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Medical laboratory science student perceptions of learning during clinical education

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ABSTRACT

MEDICAL LABORATORY SCIENCE STUDENT PERCEPTIONS OF LEARNING DURING CLINICAL EDUCATION

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This study examines the perspectives of medical laboratory science (MLS) students completing their clinical education. Experiential learning provides the conceptual framework for clinical education in the healthcare professions. Students are placed into a community of practice where they are asked to apply learned theories in a sometimes stressful and distracting setting. Through a series of interviews and observations of selected MLS students completing clinical internships, descriptions of factors that contribute to how learning occurs are given in their words. The four categories of findings that are described in depth include student self-awareness, the clinical environment and setting, preparation for clinical education, and preceptor role. Students describe the process of learning as one in which they apply skills learned prior to the internship along with the opportunity to experience professional socialization, teamwork, and unique patient or interprofessional communication. The role of preceptors is key to providing an environment conducive to student learning. These data provide valuable insight to educators of medical laboratory science and other allied healthcare professions investigating student perceptions of clinical education.

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MEDICAL LABORATORY SCIENCE STUDENT PERCEPTIONS OF
LEARNING DURING CLINICAL EDUCATION

BY

JEANNE M. ISABEL

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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
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DOCTOR OF EDUCATION

DEPARTMENT OF COUSELING, ADULT AND HIGHER EDUCATION

Doctoral Director:
Jorge Jeria

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CHAPTER 1
MEDICAL LABORATORY SCIENCE IN PRACTICE

Introduction

The World Health Organization (WHO) follows aspects of healthcare systems and service on a global scale. In a WHO Bulletin published in 2014, Rice et al. describe healthcare system performance in the United States (U.S.) compared to other countries. For example, Rice et al. state that “in 2012 . . . the U.S. spent more than 2.8 trillion US\$--more than 17% of its gross domestic product” (p. 894). Rice et al. also note that U.S. spending on healthcare is 50% higher than that in Norway, which had the highest healthcare expenditure per capita according to the Organization for Economic Co-operation and Development (OECD). The high level of spending on healthcare does not necessarily correspond to positive patient outcomes. Rice et al. attribute some of these poor outcomes to gaps in healthcare coverage and access to healthcare.

The Patient Protection and Affordable Care Act (PPACA) became law in 2010 and the percent of uninsured Americans has dropped. Blumenthal and Collins (2014) provide a progress report on numbers of uninsured people and estimate that in the U.S. “adults lacking insurance has fallen from 18% to 13.4% in May 2014” (p. 280). The PPACA contains nine “titles” addressing key components of reform, one of which is “Title V: Health Care Workforce.” This title provides provisions to increase the healthcare

workforce through a training and education infrastructure that supports student loan programs and scholarships. Although not included in the Act's summary list of programs for enhanced support, medical laboratory science is a key contributor of data relevant to evidence-based practice, preventive medicine, and disease management.

Collins and Varmus (2015) present a perspective on President Obama's initiative for "Precision Medicine." This is particularly timely for medical laboratory science (MLS), which is at the forefront of technology innovations. Genetic and molecular testing protocols continue to be developed and to need quality medical laboratory scientists to perform the diagnostic procedures. Randall Abbott (2014), a consultant for Towers and Watson, a professional services consulting company, prepared a perspective on trends for employers and employees related to healthcare benefits. Abbott notes that the "massive consolidation among healthcare providers" (p. 5) caused by changes in healthcare reform does have an impact on clinical education for all the healthcare careers. Although this consolidation may provide benefit for capital expense, there are consequences for clinical education with potentially fewer facilities for clinical placement. As mentioned by Rice et al. (2014), initiatives are established to ensure that priorities for evidence-based research has a "clinical rather than financial" (p. 899) focus. Educators must think of current students as future employees, employers, and researchers and must keep abreast of new initiatives that may help alleviate any potential personnel shortages.

The U.S. Bureau of Labor Statistics (BLS) provides a yearly summary of professions in the Occupational Outlook Handbook. The latest summary from the BLS (2015) suggests that employment of medical laboratory scientists in the next 10 years is

expected to grow by 22%. The growth in employment is dependent on successful graduation of students from MLS-accredited programs. According to Kibak (2008), a shortage of laboratory staff continues with unfilled open positions and a dramatic decrease in the number of academic programs to train MLS students. Kibak reports that the BLS predicts a need of 21,000 more MLS graduates by 2016. Achievement of this number of new graduates is becoming more challenging because the number of accredited MLS programs has dropped from 709 in 1975 to 224 in 2015 (Simonian, 2015). The NAACLS report also acknowledges that the decrease in accredited programs of study limits the number of MLS graduates becoming certified by the American Society of Clinical Pathology (ASCP) Board of Certification each year to about 2,500, which does not reach the projected need. Best (2002) makes a case for evaluating clinical laboratory staffing roles to manage staff attrition and the changing workforce.

Because there is a need for MLS in the workforce, the challenge remains how to solicit support from clinical facilities to take part in clinical education. Finding placement for MLS students in hospital laboratories may be challenged by decreased laboratory staffing and technology upgrades. Other disciplines in the healthcare field have similar concerns. University healthcare programs are depending on clinical facilities to find a way to incorporate education into the busy workload. Best (2002) emphasizes that the demand for qualified laboratory professionals is likely to continue to increase and, by hosting students for clinical internships, hospitals have the opportunity to hire employees who can grow and develop within their organizations.

Recruitment of MLS students for baccalaureate degree programs is critical to not only the survival of the profession but to the health and well-being of the general public. Additionally, the U.S. needs the services of MLS graduates as the aging population increases its demands for medical services. Gorman (1995) describes the need for physicians to utilize laboratory information when facing the challenge of diagnosis for the aging population. Separating disease from “aging-process outcomes” (p. 30) can be determined only through understanding effects of aging on laboratory values, and MLS graduates are the professionals performing this testing.

Theoretical Framework

The framework for this study is that of experiential learning. The work done by John Dewey on experiential learning theory in higher education fits well with the research of MLS student learning during clinical education, which takes place in a hospital laboratory. In his book, *Experience and Education*, Dewey (1938) describes “an intimate and necessary relation between the process of actual experience and education” (p. 7). Dewey also recognizes the value of the physical and social surroundings of experience with education. During clinical education, educators may be preceptors/clinical instructors who work one-on-one with students, or peers, or other members of the healthcare team.

What has evolved over time is a highly standardized scope of practice defined by the American Society for Clinical Laboratory Science (ASCLS) House of Delegates (2012) that guides MLS practitioners. The process of certification and, in some states, personnel licensure further endorses credentials of the laboratory scientist. One of the challenges

faced by this profession is one of identity with the changing of names and credential titles. Because the clinical laboratory is comprised of distinct subspecialties, national professional associations comprised of representatives from these subspecialties of laboratory medicine have become popular. This divides the general MLS professionals into specialists of chemistry, blood banking, microbiology, and hematology, which may be considered the four major departments of the clinical laboratory. With ever-changing medical technology and innovations, more subspecialties are evolving.

Clinical didactic material and basic laboratory skills are developed during the early phase of the MLS program, with the honing of those academic and laboratory skills, along with practice toward competence, being accomplished during training in hospital laboratories. Many hospital laboratories are made up of those practitioners reaching retirement age, which means that those individuals most likely did not have a course in teaching or management. Harmening (2007) gives insight into the dilemma of teaching hospitals made up of aging practitioners when she says “many individuals are required to provide instruction as part of their job without any formal training in education” (p. 153).

Quality MLS programs accredited by NAACLS are offered throughout the U.S. and may be associated with university or hospital organizations. In order to meet accreditation standards, program requirements include general education and prerequisite courses in general biology, general chemistry, organic chemistry, biochemistry, anatomy and physiology, and bacteriology. Several university programs admit students to the MLS major during their junior year of college or after they have completed prerequisite courses. Prior research by Chipchase et al. (2012) examines student readiness to begin clinical

education from the clinical-educator perspective. Using a Delphi survey, the researchers identified 57 characteristics that clinical instructors perceived as indicators of student readiness.

Because medical laboratory science falls into a category of healthcare professionals who work behind the scenes in the hospital laboratory, the value of their contribution to the health and well-being of patients may be overlooked. Forsman (2002) describes the valuable contribution of laboratory medicine to patient care in a way that ultimately benefits the community institution. Forsman explains that members of the MLS profession perform highly complex testing of blood, body fluids, and tissue samples and contribute “as much as 94% of the objective data in a clinical record” (p. 371) to assist with diagnosis of disease states. Sophisticated automated equipment and information systems are used to perform and report tests in many types of clinical laboratories, such as those located in a hospital, a diagnostic facility, a physician’s office, or possibly a federal government facility. The MLS is considered a part of the healthcare team that plays a critical role in determining the health and quality of patient care.

The context of learning in MLS comprises a didactic component of classroom lecture of theory followed by student laboratory exercises to practice basic techniques. This background information for students is intended to prepare them for immersion in the clinical laboratory setting. The MLS curriculum consists of courses at the university in all clinical laboratory disciplines, such as hematology, hemostasis, immunology, immunohematology, clinical chemistry, clinical microbiology, and urinalysis. These courses introduce the techniques and procedures that are likely to be used by students

during the second component of the MLS curriculum, namely clinical education. A student is placed in a hospital laboratory for what is often referred to as a “clinical practicum” to learn specific procedures and protocols used in the “real-world” setting.

Each student spends a designated number of weeks (called a “rotation”) in at least four major departments (or disciplines) of the hospital laboratory to complete the educational experience. It might be argued that there is a different learning experience in each department, depending on the individuals teaching and the environment of learning. Differences in the type of laboratory testing and equipment can also affect the level of student learning. In some cases, a student must complete various department rotations in more than one hospital setting, which would introduce the student to various cultures of learning.

During MLS clinical education, not only does a student become familiar with the laboratory procedures through unique experiences but is introduced to professional attitudes and behaviors through learning and assimilation. Quaintance, Arnold, and Thompson (2010) conducted a study with medical students to determine how to teach professionalism. Students interviewed faculty and wrote reflective narratives based on the stories shared. The researchers found that students “seemed to internalize many of the concepts embedded in the docents’ stories” (p. 122), which in turn helped them articulate key components of professionalism.

Clinical Education in Other Disciplines

Besides MLS, clinical education is a critical component of medical schools and allied healthcare education programs. According to a report by the Association of Schools of Allied Health Professions (ASAHP) task force on clinical education (Romig, O'Sullivan-Maillet, Chute, & McLaughlin, 2013), access to clinical placement sites can be challenging to all allied healthcare professions. This report evaluates 14 accreditation agencies serving educational programs for nutrition and dietetics, physician assistant, anesthesiologist assistant, medical sonography, respiratory care, physical therapy, dental assisting, clinical laboratory science, and occupational therapy. Their findings included a consensus of all accrediting agency directors on the critical need of clinical education to offer real-life clinical experiences for students. The agency directors also noted that the clinical education “exerts pressures on both the professionals at the sites receiving the students and the programs preparing them for these experiences” (p. 155).

As noted by the list of accreditation agencies studied by the ASAHP task force (Romig et al., 2013), healthcare occupations include a variety of professions, some that are well known and others that contribute to patient care behind the scenes. Medical laboratory scientists often do not have direct contact with patients; thus, their role in healthcare is not always clear. Because of this vagueness related to professional role, recruitment of MLS students can be challenging. Stuart (2003) discusses the University of Utah's MLS program's effort to increase student enrollment. Findings from a national study of MLS programs indicate that motivational factors influencing student choice of program include geographical location, family, college advisor and view of the laboratory profession as a

steppingstone to other careers. MLS program faculty and advisors are able to tell potential students that job prospects are likely to be good in the future, based on MLS graduate employment rates. The NIU MLS program reported that 82% of students had jobs prior to or immediately after graduation in May 2015.

Cross, Hicks, Parle, and Field (2006) describe how the learning environment for specialist training of doctors may have an impact on recruitment and retention. Cross et al. suggest that the interacting elements of the learning environment should include workplace learning models, learning outcomes, and professional identity. They are concerned that implementation of curriculum changes based on discrepancies between policy and practice may affect the ability to attract physicians to the specialty. Because the clinical environment is where learning takes place, workload may have such an impact on learning that the workplace may be considered “contested terrain across which economic productivity and productive learning attempt to come to terms” (p. 125). This is confirmed by the Meyer, Lees, Humphris, and Connell (2007) study on the impact of a refresher course on critical-care skills training for nurses. Perceptions of learning by attendees of the training course were closely associated with clinical application of new skills. Barriers to learning identified by this group were financial pressures on hospitals, lack of perceived relevance of the course by staff, and lack of time to practice new skills, which is related to workload.

Learning during clinical education offers MLS students unique experiences that are hard to simulate in preclinical education. The values of the unique experiences are what prepare students to evolve into quality practitioners. Because there is agreement on the

value of clinical education by accrediting agencies, this research focuses on how MLS students perceive the process of learning during clinical education to prepare them for entry level practice in the profession.

