Scardamalia and Bereiter (1985)	Writing to children who are novices in the writing process	Modeling of expert writing created a conceptual framework for students. Student writing efforts were supported through coaching and developed using scaffolding and fading while providing strategies for reflection.	Superior revisions for every student and a ten-fold increase in the frequency of idea-level revisions
Schoenfeld (1983, 1985)	Math to college students	Modeling of expert problem solving created a conceptual framework for students; Coaching, scaffolding / fading also employed in addition to specific heuristic problem-solving strategies through scaffolding and fading. Provided opportunities for articulation and reflection. Highlights were generalized through *postmortem* analysis.	Significantly increased students' problem-solving strategies

Source: Brown et al. (1989); Collins et al. (1991)

APPENDIX E

TIME STUDY AND COGNITIVE APPRENTICESHIP

Table E5

Results of Work Items of Physical Therapist Clinical Instructors

Instructional strategy	Percentage of total instruction
Modeling	12.90 %
Coaching	19.20%
Scaffolding	19.62%
Articulation	9.86%
Reflection	4.08%
Exploration	34.34%

(Page & Ross, 2004, p. 46)

APPENDIX F

MAXIMUM VARIATION AND TYPICAL CASE SAMPLING

Table F6

Characteristics of Clinical Sites Selected by Maximum Variation Sampling

Clinical site	Number of beds	Number of bassinettes	Laboratory volume/year	Number of FTE phlebotomists
Adventist LaGrange Memorial Hospital LaGrange, IL	328	16	900,958	5
Advocate Christ Hospital Oak Lawn, IL	600+	44	1,800,000	32
Alverno Clinical Laboratories - Olympia Fields Patient Service Center Olympia Fields, IL	0 Outpatients only	0 Outpatients only	1,501,455	2
Alverno Clinical Laboratories - St. James Hospital Chicago Heights, IL	230	50	406,169	9
Alverno Clinical Laboratories - St. James Hospital at Olympia Fields Olympia Fields, IL	156	0	414,470	11
Edward Hospital Naperville, IL	417	0	961,595	27
Ingalls Memorial Hospital Harvey, IL	563	41	1,250,000	37

Little Company of Mary Hospital Evergreen Park, IL	294	24	776,035	31
Northern Illinois Clinical Laboratories Willowbrook, IL	0 Outpatients only	0 Outpatients only	150,000	2
Pronger Smith Clinic Blue Island, IL	0 Outpatients only	0 Outpatients only	64,769	5
Quest Diagnostics Naperville, IL	0 Outpatients only	0 Outpatients only	6,600,000	305

Table F7

Characteristics of Clinical Sites Selected by Typical Case Sampling

Clinical Site	Number of beds	Number of bassinettes	Laboratory volume/year	Number of phlebotomists
Advocate South Suburban Hospital Hazelcrest, IL	289	25	2,045,617	29
Palos Community Hospital Palos Heights, IL	424	32	1,025,881	25
Silver Cross Hospital Joliet, IL	245	21	800,000,000 - 1,000,000,000	27

APPENDIX G

NESTED CASE STUDY: CLINICAL AFFILIATE SUBGROUPS

Table G8

Clinical Affiliate Subgroups

Subgroup	Clinical sites	Value added
Outpatient Facilities	Alverno Clinical Laboratories Olympia Fields Patient Service Center Northern Illinois Clinical Laboratories Pronger Smith Clinic Quest Diagnostics	This category will explore how changes in the location of the interface of student learning, i.e., traditional hospital setting to an outpatient setting, impacts student learning.
Non-traditional Scheduling	Alverno Clinical Laboratories - St James Hospital/Chicago Heights - St. James Hospital at Olympia Fields Little Company of Mary Hospital	This category will explore how changes in the timing of the interface of student learning, i.e., day shift vs. afternoon or weekend shifts, impacts student learning.
Recently Added Clinical Sites	Adventist LaGrange Memorial Hospital Advocate Christ Hospital	This category will explore how working with students as an affiliate site has impacted the clinical site.
Located Outside of the District	Edward Hospital Ingalls Memorial Hospital	This category will explore how serving as a clinical affiliate site to multiple programs impacts student learning.
Typical Case	Advocate South Suburban Hospital	This category will explore a "normal" or typical clinical learning