Problem Statement

Analysis of the process of MLS student learning in clinical education can include a variety of elements, such as knowledge and skills, individual attributes, attitudes, behaviors, the clinical environment, and how learning in the classroom laboratory is applied to the hospital laboratory. My research study used a phenomenological design to understand the lived experiences of MLS students during clinical education in preparation for the profession. Participants provided descriptive meaning to how learning occurs in clinical education through individual interviews and reflections. In addition to this data, evidence from observation of the process of clinical learning provides supporting data for analysis in the form of field notes.

Study Purpose

The purpose of this qualitative study is to examine the process of learning by MLS students through the lived experiences of clinical education. Description of how learning occurs during clinical education may provide ideas and strategies for preparing future MLS students for professional practice. Through interviews, students can provide their perspectives on how confidence and competence in laboratory techniques proceeds during the learning process. Student descriptions of unique learning experiences and

interprofessional interaction provide information related to the workplace environment. Direct observation of the hospital laboratory environment during the education process provides additional evidence for analysis of findings. By understanding MLS student learning in clinical education, new strategies for the process of preparing students for their role as professional practitioners may be identified.

Research Questions

The overarching question of this study is to find out how students describe the process of learning during clinical education. The participant descriptions and identification of learning gaps between preclinical education and the application of knowledge in the clinical setting can help educators plan strategies for improvement. Student descriptions of personal attributes, attitudes, knowledge and skills, the workplace environment, and the connections made between the classroom and “real life” setting are analyzed. Field notes from observation in the clinical environment provide additional evidence to be analyzed. Analysis includes identification of significant patterns related to the learning process of clinical education. Descriptions of how clinical learning provides a level of confidence and competence to enter professional practice are analyzed from participant perspectives. Through their own words, participants provided examples of how theory, practice, the environment, and professional socialization contribute to the learning experience. The following research questions are addressed:

1. According to participants, what personal attributes, knowledge, and skills contribute to learning during clinical education?

2. According to participants, what role does the workplace environment and clinical preceptor play in the learning process of clinical education?

3. How do participants describe preparation for clinical education and transfer-of-learning from the classroom and student laboratory to the hospital laboratory?

In addition to two interviews for MLS student participants, all volunteers were asked to submit a reflection paper on their lived clinical experience. Two field observations took place to provide additional data to support the interview findings.

Clinical Learning: A Unique Experience

Participant descriptions and observations of students in a clinical education setting provides evidence of how learning occurs and may identify potential learning gaps, offering educators strategies for preparing students who are about to undertake the clinical experience. By having participants describe the learning process as they perceive it, a better understanding of potential gaps between theory and practice can be gained so that strategies can be developed to better prepare MLS students for the community of practice in the laboratory. My time spent in the hospital laboratory observing provided a clear picture of two different settings for learning. Use of student reflections to support information gathered from interviews provided additional evidence for the meaning of the phenomenon of clinical education.

Research studies that have evaluated learning in healthcare education include disciplines such as surgical training (Kurahashi, Harvey, MacRae, Moulton, & Dubrowski, 2011), anatomic concepts for medical students (Wilson, Ross, Petty, Williams, & Thorp,

2009), assorted medical disciplines (Patel & Cranton, 1983), critical-care nursing skills training (Meyer et al., 2007), dietetics (Lordly, 2008), and nursing (Bembridge, Levett-Jones, & Jeong, 2010; Heaven, Clegg, & Maguire, 2006; Kroll, Asmussen, Fink, & Grysbaek, 1996). These studies, with the exception of Wilson et al. (2009), were conducted outside of the U.S. in disciplines other than MLS. In addition, the studies have focused on educator perspectives of learning, and there is a need to gain information on the student perspective.

An important factor related to student learning in the clinical setting is the group, company, or facility involved in supporting the education experience, which may be referred to as “situated Learning” or “situated cognition.” Brown, Collins, and Duguid (1989) explain the concept of situated cognition this way: “activity and situations are integral to cognition and learning and how different ideas of what is appropriate learning activity produce very different results” (p. 32). Following the theory of situated cognition, connecting learning to the culture of professional practice is a process that promotes modeling of professional behavior.

Along a similar theme, Boyle, Popkess-Vawter, and Taunton (1996) examine the role of the socialization of new graduate nurses as they begin their careers. The role of socialization of nurses was studied to measure its effect on motivation, productivity, and job satisfaction. New graduate nurses and experienced nurses responded to questionnaires about socialization. The researchers found that new employees were assimilated into the organization through “positive precepting experiences . . . [and] support systems” (p. 153) associated with successful socialization.

Some researchers have taken an interdisciplinary approach with healthcare practitioners and educators to identify similarities and differences in clinical enculturation. Arndt et al. (2009), a group of healthcare professional faculty in Canada, conducted a qualitative study to examine the “process through which healthcare students are inducted into the culture of their respective disciplines” (p. 18). Besides looking at discipline-specific culture, Arndt et al. wanted to know what emphasis, if any, is placed on interprofessional socialization. What Arndt et al. found were inconsistencies in socialization processes for clinical education of healthcare professions.

One way of explaining how something happens--and in what context--is through reflection. Use of student reflection of learning in a clinical setting has been examined by a variety of educators in nursing (Fakude & Bruce, 2003; Wong, Kember, Chung, & Yan, 1995; Wong et al., 1997), physical therapy (Plack, Driscoll, Blissett, McKenna, & Plack, 2005; Williams & Wessel, 2004), community health (Drevdahl & Dorcy, 2002), and dental hygiene (Pee, Woodman, Fry, & Davenport, 2002). Pee et al. assess the level of reflection by providing a structured worksheet to guide students as they reflect on their experiences during clinical education. Student reflection of the clinical experience in MLS programs may be useful to answer the question of how learning occurs, but the process of how to assess student reflections is challenging for many educators.

Significance of the Study

One way to exam the process of clinical learning and enculturation as a means to prepare the laboratory science student to build self-confidence and a sense of “fitting in” is

through qualitative research measures. Medical laboratory science student interviews supported by reflection summaries were used in this study to address the question of how students learn to become professional members of the practice community through clinical education. All these findings are important to the profession of MLS by showing how clinical education contributes to the goals of educational programs and meets national accreditation standards. As previously stated, Rice et al. (2014) recognize challenges to the U.S. in implementation of universal healthcare, which may include personnel shortages.

Woeste and Barham (2006) investigated the question of how MLS students transition from academics to the profession and state that the “signature pedagogy, the professional practice experience, be protected, preserved, and promoted” (p. 592) to grow successful professionals. However, these researchers have not addressed the student perspective of how the learning process occurs during clinical education.

MLS program faculty must continue to harvest positive relationships with hospital and laboratory administrators who make decisions on student placement. Although a literature search revealed research studies related to clinical education in nursing, physical therapy, and other allied healthcare professions, there is little research on MLS student perspectives on the clinical process of learning. This study provides evidence pertaining to the value of clinical education as a means for student preparation for the community of practice. Because accreditation standards require a clinical practicum component, information from this research describing the learning process of clinical education for MLS students is likely to be useful to educators and clinical preceptors. Maintaining positive relationships with personnel in the laboratories who serve as preceptors and

mentors is in the best interest of educators, employers, and students. In order to maintain the quality of MLS education, hospital laboratory preceptors should understand the significance of their role in student learning.

Researcher Background

I have the advantage of personal experience as an MLS laboratory practitioner in both domestic and international venues. My last few years of professional practice have been as associate professor and program director of MLS at Northern Illinois University (NIU). Because of my background, I have an inherent bias toward the value of clinical education for students. In my experience of working with many undergraduate MLS students over the years, the common theme expressed by these students is that the theory and practice learned in the university classroom and student laboratory comes to “light” during the clinical experience. I have seen that when an MLS student starts day-to-day learning in the environment of the hospital laboratory, the goal of reaching his or her career appears within reach. I believe that it is through interaction with laboratory practitioners and other members of the healthcare team that MLS students become prepared for the community of practice.

Definitions

Accreditation: Approval for educational programs following standards of practice formulated by a profession.

American Society of Clinical Laboratory Science (ASCLS): An organization with the mission to make a positive impact in healthcare through leadership that will assure excellence in the practice of laboratory medicine.

Bench training: Instruction of students at the laboratory work bench, which often requires standing.

Clinical education: Instruction of students one-on-one in the workplace environment.

Clinical Laboratory Educators Conference (CLEC): An annual meeting sponsored by the American Society of Clinical Laboratory Science.

Medical laboratory scientist: Formerly called clinical laboratory scientist or medical technologist; the current certification designation for graduates with bachelor degrees in the field.

National Accrediting Agency for Clinical Laboratory Sciences (NAACLS): The premier international agency for accreditation and approval of educational programs in the clinical laboratory sciences and related healthcare professions through the involvement of expert volunteers and its dedication to public service.

Preceptor: Term referring to a clinical practitioner who provides bench training in the clinical setting.

Professional socialization: Developmental process whereby individuals acquire the norms, knowledge, and skills that allow them to function in a particular role (Pitney, 2006).

Overview of the Study

The dissertation of this study is divided into five chapters. Chapter 1 introduces the study, describing the general purpose and research questions to be answered. A brief description of methodology to be used is included in this chapter. Chapter 2 includes an in-depth literature review of research on the topics of experiential learning in healthcare educational programs, student preparedness for clinical education, preceptor roles, student reflection, and professional socialization. Chapter 3 includes a description of the study methodology and design, descriptions of participants, and process for data collection and analysis. Chapter 4 provides findings categorized into themes identified from analysis of descriptive narrative of the data from participant interviews, artifacts, and field notes. Chapter 5 presents conclusions and recommendations for application of the study findings.

CHAPTER 2

LITERATURE REVIEW

Academic programs of study for the healthcare professions, whether for nursing, physical therapy, medical school, or medical laboratory sciences, all require experience in the practice setting known as “clinical education.” The purpose of this qualitative phenomenological study is to examine the process of learning by MLS students through the lived experiences of clinical education. Organization of this chapter starts with background information of the experiential learning that forms the theoretical framework of this study, followed by history of MLS. The literature review of research studies involving student clinical experiences performed in a variety of healthcare occupations follows as there is limited published research on MLS student learning during clinical education.

My literature search in the database for medicine was more productive in providing a collection of studies related to medical school, nursing, and general allied health. My interest piqued with increased reference to the component of community, environment, enculturation, and socialization as factors in student competency achievement during clinical learning. Thus, additional key words used in the second phase of literature review included clinical practice, professional socialization, clinical education, and situated learning. The broad search of medicine, nursing, physical therapy, dietetics, and dental

hygiene evolved because of the limited return of research studies of medical (or clinical) laboratory science education pertaining to the clinical experience.

Use of ProQuest to access dissertations specific to research in clinical laboratory science education was also important to this literature review. Studies have examined professional attributes of medical technologists (Martin, 1993), transition from novice to expert (Hudzicki, 2004), learning transition case study (Escolas, 2004), critical-thinking behaviors (Kenimer, 199), and clinical instructor identity (Miller, 2011). Research examining student perspectives of learning in clinical education with respect to personal attributes, environment affect, and professional socialization was not found. The focus of this research study is on the student perception of clinical learning rather than instructor opinions.

As the research questions were being developed, experiential learning in clinical education was found to be related to situated learning. The clinical learning environment in MLS is the hospital laboratory, where unique experiences introduce students to the operation of sophisticated equipment, patient testing procedures, and, in some cases, patient interaction. In the clinical laboratory, students experience new situations, as well as the expectations of behaving in a professional manner. Learning to deal with a team of professionals through socialization in the workplace often either builds or diminishes a student's confidence. The history and background information for MLS is followed by additional research on student learning as related to transfer-of-learning, clinical learning environments, learning styles, situated learning, professional socialization, and student reflection during clinical education.

Theoretical Framework

Because the purpose of this study is to examine learning through student “lived experiences,” the conceptual framework used is the experiential learning theory that began with the work done by John Dewey on higher education and experience. In his book, *Experience and Education*, Dewey (1938) describes what was then thought of as a new philosophy of education. He states this simply as “an intimate and necessary relation between the process of actual experience and education” (p.7). The new philosophy was thought to be progressive and different from the traditional approach of classroom learning in which experiences were not necessarily considered educational. Dewey goes on to explain that not all experiences may result in a positive outcome. He describes an experience as “mis-educative that has the effect of arresting or distorting the growth of further experience” (p. 13). Dewey’s example of this concept is boredom in the classroom often related to how learning is experienced by a student.

Dewey (1938) describes a continuity of experience so that mis-educative situations do not occur. However, in reality, this level of continuity may be difficult to achieve. Not all experiences are the same for each person. Dewey suggests that “if an experience arouses curiosity, strengthens initiative, and sets up desires and purposes” (p. 31), it will leave an impression. This is in contrast to what may have been judged as an experience that does not lead to development and growth. Each laboratory department conducts procedures and techniques differently and may have different levels of appeal to the variety of students who engage in clinical education.

Dewey (1938) also recognizes the value of the physical and social surroundings of experience with education. He charges educators to “know how to utilize the surroundings, physical and social, that exist so as to extract from them all that they have to contribute to building up experiences that are worthwhile” (p. 35). During clinical education, educators may be preceptors/clinical instructors who work one-on-one with students, or peers, or other members of the healthcare team. Dewey suggests that the environment of learning plays an important role in how an experience is viewed.