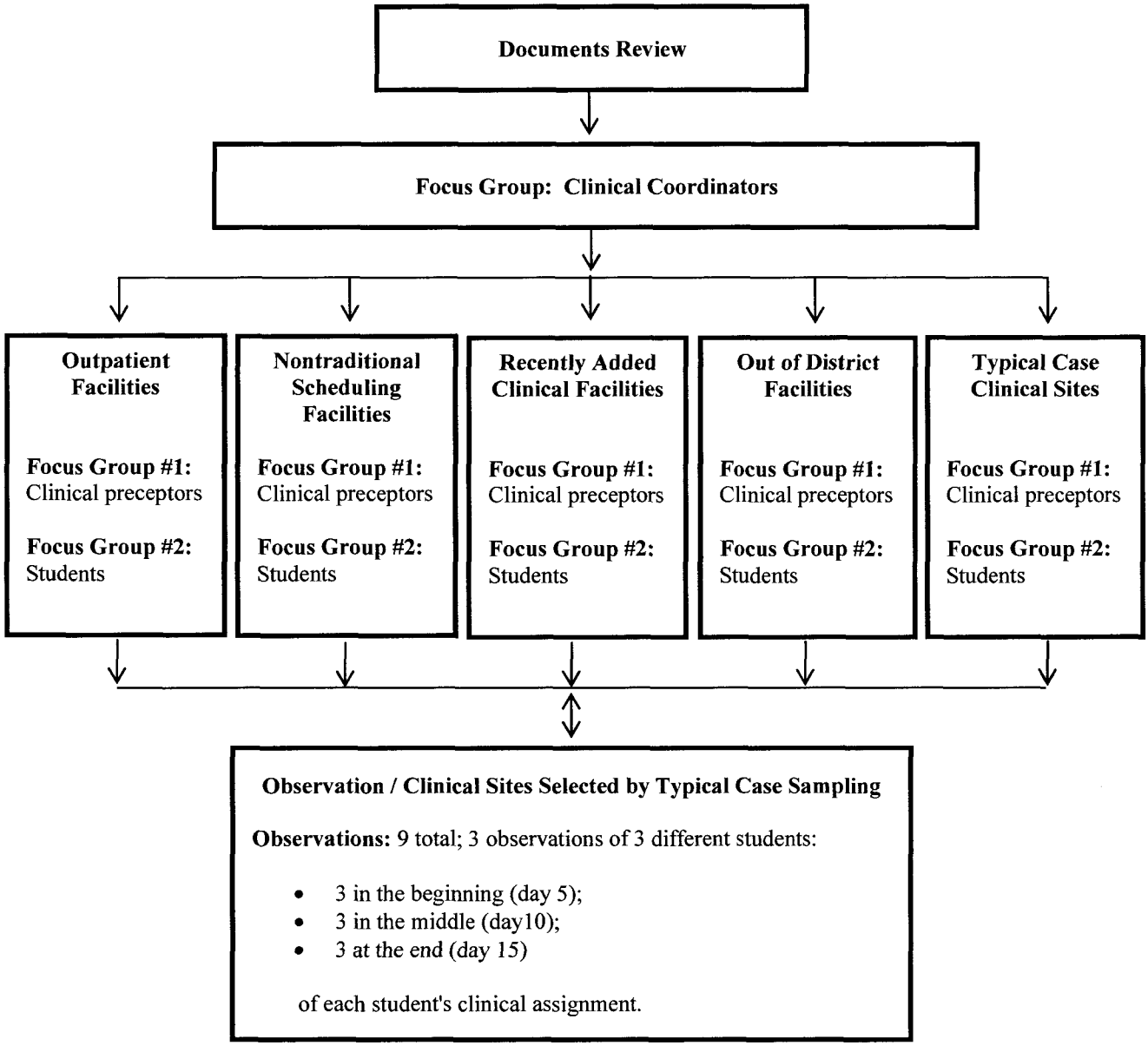
Palos Community Hospital experience.

Silver Cross Hospital

APPENDIX H

NESTED CASE STUDY DIAGRAM

Figure H1. Community College Student Learning in Phlebotomy Preceptor-led Clinical Internship: A Case Study



APPENDIX I

HUMAN SUBJECTS REVIEW

04 /27 /2009
Date Submitted

09-01
File Number

MORAINE VALLEY COMMUNITY COLLEGE
INSTITUTIONAL RESEARCH AND PLANNING

Human Subjects Research Review Board

REQUEST TO CONDUCT HUMAN SUBJECTS RESEARCH

Community College Student Learning in Phlebotomy Preceptor-led Clinical Internship
A Case Study

Title of Research Project

Susan E. Phelan	Health Sciences	5743	phelan@mvcc.edu
Principal Investigator/Project Director	**Department**	**Phone Extension**	**email Address**
None			
Co-investigator	**Department**	**Phone Extension**	**email Address**

None
Funding Source – (circle one :) Anticipated Verified

Projected Duration of Research: *8 months* **Projected Starting Date:** *May 1, 2009*

Other organizations and/or agencies, if any, involved in the study: *Old Dominion University to partially fulfill the requirements for the degree Doctor of Philosophy in Community College Leadership*

SUMMARY ABSTRACT: Please supply the following information below: BRIEF description of the objectives of the research and the subjects or participants in the research Additional information should include the location(s) of the project, the procedures to be used for data collection, whether data will be confidential or anonymous, disposition of the data, and who will have access to the data. Attach copy of the measures (questionnaires) to be used in the project and (if applicable) the Informed Consent Form.

Investigator/Project Director Signature **Date** **Co-Investigator/Student Signature (if appropriate)** **Date**

Signature of HSRRB Committee Chair _____ Date 4/20/2009

HSRRB Chair (Check 1 Box)	Approved	Approved w Conditions	Not Approved
VFI (Check 1 Box)	X 1. Exempt, Research Office Only	2. Subcommittee Review	3. Full Committee Review

APPENDIX J

RESEARCH CONSENT FORM

Researcher: Susan E. Phelan
c/o Moraine Valley Community College
9000 West College Parkway
Palos Hills, IL 60465
Phone:(708) 974-5743
Email: phelan4504@gmail.com; phelan@morainevalley.edu

Thank you for agreeing to participate in this study which will take place from May 1, 2009 to September 30, 2009. This form outlines the purposes of the study and provides a description of your involvement and rights as a participant.

The purposes of this project are:

1) to partially fulfill the requirements for the degree Doctor of Philosophy in Community College Leadership and

2) to study the impact of preceptor-led clinical internship on community college allied health student learning.

The methods to be used to collect information for this study are explained below. From this information, I will write a dissertation and assimilate data obtained for the study into a collective case study.

Research Design
This qualitative research study will employ a nested case study approach. Data will be collected using interviews, observations, focus groups and documents review. The impact of situated learning theory operationalized by the cognitive apprenticeship model will frame this study. A nested case study was selected for this qualitative research study on community college allied health preceptor-led clinical internship because I want to describe the essence of student learning within the context of the kaleidoscope of clinical processes and procedures framed by a complicated social context.

You are encouraged to ask any questions at any time about the nature of the study and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the address/phone number/email address listed above.

This report will be read by you, the phlebotomy program coordinator, the phlebotomy internship coordinator, and by one other person, with your permission, in order to check on the accuracy of the report

I guarantee that the following conditions will be met:

1) Your real name will not be used at any point of information collection, or in the written case report; instead, you and any other person and place names involved in your case will be given pseudonyms that will be used in all verbal and written records and reports.

- Confidentiality of patient identity and health information is addressed in the Institutional Agreement of Affiliation in compliance with the Health Insurance Portability and Accountability Act (HIPAA)
- Confidentiality of student information will be protected consistent with the 1974 Family Educational Rights and Privacy Act.

2) If you grant permission for audio taping, no audio tapes will be used for any purpose other than to do this study, and will not be played for any reason other than to do this study.

3) Your participation in this research is voluntary; you have the right to withdraw at any point of the study, for any reason, and without any prejudice, and the information collected and records and reports written will be turned over to you.