The environment, then, may be crucial to how each situation lends itself to various interpretations. Dewey (1938) writes that “interaction is going on between an individual and objects and other persons. The conceptions of situation and of interaction are inseparable from each other” (p. 41). This is true of the clinical laboratory in which students interact with a variety of people or a variety of highly sophisticated instrumentation and equipment.

Several years later, Kolb (1984) wrote *Experiential Learning* and used the philosophy of John Dewey to guide his research in experiential learning. Kolb also incorporates the work of Kurt Lewin and Jean Piaget along with Dewey to describe themes of experiential learning. The contemporary applications of experiential learning are derived from the seven themes described by Kolb, which include T-groups, action research, democratic values, pragmatism, development, dialectics of learning from experience, and epistemology (Kolb, 1984). Included among the applications of experiential learning theory is competency-based education, which is most applicable to the subject of my research on MLS clinical education.

Kolb (1984) uses the experiential learning theory to describe the process as “a holistic integrative perspective on learning that combines experience, perception, cognition, and behavior” (p. 21). When he interviewed MLS participants about their experience of learning during clinical education, each individual described a process that occurred during rotation through the various departments of the laboratory. Participants discussed the process as one that moved from thinking to observing, to applying, and, finally, to independence. This corresponds to Kolb’s description of the experiential learning theory in which “Ideas are not fixed and immutable elements of thought but are formed and re-formed through experience” (p. 26).

The concept of creating knowledge through the process of learning is central to experiential learning. In *Learning in Adulthood*, Merriam, Caffarella, and Baumgartner (2007) refer to Dewey’s theory and suggest that “learners must connect what they have learned from current experiences to those in the past, as well as see possible future implications” (p. 162). According to Merriam et al., adult educators agree that learning is not an isolated event and “involves interactions between the learner and environment” (p. 163). Just as Dewey described the physical and social aspects of experience and education, Kolb and others suggest that learning involves transactions between a person and the environment.

Situated cognition is another way of looking at learning from real-life experiences. Clinical education includes structured activities and socialization to promote student development of knowledge, skills, and professionalism. Brown et al. (1989) describe situated cognition occurring in apprenticeships that make use of social and physical

contexts for development of “their conceptual understanding through social interaction and collaboration in the culture of the domain” (p. 40). Lave and Wenger (1991) have taken an analytical approach to situated learning by describing legitimate peripheral participation as “a descriptor of engagement in social practice that entails learning as an integral constituent” (p. 35). Social interaction with a student is an important element of the learning environment of clinical education.

Merriam et al. (2007) describe one of the conceptualizations of experiential learning as “participating in a community of practice (situative theory of learning)” (p. 160). As one of the proponents of social cognitive theory, Bandura (1977) studied human behavior as it “results from the interaction of persons and situations” (p. 9). Bandura describes learning through observational modeling. Braungart, Braungart, and Gramet (2011) looked at Bandura’s perspective on learning to provide guidance for educators in healthcare and noted that learning “includes consideration of personal characteristics of the learner, behavior patterns and the environment” (p.70). Braungart et al. compared psychological learning theories as a means to describe the process occurring in healthcare education. The fact remains that no one theory can explain the complex process “that takes place as individuals interact with their environment and incorporate new information or experiences with what they already know” (p. 93).

In order to answer the question of how students perceive learning during clinical education, the theory of experiential learning provides the best lens for examination of the type of learning taking place in the hospital medical laboratory. Because little research has been done on MLS student perceptions on learning during clinical education, my study of

how students describe their experiential education is likely to be valuable to the MLS profession and possibly other healthcare programs with clinical education.

Background of Medical Laboratory Science

Kotlarz (1998a, b) describes the history and origins of medical laboratory science in a series of articles called “Tracing our Roots,” which were printed in the national professional journal. Growth of laboratory technicians began at the time of World War I, and the first hospital medical laboratory is described as being staffed by women who “performed analyses and simple tests and reported the results of these tests to a physician, chemist, or some other scientist in charge” (Kotlarz, 1998b, p. 98). The need for standardized training programs became evident, and collegiate-level instruction began with the first bachelor of science degree in medical technology from the University of Minnesota in 1922 (Kotlarz, 1998b). The Board of Registry was founded in 1928 by the ASCP to provide certification for graduates of university programs. In 2009, the Board of Certification joined with the National Credentialing Agency for Medical Laboratory Personnel, changing the certification title to “medical laboratory scientist,” with the most recent publication of procedures for examination and certification published in January 2015 (ASCP, 2015).

In the 1990s, the role of laboratory technologist was expanded “to include laboratory supervision, management, and teaching” (Kotlarz, 2001, p. 14). In order to avoid the problem of unprepared clinical instructors and supervisors, the MLS curriculum was revised to include courses in developing instructional units for teaching and preparing

budget and personnel documents related to laboratory management. Because of the aging MLS practitioner population, new graduates of MLS often find themselves being promoted to bench teaching or supervisor roles as little as one or two years after graduation.

One of the challenges faced in the beginning of the profession was “prejudicial claims that women’s conceptual abilities were inferior to men’s” (Kotlarz, 1998a, p. 5). Other studies have considered gender differences, such as the study on professional attitudes by Batenburg, Smal, Lodder, and de Melker (1999). Batenburg et al. were interested in whether professional attitude was related to the type of specialty preference by medical students, which in turn related to gender. Batenburg et al. surveyed attitudes of general practice students, surgery students, and final-year medical students in a Dutch medical school. What they found was that “male and female subjects within the different professional groups seem to hold similar attitudes” (p. 491).

The topic of gender equality in respect to salary is a component of the annual evaluation of the current workforce conducted by the *Medical Laboratory Observer (MLO)* (Annual Salary Survey, 2013). The *MLO* surveys practicing medical laboratory scientists from across the country and breaks down information on salary by age distribution, gender, and job function. It reports that salary disparity remains currently, with women earning on average \$9,000 less than men with the same degrees and job description (Annual Salary Survey, 2013, pp. 34-35). When summarizing information from the survey respondents, the writers suggest that the future of the profession can be seen as a “retirement cliff not too far ahead with an average age of 53.3” (Annual Salary Survey, 2013, p. 34).

Research on Learning and Clinical Education

Adult and higher education researchers have studied the topic of learning for many years. Evaluation of the way in which individuals apply learned information to new situations continues to be an interesting question for researchers. Merriam et al. (2007) describe Malcolm Knowles as the person who introduced the term “andragogy” as a means of describing how adults learn and distinguished adult learners from child learners. In most cases, an adult learner is focused on either moving toward a career path or completing a knowledge base to gain temporary employment. Knowles made assumptions about adult learners that included the concepts of maturation that leads to self-direction, experience as a rich source of learning, social role that determines readiness to learn, and adults as problem-centered learners. The theory of experiential learning that is focused on how lived experience contributes to knowledge is the conceptual framework for this research.

Merriam and Leahy (2005) reviewed research beginning in 1990 to offer recommendations for adult and continuing education and found a multitude of empirical studies. Because participants, educators, and the work environment produce such a variable number of factors, Merriam and Leahy suggest that future research should “engage more complex and theory-driven questions” (p. 19). The theory of experiential learning drives my research on MLS learning in clinical education.

Zepke and Leach (2002) provide an overview and critique of experiential learning and self-directed learning. When discussing the constructs of self-directed learning, Zepke and Leach discuss contextual meanings as an internal dimension of critical reflection on the “whys” and “reasons” of a topic. They suggest that techniques of self-directed learning that

“ignore the contextual nature of learning” (p. 208) can be criticized as lacking both internal and external dimensions of meaning-making. Instead of the focus on self, learning from other people helps discover hidden meanings from experience. As a multilayered process, relationships among learners suffer if groups of unheard voices or underrepresented people are not included in meaning-making by the instructor as a facilitator. These authors suggest that “learning is a process of making meaning from all experiences: cognitive, emotional, physical, social, and spiritual” (p. 206). Their critique is that the methods may not enable people to reach their full learning potential. Zepke and Leach note that various individuals construct various meanings from similar experiences, with “hidden meanings” (p. 210) affecting outcomes.

Kolb and Lewis (1986) provide methods to facilitate “closing the loops between experience and concept” (p. 100). The experiential learning model developed by Kolb (1984) is a four-stage cycle. Concrete experience (CE) is described as the basis for observation and reflection. Reflective observation (RO) is assimilating observations for action. Abstract conceptualization (AC) allows an individual to comprehend knowledge and make decisions and solve problems in order to reach active experimentation (AE), which leads to new experiences. Kolb and Lewis describe interaction between learner and environment by four capabilities. The first is an affective environment, which helps learners develop personal attitudes and teachers give feedback. The perceptually oriented environment is characterized by helping the learner answer why things occur. The symbolically oriented environment is focused on how to solve a problem, and the behaviorally oriented environment leads learners to take responsibility for their actions.

Experiential Learning Research

Itin (1999) takes on the challenge of explaining the philosophy of experiential education through the development of a process model. In his model, Itin suggests that teacher and student share an experience through a process that also includes the subject and learning environment. Itin recommends to educators that thinking of experiential education as a philosophy and not a theory may be a way to bring change and reform to educational strategies.

Facilitation of experiential learning was described by Fowler (2008) as it applies to nurse education in the United Kingdom. Fowler builds on the work of Dewey (1938) and Kolb (1984) by emphasizing the impact of reflection along with experience in order to recognize learning. Fowler describes factors that facilitate experiential learning. The first is “deliberate intervention of a teacher” (p. 431). This supports a comment made during some interviews related to availability of clinical instructors. Another factor is the “deliberate action of the student to combine experience and reflection” (p. 431). Fowler notes that a student’s ability to reflect on an experience is related to his or her inner motivation. Third-party intervention during the experience may result in a different type of interaction between teacher and student. Fowler also mentions barriers to experiential learning in the form of competing priorities and personal problems or active resistance to interface the experience through reflection. Through coaching and mentoring, some of these barriers can be broken down.

In Scotland, Cope, Cuthbertson, and Stoddart (2000) interviewed nurses who had completed their clinical internship. These researchers’ goal was to determine how these

students learned during this experience. Their findings described one effect of the internship that was “to place learning into a meaningful context” (p. 853). These authors described clinical education as a complex integration of cognitive and social experiences with “elements of situated learning” (p. 850).

Another way of collecting data on learning effectiveness was used in a study by Brown et al. (2011), who investigated perspectives of undergraduate students in a variety of allied healthcare programs at Monash University in Melbourne, Victoria, Australia. Data was collected from 548 undergraduate students using a clinical learning environment inventory (CLEI) tool. Their results emphasized the importance of effective communication and supportive environment during clinical education.

Barr, Walters, and Hagan (2002) are dietitians who were interested in the value of experiential education in dietetics. They mailed surveys to 1987 registered dietitians who passed the national exam between 1996 and 1999 and received a 45% response. Participants were asked to rate the didactic program and dietetic internship on five aspects of professional development: knowledge, skills, competency, ability, and confidence. Barr et al. found that the “dietetic internship (DI) consistently received the highest mean response for all. These results suggest the DI provides a valuable setting where interns develop necessary skills to practice and succeed as a professional” (p. 1459). Barr et al. concluded that students integrate knowledge with practice, which is powerful to learning.

In order to get student opinions on the clinical curriculum, Dornan, Arno, Hadfield, Scherpbier, and Boshuizen (2006) provided assessments and surveys to students in the clinical component of the medical curriculum at the University of Manchester, United

Kingdom. Dornan et al. “found statistically significant associations between measures of the environment, process, and outcomes of clinical learning” (p. 672) but also admitted some problems with inter-correlations of data. The authors suggest that using assessments and evaluations by students did not necessarily provide a correlation with their practical performance.

A year later, Dornan, Boshuizen, King, and Scherpbier (2007) analyzed the process of workplace learning of medical students of the University of Manchester Medical School once again. This school uses a problem-based learning approach and a group of eight students with a year of clinical experience was chosen for group discussions. Results of the discussions suggest that participation through observation and action were core to learning but not all experiences were participative. One factor that affected the participation of these students was interaction with patients and doctors. Additional factors contributing to the learning process included the climate of the medical team, the doctor’s knowledge of the curriculum, and the student’s state of mind. The authors developed a process model that shows that “the central condition of learning is supported participation in practice to a level that is appropriate to the student’s stage of education” (p. 89).

George et al. (2007) surveyed pharmacists in supplementary prescribing training in Aberdeen, Scotland, to determine how experiential learning was applied to this program. After pilot studies and focus groups, the researchers mailed questionnaires to pharmacists learning in practice, with 76.9% responding, and designated medical practitioners (DMP), with 62.1% responding. Findings indicate that both the participants in learning practice and the medical practitioners did not feel adequately prepared for the learning experience and

clearer expectations were needed. George et al. reported, “Many of the negative experiences and challenges during the period of learning in practice were attitudinal and organizational” (p. 1035).