4) You will receive a copy of the transcript of the focus group or observation you participated in before it is incorporated into the collective case study, so that you have the opportunity to suggest changes to the researcher, if necessary.

5) Upon your written request, I will provide you with a copy of the final report.

Do you grant permission to be quoted directly?

Do you grant permission to be audiotaped?

I agree to the terms:

Respondent _____ Date _____

I agree to the terms:

Researcher _____ Date _____

Modified from http://kerlins.net/bobbi/research/qualresearch/consent.html

APPENDIX K

STUDENT SURVEY OF CLINICAL EXPERIENCES

Clinical Site: _____

Semester: (Check one): _____ Fall _____ Spring _____ Summer

Year: _____

Student Name : _____

For my records only – completing this evaluation is a requirement of PHB-112. Your name will ***NOT*** be released in any way to the clinical site. Individual evaluations are confidential – results will be compiled and released to students in the next round of clinical rotations for the purposes of program improvement.

1. The three things I liked *most* about my clinical experience were:

_____

_____

_____

2. The thing I liked *least* about my clinical experience was:

_____

3. If I could redo PHB-112, I would:

_____

4. I wish I had learned more about _____ in PHB-110:

_____

5. The best advice I could give to next semester's PHB-112 students is:

_____

APPENDIX L

DISCUSSION BOARD ASSIGNMENTS

Table L9

Discussion Board Assignments

Title	Assignment
Discussion Board Assignment #1 – First Clinical Impressions	Some of you may have already begun your clinical experience and others of you are waiting to get started. THE ASSIGNMENT: For those of you that have started your clinical rotation, please describe what it is like. What has surprised you the most? How well-prepared do you feel for your clinical experience? For those of you that are scheduled to begin later in the semester, please feel free to ask your classmates about their clinical experience. And, when you begin your clinical experience, then, please post your experiences. PLEASE DO NOT USE FIRST OR LAST NAMES TO REFER TO INDIVIDUALS!!! CONFIDENTIALITY IS OF PARAMOUNT IMPORTANCE!!!!
Discussion Board Assignment #2 - Patient Identification	A student from a previous class had the following experience (slightly edited for grammar and punctuation): "I had an interesting morning and thought it would be one to share. I went to draw a patient this morning. The orders were for a man 52 years old. Well, the first time I went up he was not in his room. An older woman, his mother I assumed, said he went to x-ray. So I went back in half an hour. An older man was in the bed. The older woman was there.[his wife ,it turns out] Hummmm.... 52?? I asked his name. It matched the order. I asked his birthdate...no match. I checked his arm band the name was right, the birthday was not the same as the order. None of the account numbers matched. Nothing. This man had been drawn for troponins all night , every three hours, and it was the wrong patient. We have 2 men, a 52-year old and an 84- year old with the same name.[Even the

	room numbers were wrong!] What about the patient who really was supposed to be tested? Were his meds changed based on the "other" guys results? What is really shocking to me , the last person to draw him was the "Head Phleb" – the very same person who got upset with me when one of my patients was missing the arm band a few weeks ago!! When I brought this up to the "Head Phleb" her attitude was "Oh, well, did you tell the nurse?". I told the Lab manager before I left and he, at least, was interested and wondered how this could happen and thanked me for noticing the mistake. I have been an employeed [sic] Phleb for a month and all these others have been there years and no one noticed... I hope I never get sick....." THE ASSIGNMENT: Where did the procedure break down here? How serious an error was this? Who should be held accountable? Most importantly, what are YOU going to do to prevent making this type of mistake?
Discussion Board Assignment #3 – Cultural Diversity	The communication/cultural diversity assignment in the LRC discussed nonverbal communication mechanisms. In addition, it highlighted cultural differences related to health care among Arabic, Hispanic, and Eastern European (Polish) cultures. THE ASSIGNMENT: What piece of information were you surprised at? How will you change your method of interacting with patients, based on the information presented? Have you witnessed any behaviors, either during clinical or elsewhere in your personal life, that were either intolerant or disrespectful of another person's culture? What is your reaction to the situation?
Discussion Board Assignment #4 – Demonstrating Compassion	The Cultural Diversity reading assignment discussed nonverbal communication mechanisms. In addition, it highlighted cultural differences related to health care. How is compassion communicated to patients of various cultures? What about across the lifespan? THE ASSIGNMENT: Have you witnessed any behaviors during clinical that communicated compassion? What was the

situation? How did the phlebotomist handle the situation? How did the patient respond?

Discussion Board Assignment #5 – Ethics

Though edited the following was featured in February 2008 "Phlebotomy Today STAT!" newsletter as published by the Center for Phlebotomy Education, Inc. This is not an uncommon event as this is also a story from one of our program graduates about what was observed at his/her clinical site. Please read this case study and comment per the assignment below.

"You're a new employee, still on probation, at one of the most reputable hospitals in the region. You were hired out of a 9-month training program at an accredited college and recently passed your national certification exam with flying colors. You've wanted a job at this hospital for as long as you can remember, and now your dream has come true. Because you are new, the lead phlebotomist is shadowing you as you draw a difficult patient. All you need is a blue top coagulation tube for a protime and an aPTT, but the flow stops when the tube is only half-full. You put on another tube. Same thing. You terminate the draw. While bandaging the patient, you notice the lead phlebotomist combining the contents of both tubes so that one tube is completely filled. She tells you to label it."

THE ASSIGNMENT: What would you do? How do you respond in a diplomatic, tactful and ethical manner?

APPENDIX M

DISCUSSION BOARD ASSIGNMENTS AND RATIONALE

Table M10

Discussion Board Assignments and Rationale

Discussion board assignment	Rationale for selection
Clinical impressions	By reviewing this Discussion Board assignment, I gauged the student's perception of the gap between their knowledge-in-waiting and knowledge-in-use.
Patient identification	The literature reports the gap between methods and procedures students learn in school with practices and procedures for the same tasks in the clinical setting. By reviewing this Discussion Board assignment, I determined the student's ability to articulate and reflect, two elements of cognitive apprenticeship, within the context of each student's skill set for this basic yet critically important step in specimen collection procedures.
Cultural diversity and demonstrating compassion	The Cultural Diversity unit of instruction is relatively new to the program and therefore, based on *a priori* knowledge, most working phlebotomists have not had formal training in delivering culturally competent care. By reviewing these Discussion Board assignments, I identified students transfer knowledge-in-waiting to knowledge-in-use even if there is minimal support or role modeling in the clinical setting.
Ethics	The literature reports the gap between methods and procedures students learn in school with practices and procedures for the same tasks in the clinical setting. By reviewing this Discussion Board assignment, I determined the student's ability to articulate and reflect - two elements of cognitive apprenticeship within the context of each student's skill set for addressing this breach in ethics.

APPENDIX N

STUDENT FOCUS GROUP QUESTIONS

Table N11

Correlation of Focus Group Questions to Research Questions - Student Participants

Focus group or interview question	Corresponding research question or rationale
1. Describe the perfect preceptor.	Warm-up question
2. Describe the perfect student.	Warm-up question
3. Is there a gap between what you learned in the community college classroom and practices at clinical? If so, how did you identify the differences and what did you do to resolve them?	Research Question 2: How do community college allied health students reflect on their classroom / laboratory experience during their clinical internship experience?
4. Is there ever 'down time'? If so, what did you do then?	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?
5. What kinds of mistakes or errors did you make at clinical? Describe what happened as a result.	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?
6. What did the clinical internship experience contribute to your learning that you did NOT know when you started your clinical experience?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?
7. What did you do at clinical to promote your own learning?	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?

8.	Did you think about your clinical experience after you left for the day? If so, how did your thoughts / reflections cause you to change your performance of procedures?	Research Question 2: How do community college allied health students reflect on their classroom/laboratory experience during their clinical internship experience?
9.	Did you ever discuss your clinical internship experiences outside of clinical? Who did you talk with? How frequently? What kinds of things did you discuss?	Research Question 2: How do community college allied health students reflect on their classroom / laboratory experience during their clinical internship experience?
10.	Did anything at the clinical site create a barrier to your learning? Please explain.	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?
11.	Is it possible to make student learning in the clinical internship more efficient? If so, how?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?
12.	Is it possible to make student learning in the clinical internship more effective? If so, how?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?