Healthcare Student Preparedness

In the chapter “Determinants of Learning,” from the text *Health Professional as Educator*, Kitchie (2011) defines how a learner must be ready to learn both in mind and body if information is to be absorbed. She also mentions that “an environment conducive to learning helps to keep the learner’s attention and stimulate interest in learning” (p. 115). Kitchie refers to experiential readiness, which incorporates a learner’s past experiences, cultural background, aspirations, coping mechanisms, and parochial or cosmopolitan point of view as contributors to readiness to learn. Healthcare professional educators should consider both experiential readiness and knowledge readiness when assessing the process of learning during clinical education.

Chipchase et al. (2012) studied characteristics of student preparedness for clinical learning. In this study, questionnaires were sent to clinical educators in occupational therapy, physiotherapy, and speech pathology affiliated with the University of Queensland, Australia. Through a two-round Delphi study, six themes were identified regarding student preparedness: knowledge and understanding, willingness, professionalism, communication and interaction, personal attributes, and skills. Conclusions resulted in a long list of characteristics perceived by clinical educators as indicators of student preparedness.

Chipchase et al. suggest that this information can be useful to educators involved in the preparation of students for clinical education.

Prince, Boshuizen, van der Vleuten, and Scherpbier (2005) studied medical school student opinions about being prepared for clinical education. The 106 participants were students from the Maastricht Medical School, the Netherlands, and were sent information on the study and a questionnaire related to professional socialization, workload, patient contact, knowledge application, and skills. A problem-based learning curriculum was expected to produce a different level of preparation than that of traditional learning. Results indicated that regardless of the curricular format, similar transition concerns by students were noted: “sudden increase in workload, insufficient time for studying, difficulty putting theory into practice” (p. 710). Prince et al. suggest that student adjustment between classroom and clinical setting is an important consideration that has yet to be adequately addressed.

Preceptor and Student Role

Another study with researchers at the Maastricht Medical School focuses on medical student perceptions of clinical education. Stalmeijer, Dolmans, Wolfhagen, and Scherpbier (2009) found that clinical learning could be described as situated learning because students learn by performing tasks in the environment of their future practice. The researchers present student perspectives of the effectiveness of teaching methods of modeling, coaching, scaffolding, articulation, reflection, and exploration. What they report from participants is a considerable amount of variability in student experiences, which

connects strongly with an emphasis on how clinical instructors provide feedback. A recommendation to improve coaching of mentors is valuable for all programs with clinical education components.

Lekkas et al. (2007) conducted a research study to review international models of clinical education for undergraduate students in allied healthcare disciplines. Lekkas et al. investigated whether there was an advantage or disadvantage to student learning by comparing models being used related to various ratios of educator to student. What Lekkas et al. found was that there is no particular ideal model for clinical education and that a lack of empirical research suggests recommendations for future research of evidence-based practice for clinical education.

The topic of partner-specific variables was the basis for Lovin's (1992) research of paramedic professionals. Lovin discovered both routine and nonroutine experiences between these practitioners in the workplace setting, which had an impact on experiential learning. If the paramedic partnership interaction was in the form of mentor-learner, with one person more controlling, the collaboration appeared to be diminished and learning effectiveness decreased. This finding is contrary to the belief that mentoring builds collaboration. Lovin suggests that informal learning through experience with peers may lead to innovative means for competency attainment.

Harmer, Huffman, and Johnson (2011) studied clinical peer mentoring for nursing students to help them understand their role in caring for patients. Using the situated learning theory, experienced practitioners were partnered with novice students. Thirty-two students from the Veteran's Medical Center in Michigan were asked to evaluate the

effectiveness of the partnering program. The most reported findings were improved self-confidence, teamwork and collaboration, improved time management, and clinical judgment in the novice students. Harmer et al. plan to continue the program by expanding to more facilities.

Probably the most relevant study was that of Delany and Bragge (2009), who studied physiotherapy students and clinical educator perceptions of roles during clinical education. Participants were recruited from the Australian University School of Physiotherapy to take part in focus groups as they were attending clinical placements. Findings from the student perspective included dynamic knowledge development that identified gaps in knowledge and “strategies for unpacking the learning process” (p. e405). The themes that emerged from the educator perspective focused on transitioning roles and a structured teaching process. These researchers developed strategies for teaching and learning in the form of “BUILD” statements. These statements to increase congruence between teaching and learning are defined as B-Build confidence in students, U-Understand student perspective, I-Insist on reflection, L-List strategies for active learning, and D-Decide on actions to promote student learning. Delaney and Bragge recommend testing these strategies in future research.

A study involving student perspectives of teachers’ skills in clinical education was conducted by Rogers, Lautar, and Dunn (2010). A survey was distributed to 124 students in allied healthcare programs of a university. Findings showed that although students had confidence in clinical instructor’s knowledge, three areas of improvement were noted. Recommendations for improvement of clinical supervisors included a workshop featuring

education methods, recognition of clinical supervisors with developed teaching skills, and creation of an academic website. Because many students are recruited for employment by clinical placement facilities, the impact of professional development to enhance clinical education is relevant for continued workforce employment.

In contrast to student perspectives of preceptors, a study by Hill, Wolf, Bossetti, and Saddam (1999) asked preceptors to express their expectations of students in a supervised practice setting. Clinical instructors affiliated with the School of Allied Medical Professions at Ohio State University were sent questionnaires that required answers to open-ended questions related to clinical experiences. A rather low rate of response (42%) is attributed to the length of time needed to complete the questionnaire. The key rewards reported by respondents were observation of student growth and increased independence. With limited internal rewards for clinical instructors, recognition from students for instructor efforts became an important factor. Recommendations for a preceptor reward system and better preparation of students for clinical education were the important findings of this study.

Because the role of preceptors is determined to have an important impact on clinical education, the idea of supported participation was demonstrated by Cope et al. (2000), who found that coaching and mentoring by preceptors modeling good practice had incorporated scaffolding for learners by “providing them with sufficient support to allow them to achieve more than they would be able to without help” (p. 854). Another nursing researcher, Nickle (2007), applied the educational strategy of mentoring, noting the importance of the sociocultural application to learning in the practice environment. Nickle emphasizes that

the healthcare environment demands employees who are knowledgeable and “possess transferable skills and sensitivity *to social context*” (p. 26).

Benner, Tanner, and Chesla (1992) conducted a phenomenological research study by interviewing groups of 105 nurses working in intensive care units. The purpose of their study was to gain a better understanding of how critical-care nurses acquire skills and evolve from beginners to experts. One finding from the study was that advanced beginners recognize that “their work is shaped by a concern to organize and to prioritize tasks and failure to do so raises considerable anxiety” (p. 16). These subjects also described demands of the clinical situation. Findings report that the advanced beginner “moves to competence in part as a result of a crisis in confidence” (p. 19). Benner et al. found that experience leads to learning and each situation is different with respect to environment and emotional responses.

Healthcare professionals as educators are interested in understanding the meaning of how learning occurs and the kinds of experiences that both facilitate and hinder the learning process. Melincavage (2011) studied anxiety in student nurses during clinical education, which can cause them to leave the program. Through interviews, the researcher attempted to learn the basis for stress that can affect learning in clinical education. Findings related to the power structure of a clinical setting in which nursing instructors are seen as authoritative figures by students. Students communicated the need for an accepting attitude by nurse educators in order to alleviate the stress and anxiety of the process.

In a related study, McClure (2009) studied student attitudes and perceptions of clinical laboratory science (CLS) as a professional field of study. A total of 56 participants

comprised six focus groups that described CLS as an exciting career prospect but not necessarily a lifelong profession. McClure mentioned that “CLS students are concerned about what they are observing in clinical laboratories during their clinical rotations” (p. 20). This finding supports the need to gather more information related to student experiences during clinical education.

International Research on Clinical Education

The study of student perceptions of learning in clinical education can provide rich qualitative information for educators in many of the healthcare professions. By evaluating the way in which students put learned information into practice while gaining confidence and competence in their community of practice can provide insight to both the academic faculty and the clinical instructor. During the last 10 years, there have been contributions from researchers in a variety of countries and disciplines.

For example, researchers in Canada have studied skill transfer in dietetic practice (Lordly, 2008), the use of simulator training for medical students (Fraser et al., 2009), and the use of practical training for surgical students (Kurahashi et al., 2011). Another Canadian study by Williams and Wessel (2004) investigated the effect of reflective journal writing by physical therapy students as a way to obtain feedback on learning. A general literature review of student competency in self-assessment for healthcare professions in general was conducted by Eva and Regehr (2005). Nickle (2007) investigated the role of mentorship by intensive care nurses. Three additional studies were conducted on the topics

of socialization through interprofessionalism (Arndt et al., 2007) and perspectives on professionalism in medical students (Macpherson & Kenny, 2008; Mann, 2011).

The research coming from Australia includes a general study of learning environments and expectations of undergraduate healthcare science students by Brown et al. (2010). Studies of nursing practice related to transition experience by Rapley, Nathan, and Davidson (2006) and transferability of nursing skills learned in university to the practice environment by Bembridge et al. (2011). Four studies with physiotherapy students investigated the use of critical reflection by Delany and Watkin (2009) and Maloney, Tai, Lo, Molloy, and Ilic (2013), with two additional studies on perceptions of learning and teaching in physiotherapy (Delany & Bragge, 2009; Stiller, Lynch, Phillips, and Lambert, 2004). As mentioned previously, Chipchase et al. (2012) investigated student preparedness for clinical learning, and a commentary on an international perspective of clinical education was prepared by Rodger et al. (2008). In the discipline of speech-language pathology, Sheepway, Lincoln, and Togher (2011) investigated practice models in use for placing students in a clinical environment and determined a need for evidence to support student competency and outcomes following clinical education.

Literature review of the last 10 years from the United Kingdom includes two descriptive articles: for nursing on teaching critical reflection by Smith (2011) and teaching and learning clinical skills by Woolley and Jarvis (2007). Two of the research studies on nursing investigated learning transfer of critical care nurses by Meyer et al. (2007) and transfer of communication skills of nursing clinical supervisors by Heaven et al. (2006). Another research study of using reflective journaling by nursing students was conducted by

Chirema (2007), and the study by Christiansen and Bell (2010) investigated peer learning for nursing students in the practice (clinical) setting. Cross et al. (2006) used interviews and questionnaires to gain insight on perceptions of the learning environment of medical students in specialty training, and Lewis (2012) provided a description of the latest trend in healthcare education, which is interprofessional learning.

From the Netherlands, three research studies were found that all pertained to medical students in programs of study. Prince et al. (2005) asked students whether or not they believed they were prepared for clinical training and found that the students experienced a variety of deficiencies in preparation for clinical education. Stalmeijer et al. (2009) studied student opinions of various teaching methods for clinical education and found that modeling, coaching, and articulation were preferred methods of instruction. A follow-up study on student perspectives of modeling and feedback for medical students in surgical and pediatric training was done by Stegeman, Schoten, and Terpstra (2013).

Interestingly enough, of the research studies found in the U.S. over the last 10 years, seven of them were investigating the introduction, teaching, or capturing of student learning of professionalism. Brehm et al. (2006) took on an interdisciplinary approach by surveying students in a variety of allied healthcare professions on their awareness of professionalism as part of the healthcare team. Davis (2009) investigated opinions of students in physical therapy programs on the impact of professionalism in the clinical setting. Russell et al. (2011) created a standardized tool to be used by educators for assessment of professionalism in medical education students across five allied healthcare disciplines.

The following four studies investigated how professionalism is taught and achieved by medical students during clinical education: Quaintance et al. (2010); Goold and Stern (2006); Bennett, Roman, Arnold, Kay, and Goldenhar (2005); and Ainsworth and Szauter (2006). Additional studies of student nurses in clinical education related to anxiety experiences (Melincavage, 2011) and peer mentoring (Harmer et al., 2011). Bridging the gap between basic science and clinical practice for medical students was the objective of a study done by Wilson et al. (2009).

There is a continuous need for more research on the enculturation of healthcare professionals into the community of practice. Research findings of clinical learning perceptions by MLS students can be used by healthcare educators and laboratory administrators to ensure the quality and supply of medical laboratory scientists throughout the world. These research findings can also be applied by educators in other healthcare disciplines. The way that educators and clinical preceptors approach clinical education is important to all healthcare occupations that can benefit from research of student learning. In a way, all academic disciplines are competing for time and resources from healthcare organizations. It is through this experience in the community of practice that a student learns about his/her professional role in an applied way. Woeste and Barham (2006) have described the unique professional practice in clinical laboratory science education as a signature pedagogy of “learning from experienced laboratory professionals usually in a one-on-one dynamic” (p. 591).

Transfer-of-Learning Research

One way to determine the values of student learning in the clinical setting is to evaluate the way in which these individuals put learned information into practice, which is known as “transfer of learning.” Egan (2008) studied the transfer of learning in human resource practitioners who were part of a healthcare organization. Through an online survey of 354 randomly selected healthcare providers, Egan hypothesized a positive association between employee perceptions and organizational motivation for learning transfer. Although the hypothesis was supported, implications of the subculture influence and leadership styles of members in the organization were not discussed.

This theme of organizational subculture was addressed in the research of Bates and Coyne (2005), who evaluated transfer-of-learning in addiction counseling supervisors after a five-day workshop. Bates and Coyne were critical of studies that were performed without valid measurement evaluation tools. Using the Learning Transfer Systems Inventory (LTSI), these researchers discovered modest learning gains from their participants but found that clinical supervisors who failed to provide both interpersonal support and opportunities to practice learned skills in the work environment created a substantial barrier to transfer-of-learning.