APPENDIX O

CLINICAL PERSONNEL FOCUS GROUP QUESTIONS

Table O12

Correlation of Clinical Personnel Focus Group Questions to Research Questions and Cognitive Apprenticeship

	Focus group question	Corresponding research question	Connection to cognitive apprenticeship
1.	Why was/is the MVCC phlebotomy preceptor-led clinical internship experiences structured as it is?	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection, Exploration
2.	What do you do to improve or expand community college student learning during their phlebotomy clinical experience?	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection, Exploration
3.	Is there ever 'down time' for students? If so, what are community college students expected to do then?	Research Question 1: What are the constructions of learning that emerge in the community college allied health student clinical internship experience?	Modeling
4.	Describe what happens when the community college student has an issue or a problem, such	Research Question 1: What are the constructions of learning that emerge in the	Articulation, Reflection, Exploration

	as a miss or a conflict with a patient.	community college allied health student clinical internship experience?	
5.	Is there a gap between what students learn in community college classrooms and common practices at clinical? First, how do you identify the gap and then what do you do to resolve the difference?	Research Question 2: How do community college allied health students reflect on their classroom / laboratory experience during their clinical internship experience?	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection, Exploration
6.	How frequently do you ask community college students to rationalize a technique or procedure? Please describe a typical conversation.	Research Question 2: How do community college allied health students reflect on their classroom / laboratory experience during their clinical internship experience?	Articulation, Reflection, Exploration
7.	How frequently do you provide feedback to community college students consistent with the standard of practice defined for your facility? Please describe a typical conversation.	Research Question 2: How do community college allied health students reflect on their classroom / laboratory experience during their clinical internship experience?	Articulation, Reflection, Exploration
8.	Please describe changes in clinical preceptor teaching strategies implemented over the last 5 years? 10 years? 15 years?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection, Exploration
9.	How does working with patients within the clinical environment	Research Question 3: How do stakeholders in community college	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection,

	impact community college student learning?	allied health programs describe the impact of allied health student clinical internship experience on student learning?	Exploration
10.	Have you ever hired someone who had weak clinical preparation prior to hire? How did that employee's performance at 3, 6 and 12 months post-hire compare to someone hired following quality clinical preparation at 3, 6 and 12 months post-hire?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?	Modeling, Coaching, Scaffolding/Fading, Articulation, Reflection, Exploration
11.	Is it possible to make learning in the clinical internship more efficient? If so, how?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?	Modeling, Coaching, Scaffolding/Fading,
12.	Is it possible to make learning in the clinical internship more effective? If so, how?	Research Question 3: How do stakeholders in community college allied health programs describe the impact of allied health student clinical internship experience on student learning?	Articulation, Reflection, Exploration

APPENDIX P

OBSERVATION PROTOCOL

The following format was used to document descriptive and reflective notes during each student interaction with patients while being supervised by a preceptor over the course of an 8-hour day. Approximately 25 of these forms were used each day of observation.

Descriptive Notes

Adult Child Estimated Age:

Ethnicity: African-American Arabic Hispanic Oriental
E. European White

Tubes R B L G Grey Y

Order of Draw:

Adaptation Required:

Difficulty of the draw per the student:

Reflective Notes Modeling (Observation); Coaching; Scaffolding/Fading; Articulation (learners verbalize problem solving and critique actions); Reflection (compares their problem solving with the expert); Exploration

VITA

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Education

Doctor of Philosophy — **2004 - Present**
Community College Leadership - Candidate — Norfolk, VA
OLD DOMINION UNIVERSITY
Dissertation: Community College Student Learning in Phlebotomy Preceptor-Led Clinical Education

Master of Health Science in Allied Health Degree — **August, 1980**
GOVERNORS STATE UNIVERSITY — University Park, IL
Major: Allied Health Science Education

Certificate - School of Medical Technology — **July, 1976**
CHRIST HOSPITAL SCHOOL OF MEDICAL TECHNOLOGY — Oak Lawn, IL
Certified as a Medical Technologist by the American Society of Clinical Pathologists (ASCP). Certification Number: MT(ASCP)108002