The role of the workplace environment continued to surface as a factor in transfer-of-learning. Brown and McCracken (2009) studied a small group of human resource managers and determined that barriers in transfer of training related to intrinsic factors, such as perceptual value of training, emotional insecurity, and effect on future training. The success of the mid-career managers studied was impacted by not only intrinsic factors

but also extrinsic variables, such as the organizational and management development cultures and work-life pressures. Research is needed to determine if the factors and barriers determined by this study might also be applied to healthcare students' transfer-of-learning.

The process of transferring classroom knowledge to the clinical practice setting has been the object of research in physical therapy, dietetics, nursing, and physician preparation. Providing hands-on experience in a laboratory can be the start of linking theory with practice. Kurahashi et al. (2011) conducted a pilot study of medical students in surgical training in Canada to connect cognitive thinking to multiple psychomotor task performance. These researchers predicted that students who had the chance to practice a surgical procedure would be “more effective at learning the verbal information presented during surgical task performance when compared with participants who did not receive hands-on practice” (p. 2). Their findings, for the most part, supported the hypothesis that the group with hands-on practice in a controlled environment exhibited better technique when evaluated for the task. It was unclear how this research applied to students performing two tasks simultaneously. Because this was a small pilot study of first-year surgical students, the researchers suggested an expanded participant sample to provide more evidence to support student lab practice to enhance transfer-of-learning.

Still another study of students in medical education, conducted by Patel and Cranton (1983), attempted to determine how the transfer of learning among different subject matters occurred. These researchers used a combination of ethnographic and experimental studies to determine similarities and differences between clinical instruction in medicine, pediatrics, and surgery. Patel and Cranton found that clinical teaching is complex and

could not make generalizations regarding transfer of knowledge from one discipline to another. These authors also reported that aspects of the environment influenced the way individuals engaged in problem-solving and learning of technical and interpersonal skills, supporting the “theory that the ability to perform tasks is dependent on the environments in which the tasks are performed” (p. 134).

Meyer et al. (2007) conducted a qualitative study in the United Kingdom to understand opportunities and barriers of learning transfer better by interviewing staff nurses and nurse managers attending a critical-care nursing course. The researchers were trying to assess effectiveness of perceived learning and transfer-of-learning from nursing skill training. Because of the shortage of nurses with a particular skill, the targeted training conducted was meant to provide evidence of transfer-of-learning through opportunities to gain competence. Their finding of the importance of relevance of course content for the nurses being trained emerged through data-analysis coding with a software program called NVivo(10) made by QSR International Pty Ltd. (2014), in Australia, to identify themes and categories from coded interviews. In the interviews, the respondents could speak frankly about how learning from the workshop affected the practice of their learned skills. They determined that the degree of individual learning supported by organizational benefits related to relevance of training to job role, opportunity to implement learning, level of access to facilitators, and opportunities to gain competency. Meyer et al. emphasize “the importance of a clearly defined process” (p. 315) with follow-up methods to assess competency achieved.

Situated Learning

The culture of learning is the topic of a paper by Brown et al. (1989), who argue that “activity and situations are integral to cognition and learning” (p. 32). These authors suggest that the use of various learning tools or activities--not abstract ideas--impact knowledge acquisition. This view of learning in the situation may be referred to as cognitive apprenticeship. The clinical education of MLS students is more than an apprenticeship, as they are not only learning new knowledge, but they are learning how to apply knowledge learned previously as a means of transferring knowledge to a new situation. Along with learning the tools of the discipline, the student is also learning how to fit into the culture of the practice environment.

Learning in the culture of the practice environment is described by Lave and Wenger (1991) as a community of practice. They describe the learning relationship between practitioners and newcomers as a “move toward full participation in the sociocultural practices of a community” (p. 29) and refer to it as “legitimate peripheral participation” (p. 29). They view this participation as a bridge connecting learning and the culture in which knowledge is learned. This way of understanding learning can best be analyzed through evidence presented by the learners.

Other authors have taken the ideas of Brown et al. (1989) to develop an instructional design for situated learning who believe that remembering knowledge takes place “through interactions with the environment” (Young, 1993, p. 44). Young emphasizes that learning situated in realistic contexts is more desirable than traditional memorization and benefits education in many areas. Collins, Brown, and Holum (1991) describe cognitive

apprenticeship as a “model of instruction that works to make thinking visible” (p. 6). They point out the need for problem-solving skills as tasks arise in the workplace. It is through real-life situations that a student must apply knowledge and transfer that knowledge to a new situation.

Work-life pressures may lead to stress in the workplace. When student clinical learning is added to the job of the healthcare professional, an increased level of stress may develop. A study by Heaven et al. (2006) found that despite the increased pressure, the role of clinical nurse specialist supervisors plays an important role for transfer-of-learning in the workplace. Heaven et al. also found that skills for assessment of patient conditions for clinical application was highly dependent on basic communication skills used by supervisors. The researchers found that a negative experience when attempting a new skill due to lack of supervisor communication can discourage a student from continuing with learning. Interaction of the student with clinical instructors and other practitioners socially may also impact the level of learning that takes place in clinical education. Demonstrating the ability to perform a job task after transfer of knowledge is one way in which performance competency is assessed.

Two additional qualitative studies by Lordly (2008) and Kroll et al. (1996) examine skill transfer of 14 recent graduates of dietetic internships in Canada and 98 Danish nurse and nurse assistants respectively. Findings from the dietician perceptions on transferability of skills in both long-term and acute-care facilities reveal challenges influenced by the context of the experience. Kroll et al.’s research of nursing staff training competency attainment was influenced by the level of the person’s autonomy in the job. What Kroll et

al. discovered was the need for a more goal-oriented teaching process in order to see effectiveness of the learning process. Because the gap between theoretical knowledge and practical application may be wide, a “superior’s ability to create the right environment for changes was all important for the participants” (Kroll et al., 1996, p. 17). Cooperation with superiors who create visions was listed as criteria for establishing effectiveness of learning transfer.

Clinical Learning Environment

The clinical learning environment can take place anywhere where patient care and testing take place. The most common locations include hospitals, clinics, long-term care facilities, or physician offices, to name a few. In order to understand better what type of learning is taking place in this environment, one needs to be immersed in the environment. One study to explore student perceptions about the clinical experience was conducted by Stalmeijer et al. (2009), who recruited medical students in the Netherlands to participate in focus groups. These researchers found that through various teaching methods, students were able to put knowledge into use for future practice, which is a common characteristic of situated learning. Stalmeijer et al. were interested in the learning climate of the internship and the effect of teaching methods, such as modeling, coaching, scaffolding, and reflection used by clinical instructors. Although the strategies used for clinical teaching were effective, the researchers found considerable variability in the manner in which the strategies were executed. Recommendations included additional training to improve

clinical teaching, with an emphasis on providing clinical instructors with means to promote constructive feedback.

Nickle (2007) researched the educational strategy of mentorship between expert and novice in nursing practice. In nursing, as in other healthcare fields, the definition of mentorship can be described as “an educational strategy [that] capitalizes on the wisdom of experienced colleagues to facilitate the integration of a novice . . . into the context” (p. 19). Nickle developed a mentoring model using modeling, scaffolding/coaching, and fading to form a framework for the mentor-mentee relationship. This model is based on the use of explicit and tacit knowledge of nursing theory and the sociocultural influences of nurses within the environment to pass on relevant information to the novice. Nickle points out that implementing a model such as this relies on preparation and mentor development that must be supported by management.

Similarly, Wilson et al. (2009) developed an intervention for the study of anatomy by medical students at Rush University Medical Center in Chicago, Illinois. The researcher’s experiment included two groups of students that were learning anatomy. One group was offered a session on clinical procedures with hands-on practice, using cadavers and models, and was compared to the other group using traditional methods of didactic instruction with no procedural demonstration or practice. Posttesting scores, from both the anatomy and clinical exams, for the students who had the hands-on practice were improved. Wilson et al. report specific findings that “all respondents (71/71) agreed the laboratory session enhanced their knowledge of basic clinical procedures” (p. 794). Thus, the researchers conclude that the degree of transfer was related to the “method of review . . .

covering the same procedure-specific anatomical content” (p. 796). However, improvement of test scores, although widely used, may not be the best way to recognize the success of the learning experience.

Professional Socialization

Part of the role of clinical educators is to embrace the student into the community of practice through professional socialization. Most students entering healthcare professions have selected this type of occupation because of a service-minded goal to help people in one way or another. Bruhn (1987) describes allied healthcare professionals as groups who desire service over profit. Even in 1987, Bruhn was describing current trends in allied healthcare to include increases in the emphasis on research, opportunities in private practice, specialization, and direct management, to name a few. Professional behavior skills needed to meet these trends include critical thinking, personnel management skills, communication skills, and interpersonal skills. Bruhn suggests that educators are not doing enough “to help students learn about their future roles as health professionals” (p. 116) and need to teach the traits that can be acquired. My student interviews provided participant perspectives on communication, teamwork, and socialization during the clinical experience.

Olmstead and Paget (1969) examined the theory of professional socialization of medical students as a planned component of their education and made a distinction between child and adult socialization. Relative to their question of the change that medical students undergo during training, Olmstead and Paget determine that role transformation to the demands of medical practice is strongly influenced by student personality. Without a

structured method of measuring the type of socialization that occurs in the clinical environment, it is hard to interpret outcomes.

Brutvan (1985) conducted a study of medical technologists, dental technicians, physician assistants, and registered dieticians to look at links among these allied healthcare occupations. Brutvan looked for factors that indicated role conflict, as attrition rates of practitioners in allied healthcare professions continued to be a problem. By investigating the autonomy of the various occupations, she found that predisposing factors contributed to intrarole conflict. Her conclusions resulted from evidence of student preparation for the occupational role by educational programs. Interestingly enough, she found that the structure of medical technology, with all of the subspecialties, “was shown to have the highest level of intrarole conflict among the four occupational groups” (p. 10). Although this study was conducted 30 years ago, it supports the examination of current student perspectives on professional socialization in the MLS clinical internship. Through my research study, interdepartmental interaction is analyzed from the student perspective.

Organizational influence as a factor related to student learning in the clinical setting is an important component supporting the educational experience. Pitney (2006) studied the influence of an athletic organization on quality-of-life issues for students studying athletic training. He found that through professional socialization, the students were affected by bureaucracies of the organization. The role of MLS specialty organizations may or may not have an impact on MLS students’ perspectives of their clinical experience. In collecting data related to laboratory department experiences, the impact of specialties can emerge.

Another organizational influence that affects clinical students is the hospital organization. Boyle et al. (1996) collected data from new graduate nurses in six midwestern hospitals to examine the role of socialization of new graduate nurses as they began their careers. The role of socialization of nurses was studied to measure its effect on motivation, productivity, and job satisfaction. They found that new employees were assimilated into the organization through “positive precepting experiences . . . support systems” (p. 153). The study of Boyle et al. assesses whether inadequate socialization of new graduate nurses contributed to turnover and attrition. As mentioned earlier, Batenburg et al.’s (1999) study of the role of gender as a factor of specialty preference and attitude in Dutch medical students indicates that professional attitudes are related to medical specialty and the influence of professional experience and socialization. Because MLS is a profession dominated by females, gender may contribute to student learning and the ability of students to fit into the community of the laboratory department. By collecting evidence of student perspectives on learning through the clinical internship, I hope to provide healthcare educators with new ideas to promote student competency and professionalism.

Learning Styles

Although the clinical environment and role of preceptors have a large impact on student learning, students may or may not be aware of how they learn best. The MLS career path attracts a variety of individuals from those persons completing an undergraduate education for the first time to those who have already completed a degree and have not found their place in the job market. Other individuals embark on the MLS profession as a

completely alternative career. These demographics translate into a range of adults, usually age 22 or older, in the undergraduate collegiate classroom. For educators with this range of students there are also most likely a variety of learning styles.

The concept of learning models and structure of knowledge was studied by Kolb (1984). Kolb describes structural functions of the brain and how these functions correlate with basic characteristics of learning. In his book, *Experiential Learning*, Kolb writes, “The learning process is not identical for all human beings. Rather, it appears that the physiological structures that govern learning allow for the emergence of unique individual adaptive processes that tend to emphasize some adaptive orientations over others” (p. 62). A learning-style inventory was developed to help individuals understand their own ways of learning. The ability to recognize one’s own strengths and area for improvement can be beneficial, especially with rigorous curricula. Because the trend of increased nontraditional students in undergraduate programs continues, educators must strive to relate to all types of learners.

In 2001, Neil Fleming of Christchurch, New Zealand, published *Teaching and Learning Styles: VARK Strategies*. (VARK stands for Visual, Aural, Read/write, and Kinesthetic.) The current revised and reprinted version of this book (Fleming, 2012) is available only via Internet purchase. Fleming’s description of learning styles is based on development of the senses and is interpreted differently from the Kolb inventory. Leite, Svinicki, and Shi (2010) conducted a study to check validation of the VARK inventory and stated that they “support the use of the VARK as a low-stakes diagnostic tool by students and teachers” (p. 336). Leite et al. also suggest that the instrument may be used as a

research tool for further investigation of student learning styles. In addition to the consideration of learning styles, a review of how the theory of situated learning applies to clinical education in a community of practice can be better understood.

Student Reflection

The qualitative analysis of student reflections of their clinical education can provide valuable insight into the process of learning. Student reflection of learning in a clinical setting has been examined by a variety of educators in nursing (Fakude & Bruce, 2003; Wong et al., 1995; Wong et al., 1997), physical therapy (Plack et al., 2005; Williams & Wessel, 2004), community health (Drevdahl & Dorcy, 2002), and dental hygiene (Pee et al., 2002). Chirema (2007) used reflective journals to enhance learning in post-registration nursing students. She emphasizes that the process of journal writing can help students reflect on attitudes, feelings, and association of previous knowledge. Chirema refers to Boud (2001) as an expert on the use of journal writing to enhance reflective practice.

Boud (2001) defines journal writing as reflective practice and can be considered a “device for working with events and experiences in order to extract meaning from them” (p. 9). Boud suggests that the reflection of an experience as it is taking place includes noticing events, intervening in an overt way, and interpretation of events as “reflection-in-action” (p. 13). Boud continues to explain that reflection after events can also be valuable because the immediacy of the moment has passed and a student can return to the lived experience and reflect on the impact on his or her learning. Also, when returning to the experience to reevaluate what happened, the student can focus on his or her emotions at the time.

Williams and Wessel (2004) also utilized the process of reflective journaling with physical therapy students to obtain feedback about their learning during a particular course of study. The themes discovered by Williams and Wessel from analysis of student learning relate to adoption of coping strategies, student awareness of roles, appreciation of values, and adjustment to group learning. Wong et al. (1995) acknowledge the usefulness of the reflective journaling for nursing students. What they find to be lacking are reliable methods of assessing the reflections. A common theme for the assessment of reflective writing depends on development of appropriate criteria for students to follow. Pee et al. (2002) assess the level of reflection by providing a structured worksheet to guide students as they reflect on their experiences during clinical education.

Summary

Relevant literature on student perspectives of learning during clinical education is limited. There are few specific studies on MLS student perspectives on clinical education learning. Several studies from the literature review indicate the need for better evidence for best practice in clinical education. Most of the researchers agree that effective learning has meaning when students are placed in an environment where that student can apply knowledge. There is also agreement on a multitude of factors present in the environment that impact learning (Benner et al., 1992). There is a need for clear expectations for both the preceptor and the student (George et al., 2007), and the adjustment between the classroom and clinical setting is an important consideration (Prince et al., 2005).

Many of the research studies include surveys sent to either students or instructors. Although surveys can provide good information, simple assessment and evaluation by students should be supported by observation of learning (Dornan et al., 2006). Researchers have noted considerable variation among student experiences that is often related to clinical instructor feedback (Stalmeijer et al., 2009). Recommendations for better recognition of clinical instructors and provision of educational resources are suggested by Rogers et al. (2010).

This literature review reveals research in the use of student journal writing to reflect on clinical experiences in nursing and allied health. Two of the strategies for teaching and learning of clinical education by Delany and Bragge (2009) emphasize building confidence in students and insisting on reflection. There has also been more of a trend for research in the areas of socialization, professionalism, and interprofessional education.

A gap in research for best practice in clinical education for MLS students has been identified as a need to better prepare MLS students for the clinical experience. By developing recommendations of researchers in a variety of healthcare education programs that include clinical education, additional research for MLS student preparation can be performed. Application of this research to the process of learning and described preparation by MLS students in clinical education can contribute to the gap of information in this subject and may be useful to educators in other healthcare professions.

CHAPTER 3

METHODS AND DESIGN

The purpose of this qualitative phenomenological research is to study the process of learning by MLS students through the lived experiences of clinical education. The following research questions were addressed.

1. According to participants, what personal attributes, knowledge, and skills contribute to learning during clinical education?
2. According to participants, what role does the workplace environment and clinical preceptor play in the learning process of clinical education?
3. How do participants describe preparation for clinical education and transfer-of-learning from the classroom and student laboratory to the hospital laboratory?

This chapter is organized by first describing the research sample and the strategy for selection of the sample. Next, the information needed to answer the research questions is described, followed by the research design and methodology. The data-collection methods are followed by the ways in which the data were managed and analyzed and, finally, a summary of the chapter's key points.

A qualitative research approach was used in order to obtain student descriptions of the process of learning in clinical education. Seidman (2013) describes the phenomenological approach to interviewing as “a focus on the experiences of participants

and the meaning they make of that experience” (p. 16). Finding the meaning of how MLS students learn during clinical education was the basis for choosing this type of research method. The descriptive words of the research participants provided insight into the phenomenon of clinical education. I was more interested in what the students observed taking place during the clinical experience rather than what I believed should be taking place. In order to learn more about the environment of clinical education, I spent several hours in two separate hospital laboratories, which provided “a firsthand encounter with the phenomenon of interest rather than a secondhand account of the world obtained in an interview” (Merriam, 2009, p. 117). Observation of the physical setting in which interaction between the student and practitioner takes place was valuable to analysis of participant interviews.

Research Sample

The intended purposeful sample strategy was to select students enrolled in NAACLS-accredited MLS programs in Illinois other than the NIU MLS program who were completing their clinical education component of the program. Recruitment of participants occurred through correspondence with MLS program directors. The Institutional Review Board (IRB) approval for this study was granted on March 17, 2014, by the Office of Research Compliance and Integrity of NIU. When IRB approval had been received, an email recruitment letter was sent to five MLS program directors in Illinois on April 9, 2014 (see Appendix A). Two amendments were made to the original IRB. The first amendment was written to include a student completing an NAACLS-accredited MLS online program

through a university outside of Illinois, and the second amendment was written to include observation as a method of data collection.

Program directors were asked to announce the study to their class of students and share the recruiting flyer with students completing the clinical internship (see Appendix B). Approximately 40-50 students would have been contacted through this approach. Interested participants were asked to contact me directly. Any student who contacted me through email was sent additional email correspondence and contacted via telephone calls. I received three participants through this first effort of recruiting. No participants were rejected.

My original goal of 8-10 participants was not met, so I contacted three hospital-based program directors, hoping to recruit participants from those programs. However, no participants were recruited from the hospital-based programs. The process of participant recruiting through network or chain sampling, sometimes referred to as snowball sampling strategy (Bloomberg & Volpe, 2012), was initiated by email correspondence with NIU-affiliated hospitals that often provide internships for students from multiple universities. Through this process, I was able to recruit two additional participants. The final participant was recruited via an alumnus of the NIU MLS program working in a Chicago hospital. A total of four universities are represented by the sample population. Interviews took place between the months of April and December 2014. A total of 10 hospitals located in Illinois were represented either by a clinical education location or observation location.

Six MLS students currently completing clinical education in hospitals in Illinois were interviewed. Five of them participated in a second interview. Although I was able to

recruit only six participants, I believe the diversity of the participant population is good. Age of participants ranged from 23 to 30 years, with four of the participants already holding a bachelor degree in biology. Participant selection of the program was dependent on location, with one person having a relative in the city of the university location, one person moving back home, one person relocated due to a husband's job, and two participants with bachelor degrees selecting a university program that offered a master's degree in MLS. The participant completing the MLS program online was able to continue her full-time job and complete online courses at the same time so was not required to relocate.

A demographic table with information for each participant was set up using an excel file and included several factors related to the participant such as gender, age, ethnicity and post baccalaureate status. Some other factors about the student included in the table described whether English was a second language for the participant, what point of the practicum experience the student was in at the time of the interview, and reason for the student's choice of the particular program. See Table 1 of collected demographic information where C= Caucasian and AA= African American (ethnicity).

Table 1

Demographics of Study Population

| Pseudonym | Gender | Ethnicity | English 2nd language | Reflection summary | Post-BS | Clinical setting | Reason for choosing program | At one point in the practicum |
|-----------|--------|-----------|----------------------|--------------------|---------|------------------|-----------------------------|-------------------------------|
| Connie | F | C | No | No | Yes | Mixed | Relative | End |
| Sam | M | C | No | Yes | No | Rural | Home | Last half |
| Vera | F | AA | Yes | Yes | No | Rural | Husband | Middle |
| Mary | F | C | No | Yes | Yes | Urban | Online | End |
| Nancy | F | AA | No | Yes | Yes | Urban | MS | Middle |
| Mark | M | C | Yes | Yes | Yes | Urban | MS | Middle |

Descriptions of Participants

All participants have been given pseudonyms to protect confidentiality. My group of interviewees consisted of four females and two males, which is reflective of the percentage of female to male students in most MLS programs. Of the participants, four were Caucasian, and two were African-American. English as a second language applied to two of the participants, and they proudly announced recent U.S. citizenship during the interview. Progress through the clinical practicum year varied among the participants, from the middle of the experience to completion of the practicum.

Connie was a female Caucasian who had just completed her clinical education when I conducted the interview. She was a post-baccalaureate student earning a second bachelor of science degree in MLS at a university in a different state from where her first bachelor of science degree was earned. The opportunity to live with a relative was her reason for choosing the location of the MLS program. Her clinical education was divided among three different hospital facilities, which included both urban and rural settings.

Connie was not talkative, and I had to draw out information from her. One of the things about which she was quite talkative was the hardship of long travel times to her clinical site. She mentioned that for a few weeks, she spent three hours a day in travel time and was required to begin the day at an early hour. This interview took place at a hotel serving as a venue for a professional meeting that included an academic bowl competition. This student was competing in the bowl the evening of the interview, which may be one of the reasons for her distraction and lack of focus on answering my questions. I had asked her a couple of times to share a unique situation that she had encountered, to which she

replied, “I can’t think of any right now.” Although a second interview could not be arranged with Connie, I believed that some of her perspectives provided insight for my research questions.

Sam was a male Caucasian who was completing his first bachelor of science degree in MLS after spending two years in a different program in an out-of-state school. Moving back home to complete his clinical education in a rural setting was a way for him to save some money. Although the clinical education setting was rural, Sam had the opportunity to experience a summer internship at a large reference laboratory that performs testing that may not be commonly done in hospitals. This offered an opportunity for Sam to experience both a large and small clinical environment. The first and second interviews with Sam were two weeks apart from each other and took place in the cafeteria of the hospital where his clinical education was taking place. Unlike Connie, Sam was quite talkative and had many good insights to share. He was in the middle of his practicum when the interviews took place.

Vera was the third person to be interviewed. Vera was originally from an African country. English was a second language for her, and although she was easy to understand, she had some unique ways of describing some things. Vera had a family, and her reason for being in the MLS program at the current location was due to changes in jobs for a member of her family. She had completed courses in a different state prior to joining the MLS program. Her path to MLS, like many of the other interviewees, was indirect. Vera told me that what she liked least about clinical education was the drive to and from the hospital from home. She mentioned that she tired easily because she was pregnant. The

length of time between the first and second interviews for Vera was two weeks and also took place in the cafeteria of the hospital of her clinical education. Vera's hospital setting was also considered rural.

Mary was the next person to be interviewed. She was a female Caucasian who already had a bachelor of science degree and had been working in a laboratory for a few years. I did not find out that she was completing her clinical education through an out-of-state online program until during the first interview. Mary was the oldest participant and offered some interesting perspectives related to online education, which is why I submitted an addendum to the IRB in order to include findings from her interviews. Mary's hospital was in an urban setting, and both interviews took place in a small conference room just off of the laboratory in the hospital. The time frame between the first and second interviews with Mary was approximately two and a half weeks. Mary had also just completed her clinical education practicum when the second interview was conducted.

Nancy was an African American female who already had a bachelor of science degree and was completing a master's of science degree in MLS at a university program in an urban setting. The first interview with Nancy took place in a coffee-shop area of the hospital of the clinical practicum. Because there was a considerable amount of commotion in this location, a decision was made to conduct the second interview at a central location in the urban setting. Due to the difficulty in scheduling interview times around the student's schedule, there was a period of four weeks between the first and second interviews for Nancy. Nancy was a bright and talkative participant who offered many interesting perspectives.

Mark, a male Caucasian originally from a European country, was the last participant interviewed. The first and second interviews were three weeks apart from each other and took place at a central urban setting with few distractions. For Mark, English was a second language, and he also had some unique ways of describing things but was easy to understand. Mark actually started an MLS program at a university that discontinued the program, so he had to earn a bachelor of science degree in biology and at the time of the interviews was completing his master's of science degree in MLS in an urban setting. Mark was working part time in a laboratory while completing his clinical education, so was able to make some comparisons between the two different locations.

Research Setting

The research setting included the hospital medical laboratory where clinical education was taking place. Participants were asked questions during the interviews regarding urban or rural hospital locations to learn about the student preference for hospital environment. In order to better understand activities and communication between students and practitioners in the hospital setting, visits were made for direct observation of two hospital laboratories involved in clinical education. Field notes from the visits were written immediately after the visits.