Bachelor of Science Degree — **July, 1976**
TRINITY CHRISTIAN COLLEGE — Palos Heights, IL
Major: Medical Technology

Employment

Department Chair, Health Sciences — **August, 1999 - Present**
MORAINE VALLEY COMMUNITY COLLEGE — Palos Hills, IL

Department Chair, Public Service — **June 2001 - August 2009**
MORAINE VALLEY COMMUNITY COLLEGE — Palos Hills, IL

Department Chair, Health Sciences and Nursing — **August 1999 - June 2001**
MORAINE VALLEY COMMUNITY COLLEGE — Palos Hills, IL

Full-Time Faculty Member, Phlebotomy — **1994 - Present**
MORAINE VALLEY COMMUNITY COLLEGE — Palos Hills, IL
Internship Coordinator, Phlebotomy Program — **2008 - Present**
Program Coordinator, Phlebotomy Program — **1986 - 2008**
Adjunct Instructor, Phlebotomy — **1986 - 1994**

Professional Committee Membership

Editorial Advisory Board Member — **October, 1997- 2004**
LABORATORY MEDICINE
Chicago, Illinois

Vanguard Learning College Team — **2000 - 2003**
Moraine Valley Community College — Palos Hills, IL

NN2 Planning Committee — **1998 - 1999**
"Y2K MEETS NN2" - NN2 Annual Meeting — Chicago, IL

Programs Approval Review Committee — **1993 - 2001**
NATIONAL ACCREDITING AGENCY FOR CLINICAL LABORATORY SCIENCES — Chicago, IL
Committee Chairman — 1998 - 2001
Committee Vice-Chairman — 1997 - 1998

Coalition for Allied Health Leadership — **1998**
Represented the National Network of Health Career Programs in Two Year Colleges — **April - September**

Phlebotomy Examination Committee — **1988 - 1993**
AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS
Committee Vice-Chairperson — 1988 - 1989

Publications

National Network of Health Career Programs in Two-Year Colleges Spring 2003 Newsletter — **Spring, 2003**
TITLE: "Breaking the Barriers of Time and Place"
Co-authored with Margaret Machon

NAACLS News Article — **Spring/Summer, 2001**
TITLE: "Accreditation and Approval: Similarities and Differences"

Laboratory Medicine — **November, 1999**
Title: "The Costs and Benefits of Clinical Education"

Phlebotomy Review Guide — **1999**
PUBLISHER: ASCP PRESS
Chicago, Illinois
ISBN 0-89189-433-0

"Editorial" in *Laboratory Medicine* — **August, 1999**
TITLE: "Balancing Work and Family - Where's the Procedure?" — Page 496

"Q & A Column" in *Laboratory Medicine* — **February, 1999**
TITLE: "Phlebotomy in Mastectomy Patients" — Page 93

Phlebotomy Techniques: Curriculum Guide — **1993**
PUBLISHER: ASCP PRESS
Chicago, Illinois
ISBN 0-89189-359-8

Phlebotomy Techniques: A Laboratory Workbook **1993**
PUBLISHER: ASCP PRESS
Chicago, Illinois
ISBN 0-89189-343-1

"Blood Collection: Special Procedures" **1991**
PUBLISHER: ASCP PRESS
Chicago, Illinois
ISBN 0-89189-309-1

"Blood Collection: The Pediatric Patient" **1990**
Videotape and monograph
PUBLISHER: ASCP PRESS
Chicago, Illinois
ISBN 0-89189-302-4

Awards

Innovation of the Year (Team) **2011**
Fire Science Cohort Program
MORAINE VALLEY COMMUNITY COLLEGE

Professor of the Year **2003**
MORAINE VALLEY COMMUNITY COLLEGE
Palos Hills, Illinois

Adjunct Professor of the Year **1991**
MORAINE VALLEY COMMUNITY COLLEGE
Palos Hills, Illinois

Outstanding Alumna of Health Professions Education **1988**
COLLEGE OF HEALTH PROFESSIONS
Governors State University
University Park, Illinois