The type of information needed to answer the research questions was obtained through personal interviews and hospital observations. In addition to the interviews with participants, a written reflection of the experience was collected from all but one of the participants and was included in data analysis as an artifact. Although the addition of a

student with online learning combined with the clinical practicum was unplanned, her perspectives provided valuable insight to the findings.

Arrangements for date, time, and location for the initial interview were made through email correspondence with the participant. At the completion of the first face-to-face meeting, we decided on a tentative date, time, and place for the second interview, which was later confirmed through email. The first participant, interviewed at a hotel prior to a professional event, had completed her program and was moving out of state, so a second interview could not be arranged.

MLS student descriptions from the interviews and the field notes from the direct observations provided evidence for the process that takes place during the practical experience. Requesting a participant reflection was intended to complement the interviews through clarification of student perceptions of experiences. For some individuals, having time to think about particular situations and strengths or areas for improvement is easier than thinking of an example during an interview. Direct observation of two hospital laboratory settings provided a firsthand encounter of the physical environment and phenomenon in which teaching and learning occurred.

Research Design

The phenomenon in this study is clinical education in a hospital laboratory with students interacting with practitioners to learn techniques and skills needed to be successful in the MLS career. The methods used were participant interviewing as described by Seidman (2013) and direct observation of the phenomenon environment as described by

Merriam (2009). According to Merriam (2009), the use of observation as a qualitative research tool can be used to “triangulate emerging findings” (p. 119). My field notes from observation of the physical environment for clinical education supplemented data from participant interviews and provided a context for interviewee descriptions. Use of an observation guide and activity table helped to facilitate my observation of the physical setting and take notes on interactions between practitioners and students. In addition to observation of the process of teaching, transactions between teacher and student in an experiential setting provided valuable information on learning. Itin (1999) wrote a paper distinguishing experiential learning from experiential education and suggests that experiential education should be conceptualized as a philosophy of education, which “can be part of educational reform” (p. 91) that looks at a broad range of educational strategies.

The first step after obtaining the research sample was to set up interviews. The participant interviews took place at a variety of locations and were arranged prior to the interview through email and telephone communication with the participant. After explaining the purpose of my research study, participants were asked to sign a consent form that included consent for interviews to be digitally recorded and confirmed the security and confidentiality of all data collected (see Appendix C).

Participants were interviewed at a location in or near the hospital where the clinical education was taking place for the convenience of the participant. Of the 11 interviews conducted, 1 was conducted at a hotel prior to a professional event, 7 were conducted at the hospital conference room or cafeteria where the clinical education was taking place, and the

last 3 took place in the great hall of Union Station, Chicago, Illinois, which was a convenient location for both the participant and me.

During the first interview, demographic information was collected and an explanation of the reflection summary was given. A reflection summary guide was provided to help the participant think about the overall experience or experience from one department during clinical education (see Appendix D). Seidman (2013) suggests that the third interview can be a reflection of meaning for the participant, and my research incorporated the reflection summary for this purpose. Five reflections were received from the participants and provided reinforcement of statements made during the interviews.

The second interviews were arranged at the end of the first interview as the students had very busy schedules. The interview recordings were transcribed at the earliest convenience. Analysis took place after the interviews were completed using the QSR NVivo software. Interview transcripts and reflection summaries were added to the program for later coding. Analysis took place between January and March 2015. Additional data collection through observation at two hospital laboratories engaged in clinical education took place in April 2015. Field notes from these observations were added to the software program for analysis.

Data Collection Methods

Prior to data collection, a selected literature review of clinical education, transfer-of-learning, professional socialization, and professionalism in a variety of healthcare disciplines was conducted. The literature review provided information from previous

research studies that served to guide aspects of this study. The literature review is not part of data collection.

The first part of data collection included participant interviews that were done face to face using a digital recorder for later transcription. The average length of first interviews was 45 minutes. One item on which I focused in the first interview was finding out about the participant's path in higher education that resulted in his/her current enrollment in an MLS program. The interview guides were written in a semistructured format to engage the participant in descriptive language to determine his or her perspectives on the phenomenon of MLS clinical education.

During each interview, the participant was asked questions about experiences in various laboratory departments, including both typical and nontypical daily activities to encourage descriptive narratives with important implications to the participant (see Appendix E). According to Seidman (2013), when conducting phenomenological interviewing, the "goal is to have the participant reconstruct his or her experience within the topic under study" (p. 14), and he recommends a series of three interviews. By interviewing students "living" the clinical experience, new insights of the process of learning in the professional environment during clinical education were explored.

In addition to interviews, participants were asked to complete a reflection of the clinical experience to add meaning and reliability to the data collected from interviews. The reflection guide listed items to consider such as unique events, personal strengths, and areas for improvement. Additional items for the participant to consider in the reflection

were observations of teamwork and professionalism exhibited throughout the clinical education experience.

The second follow-up interview included questions related to confidence building and competency development as a result of professional socialization in the clinical environment (see Appendix F). A total of five second interviews took place, with one participant unable to arrange a second interview. The average time for the second interviews was 36 minutes. Each second interview took place between 14 days and 28 days after the first interview, with an average time span between the interviews being 16 days. The purpose of the second interview was to build on comments from the first interview with additional questions related to the workplace environment, professionalism, and social interaction with clinical instructors. Further inquiry about the participants' perspectives on their role as students to build confidence and independence provided valuable information.

During the interviews, prompts for reconstruction of learning events, problem-solving situations, interaction with other practitioners or patients, and instances in which transfer-of-learning occurred were used. For both interviews, the leading questions were supplemented as needed in order to collect rich descriptions from each participant. Participants were in the middle of or finishing their clinical education, and the interviews were scheduled so as not to conflict with the education schedule. All interviews took place in the afternoon after the participant had finished his/her day of internship, with the exception of the second interview with the last participant, which took place on a Saturday morning before the participant had to go to his job. All participants were working either part-time or full-time jobs in addition to completing the MLS program practicum.

The last component of data collection was direct observation in two different hospital laboratories in northern Illinois where students were completing a practicum experience. The observations took place on April 28 and April 29, 2015. There were four students completing their practical experiences at each of the two facilities. These observations took place during the last week of the student practicum, and many were working independently or completing practical exams. The students observed were not the same students interviewed. Students and preceptors were designated by letters and numbers and were not identified by name. Note-taking was done manually to avoid audio or visual recordings to protect confidentiality of all persons present.

Notes related to the environment and processes were later transcribed as field notes. An observation guide and table of activities were used to facilitate note-taking during the field observation (see Appendices G and H). These observations provided an overall picture of the physical setting and interpersonal interactions that are part of clinical education. Rough diagrams of the laboratory departments were completed during the observation.

Hospital organizations are required to comply with multiple regulations associated with safety and patient confidentiality. In order for me to enter the hospital laboratories, evidence of clinical requirements similar to those required by students was needed. One facility also required my completion of eight learning models related to the facility's organization and safety protocols. Although not all laboratories are laid out exactly the same, these observations provided general information that was referenced by participants during the interviews.

Transcription of the interview recordings were completed by myself from September through December 2014, using the software Inqscribe[®]. Transcription of the observation field notes was done immediately following the observations in order to remember details of the two settings. All recordings and transcriptions have been maintained in a secure location, with pseudonyms used for participants to maintain confidentiality. These data are to be stored on an encrypted flash drive for a period of five years.

Data Analysis

Knowing that qualitative research can generate much data, my first step was to set up a system of identifying and organizing all data collected. An encrypted flash drive was purchased to store the digital recordings, transcripts, field notes, and reflection papers so that participant confidentiality could be maintained. Separate files were organized for each category of data. Paper copies of consent forms were stored in a secure location. The transcribed participant interviews and reflection papers were printed and stored in a research notebook kept in a secure location.

Recordings of interviews were transcribed by myself using Inqscribe[®], an online software program that allows for the slowing down of recordings. Transcribing of interviews took place as soon as possible after the interview to capture the essence of the words, gestures, and emotion that occurred. The transcribed interviews were organized chronologically in a research notebook and kept in a secure location. Multiple reading of transcripts and knowledge of the data collected was helpful during the coding sequence.

The software program QSR NVivo10 was used to code all documents. In addition, the NVivo program was used to query and explore for patterns and themes for findings and analysis.

A table of findings was prepared to summarize topics and subtopics that had emerged. A system of open coding was used to capture the meaning of what had been described by participants. The coding method as described by Saldana (2013) for the first cycle included both a holistic and exploratory approach to discover broad topics to align with the research questions. The second round of coding was a more structural process to split the broad topics into more descriptive phrases according to the narrative presented by participants.

The third and subsequent coding cycles were done to look for patterns or categories that emerged from previous cycles to answer the research questions posed. By looking at both similar and contrasting phrases, I was able identify themes on the process of how learning occurs from the participant's perspective. The QSR NVivo10 software program was an excellent way to organize data for later analysis and for development of themes and patterns through queries and word searches. Qualitative analysis of transcribed interviews and reflection papers from participants provided rich and detailed meaning for the process of learning in clinical education.

Researcher Role

I began my undergraduate college experience during the years of 1969 to 1973, and I am proud to say I have been an MLS practitioner for approximately 42 years. Thanks to a

good introduction to careers in a high school biology class, I knew that I wanted to study medical technology, so my goal was to find a college with that program. During the past 20 years, I have served as a professor in an MLS program.

Students in the MLS program at NIU were not recruited because of my role as program director for MLS at this institution; it would be a conflict of interest to interview these students. For that reason, I contacted other MLS programs in Illinois to recruit participants. Care was taken to recruit participants from programs other than NIU and to use the words of the students to present the process of how learning occurs during clinical education. In addition to other program directors, I communicated regularly with several clinical affiliates of the NIU MLS program where students are placed for clinical education.

My own clinical education took place at a hospital in Rockford, Illinois, in the early 1970s. During that experience, I was introduced to what a full-time working day would be like when I had completed my education. I believe that was good preparation for easy transition to employment in the field, and I managed to start a job immediately after graduation. My future assignment with the U.S. Peace Corps was the first of multiple years of international employment that led me to my current role of professor.

Higher education has changed over the years, and techniques for facilitating learning have also changed. Clinical education for MLS continues to be a critical component, and reliance on hospital laboratory collaboration may be compromised by personnel shortages. I am hopeful that MLS student descriptions of the importance of the hospital experience carry significance for hospital laboratory administrators. It is my goal

that development of student self-awareness and the clinical environment to support learning can contribute to advancement of education in medical laboratory science.

Because of my role as a practitioner and professor of MLS, I am considered an insider with respect to this research. I am able to relate to the participants' descriptions of experiences and progress through the MLS program from their universities even though I do not know specific information about their course preparation prior to the clinical experience. The interview questions were designed to bring out descriptive words on how they perceive the learning situations. The outsider role also fits because I did not meet the participants prior to the first face-to-face interview and knew nothing about them personally or academically. Not knowing the participants was valuable in keeping an open mind regarding their insights and perceptions of clinical education.

Summary

My research design using qualitative data collection from MLS student interviews, observations, and reflection papers produced a rich collection of information that contributed to the analysis of the process of student learning in clinical education. Evidence collected for the three research questions on how personal attributes, knowledge, clinical environment, preceptors, and preclinical learning contribute to student preparation for laboratory practice through the process of learning in clinical education were analyzed. Zepke and Leach (2002) describe experiential learning as a "multi-layered experience incorporating exposed meanings, hidden meanings, and unheard voices" (p. 205). The data

were analyzed to determine what the voices of MLS students expressed and if they perceived hidden meanings during clinical education.

Obtaining participants for the study was somewhat difficult due to the limited number of students completing clinical internships in the location that I was investigating. Scheduling times for interviews with young adults who were juggling school, work, and family was a challenge. Recruiting six MLS students completing clinical rotations for interviews was considered acceptable. Visits to hospital laboratories for observation were easier to arrange. Interviews and field notes were transcribed by myself.

The series of two interviews provided formative descriptions of different aspects of learning at the clinical setting. Two hospital visits to clinical laboratories engaged in clinical teaching provided a firsthand view of the setting described by participant interviews and provided perspectives for my analysis of the learning environment. Through face-to-face interviews, participant descriptions of personal characteristics, knowledge, preclinical preparation, and interactions with preceptors helped to demonstrate the mystery of clinical education. During observation of the hospital laboratory, the physical setting and some of the distracting features of the environment were noticed. Analysis of the evidence was done using QSR NVivo software. Data collected provided information on how MLS students learn during clinical education and prepare for their role as professional practitioners.

CHAPTER 4

FINDINGS

The purpose of this qualitative phenomenological research was to study the process of learning by MLS students through the lived experiences of clinical education. Through descriptive words of the participants and observation of the learning environment, relevant findings for the research questions are presented. Although participants were in various settings, their descriptions of the learning process were quite similar, which facilitated interpretation of how learning occurs in the clinical laboratory. These findings provide relevance to the process of clinical education, which is meant to prepare students for professional practice within the hospital organization. Observation findings of the physical environment where learning occurred helped with the interpretation of participant descriptions of the process of learning.

During analysis of the transcribed interviews, reflections, and observation field notes, numerous codes were identified. After first- and second-cycle coding, the two outstanding primary categories of factors affecting learning were student self-awareness and the physical setting or environment. Two other categories that had an effect on learning included how a student prepares for clinical education and the role of clinical instructor or preceptor. In addition to these learning factors, information related to how students discovered MLS as a profession proved to be significant for promotion of the

profession. This chapter is organized into each of these categories with subheadings to provide focused organization of evidence to support the research questions. Table 2 provides a summary of the categories and related topics found.

Table 2
Summary of Category Findings

| Categories |
|---|
| Student self-awareness facilitates learning through <ul style="list-style-type: none"> • knowledge of strengths in laboratory skills and critical thinking • recognition of areas for improvement • knowledge of how learning occurs and how learning styles can be recognized |
| Factors of the clinical environment and physical setting that affect learning include <ul style="list-style-type: none"> • heavy workload that disrupts the ability of the student to ask questions • unique interactions with patients such as phlebotomy |
| Student preparation for clinical education can depend on <ul style="list-style-type: none"> • how the student organizes materials from preclinical learning • types of relationships with instructors • student understanding of methods of evaluation |
| The preceptor has an effect on student learning <ul style="list-style-type: none"> • through socialization that helps build student confidence • through demonstration of professionalism and teamwork as a mentor • by demonstrating effective communication with other professionals |
| How students can discover MLS as a profession is linked to <ul style="list-style-type: none"> • visibility of the profession • good program information on websites • evidence of career success in healthcare serving the community |

Student Self-Awareness

All participants were able to identify factors that they recognized as being helpful to the process of how learning occurs. Individuals reported on personal strengths seen as personal attributes, laboratory skills learned at a previous job or during preclinical

education, theoretical knowledge from didactic courses, and areas for improvement, either through interview descriptions or their reflective summary. Because there are many significant items a student must remember in each department of the laboratory, such as ID numbers and passwords, educators often suggest a small (or large) notebook to keep handy for making notes during the clinical practicum. Boud (2001) suggests that journal writing is one way to make meaning out of experiences. If a student is able to witness a unique or unusual occurrence, it should be recorded for later reflection. My purpose in utilizing reflections as artifacts was to support descriptions of particular events that provided effective meaning for the participant. Some participants were not familiar with self-reflection but were able to follow the guide provided.

Self-Identified Strengths

Participants in this study had already been immersed in clinical education for a few months by the time I interviewed them. They had completed the university courses, including student laboratory courses that may be considered preclinical education. Although they may have been unfamiliar with the learning process when they began the clinical experience, at the time of interview, they were quite aware of the daily routine and their own individual abilities. At least two of the participants commented on being “scared” at the beginning of the practicum due to the unfamiliarity of so many things. It was the preceptors and practitioners who made the student welcomed.

Most participants followed the suggestion on the reflection guide and wrote about his or her strengths and areas for improvement, either in one department of the laboratory or

as a general overview. Every participant expressed a level of self-awareness to the extent that he or she could describe strengths or personal attributes that contributed to his or her self-reported success in learning. A comment from Nancy's reflection paper stated, "As an MLS, I believe that I am a hard worker and a fast learner. I have been successful in my rotations." Sam stated a list of strengths in his reflection when he wrote, "In my opinion, my strengths as an MLS student are my organizational, listening, and communication skills."

Sam also described himself in the first interview as being "particular." He expanded on that definition this way.

Well for one thing I'm very particular. I'm a very particular person. I've noticed that people in this field tend to be like that. They tend to have, I guess, a certain desire for things to be . . . you know . . . in a certain way, I guess.

Sam mentioned that he also saw this trait in other professionals he had worked with during clinical education, who want things to be a "certain way." He reported that some practitioners become quite upset if someone makes a change affecting the routine.

Participants also identified personal attributes contributing to learning success in clinical education, such as being observant, organized, detail-oriented, and able to communicate to a variety of audiences. It is not unusual to hear students report on the ability to follow detailed instructions. MLS preclinical instructors often emphasize the need to pay attention to details when following procedures because of the importance of this trait in MLS practice. In the first interview with Mark, he described himself as being "detail-oriented." Mark also mentioned the need to be organized.

Some of my strength, that I consider important for [an] MLS student, and I possess, are being organized, detail-oriented, getting along with other coworkers and team members. This program forced me to be even more organized and keeping track, . . . being consistent with my studying and that kind of stuff.

Nancy also described the need to be organized. She was fortunate to spend time for clinical education in two different hospital laboratories and mentioned the fact that she really preferred the organized laboratory over one that she observed to be unorganized. When asked what she meant by unorganized, she described clerical errors made by staff, personnel not knowing what the work schedule would be, and staff not being able to find documents and supplies. Another aspect of being organized in the workplace is the ability to do more than one task at a time, often referred to as “multi-tasking.” During one of my observations, a discussion about multi-tasking took place with a clinical preceptor with many years of experience. He mentioned the fact that students do need to be organized to do several tasks at one time and they need to complete tasks in a timely manner. At the same time, the student needs to be quite focused on a task being done.

Participants responded that time management was another essential part of being organized. Creative scheduling is required to find a block of time to read and study during the week when working essentially an eight-hour shift at the hospital five days for clinical practicum and working a part-time job. At least two participants commented on the stress involved in commuting to different facilities that sometimes meant a long-distance travel from home. When the students are expected to be present and ready to learn in the laboratory at 7 am and they are facing an hour of travel time, the morning wake-up can be

quite early. Participants reported pride in the fact that they were able to accomplish this and manage family life.

Participants were also proud of the fact that they were able to “catch on quickly” and, at the same time, described the means of becoming proficient in the work through repetition. At least two participants referred to themselves as being a “fast learner” or “quick learner.” The ability to learn hands-on tasks in a timely manner is an important distinction between initial steps in the process of clinical education versus the end point, at which a confident individual emerges. Some participants expressed pride that they did not have to be shown a task multiple times before being able to perform alone.

Nancy described her strength as being a “self-starter.” She liked to be independent and was striving for that point in time when she would be able to exhibit autonomy when performing tasks. The ability to communicate needs and show initiative was described by both Mary and Mark as they worked with clinical instructors to balance work and clinical education schedules. At times during the clinical learning process, a student must find ways to communicate concerns or needs and not be intimidated by instructors. If that student is too shy or afraid to speak up, learning goals may go unattained.

Identified Areas for Self-Improvement

Some of the participants recognized an area of self-improvement needed in a particular department of the clinical experience. These were often identified in the reflection papers. Sam described an area in which he was less confident in technique and how he was able to use his strengths to overcome difficulties. He stated it as follows:

The microbiology department was an area that I knew would be more difficult for me. These were concepts that required more time for me to learn in the classroom and student lab, so I expected the same difficulty in the professional experience. To buffer this difficulty, I was sure to communicate my concerns with the technologists that were teaching me and also to pay extra attention to the processes that I was less comfortable with. These actions ultimately led to my confidence being built up in this department to a point I felt was satisfactory.

Vera also described the microbiology department as a challenging one when she stated that

it required a lot of understanding and remembering a lot of the material. At one time, I was very overwhelmed, fearing that I would not pass the department, but I thank the techs that sacrificed their time to make sure that I understood all the tests and reading the plates.

Vera was able to get through this overwhelming experience and meet the goals of the department through the patience and understanding of the staff working with her.

Mark wrote these comments in his reflection paper: “One thing that I would like to improve is definitely being patient. Sometimes the learning process requires a lot of patients [sic], and especially during the training, so I would like to improve that.” Just as Vera described the need for patience from the instructors, Mark believed that he needed patience when learning new tasks so he did not become frustrated. Mary said that she was rather intimidated by some instruments and would like to become more comfortable performing maintenance on them. Mary was a rather short young lady and wrote in her reflection, “Our chemistry machines are really big, and when changing the probes, half my body is in the machine, and it’s just scary.”

In the reflection from Nancy, she summed up a common theme for area of self-improvement as “to build self-confidence in the lab.” She stated that she was comfortable in a variety of procedures already but knew that building confidence would come with

experience and she was ready to “transition into the workforce.” Several of these comments were not expressed in the interviews but were written in the reflective summaries. Williams and Wessel (2004) state that physical-therapy students, in their study of reflective journal writing, identified significant learning events that proved to be valuable feedback for instructors. The problem that remains is the best way to assess student reflections, which is what Wong et al. (1995) studied in their research of nursing student reflections.

Student Attitudes

During the interviews, all participants exhibited an attitude of positivity and sense of humor. Descriptions of reactions during interviews such as “laughs or giggles” were coded in each transcript multiple times. Whether participants were laughing about an event triggered by my question or a unique experience recalled during our conversation, I believe that all participants represented a positive attitude of accomplishment toward their academic pursuits.

Encouraging students to exhibit an attitude of positivity and flexibility makes an impression on practitioners in the clinical setting. One way in which this positivity can be applied to enhanced learning in clinical education is through coping strategies. Melincavage (2011), in her study of anxiety in nursing students to a degree that they might leave the education program, suggested that educators should strive for a better understanding of the anxiety and therefore develop interventions to decrease it. Students in their clinical internships for healthcare professions experience a fair amount of stress and

anxiety related to fear of not performing a task correctly or simply a fear of the unknown. Participants described a level of stress or anxiety that contributed to their experiences by noting the difference between familiar and unfamiliar laboratory tests or equipment which often subsided with time and when confidence was developed.

One participant in particular discussed the need to have an attitude of inquisitiveness and an open mind to absorb information that would be presented during clinical learning. Mary used the term “open” repeatedly and stated repeatedly that you have to be “open to new things.” In an effort to find out what exactly she meant by this term, I asked what the opposite of “open” was, and she replied, “not willing to learn.” Mark used the term “open” when discussing communication and the willingness to engage in conversation without restrictions. Several of the participants referred to the need for “open-mindedness” when discussing the role of student and preceptor. Connie referred to preceptors as being “open” to questions from students and that students should not be “spoon-fed” information. All participants used the term “open” in one fashion or another to make the point of being able to provide input.

Mary: I’m fun. I love learning. I’m easy-going. Uh, I’m very open. You have to be open. Everybody was really open to me learning new things and me being able to see something. (*laughs*)

Jeanne: Can you describe what you mean by being open?

Mary: Just being able to doing anything and not just think like, “Oh I don’t want to do that.” Just go for it. Just being able to go for something.

Because Mark was working part time at a hospital laboratory, he talked about an initiative at his workplace and the emphasis on “innovation.” He mentioned that with the correct attitude, one might be able to provide new insight into techniques and procedures

that would be welcomed as a fresh perspective. Mark took that as a challenge to show an attitude of focused attention to learning that would be noticed by clinical instructors and might lead to suggestions for new innovations in his workplace.

Self-Identified Skills

During the interviews, participants were asked if they could identify any particular knowledge or skills that might contribute to learning in the clinical setting. Three participants described a history of previous laboratory work experience. One of the participants, Mary, was working full time in a department of the laboratory that collected samples for testing by MLS via specimen processing. She was also dedicating additional hours each day for clinical education while completing didactic coursework online. The challenge of finding time to schedule work and time for internship would have been too much for many students. When I asked Mary if it was difficult to separate “work time” from “clinical time,” she responded,

Oh yeah, oh yeah. Work was work in the time that it was set. So depending on what area it was, . . . so like my heme [hematology] after work . . . so from 3-9 pm were my clinical hours. So I would be here in the morning for work and from 3-9, I was doing my clinical hours. And then for micro, . . . I had to take vacation time from here, and then I had to do that up there since they only do certain things in the morning at that shift time.

It became clear to me that this particular student had sacrificed much to complete this clinical education and her experience in the laboratory environment was extremely beneficial.

Another participant, Mark, had started working in specimen processing in a hospital laboratory about one month before the start of clinical education in a different facility.

When I asked if it was beneficial to have that experience, he responded that it was helpful to “know the basic stuff.” When pressed to tell me just what the “basic stuff” included, he referred to topics and program content information introduced at the university level. Mark also emphasized the fact that each department of the laboratory was different. The differences applied not only to personnel but also to methods of performing tasks. These differences are described in more detail in the environment section.

Sam was the third participant with previous work experience who was completing clinical education in a rural setting but had spent the summer months in an internship experience in a large reference laboratory. He described the techniques learned at the large laboratory environment as beneficial preparation for his experience in a rural setting. At one point, we joked about the number of procedures in the urban setting versus the rural setting. Sam was quick to emphasize that he was learning just as much in the rural hospital. One point that Sam made about the reference lab was that because they had a steady flow of student interns every summer, they were well equipped for student instruction and knew how to give instructions to students with little or no clinical laboratory background. Smaller hospitals also have practice with clinical instruction of students but it may not be as often. Sam had the advantage of seeing procedures performed on a large scale followed by lab operations on a smaller scale. He told me that the skills he developed during the internship were valuable to the learning taking place during the clinical practicum of the MLS program.

Participant Description of Critical Thinking

Not all participants had the opportunity to work in a clinical laboratory prior to beginning clinical education. However, most academic MLS programs include case studies and other methods in the classroom or student laboratory to help students think about what the “next step” would be or how a “diagnosis” would be made. This type of preparation for students is a form of critical thinking, a skill that students should be able to apply in the clinical setting. The use of medical case studies is just one method of engaging students in the process of critical thinking. Of the five participants whom I asked this question, five rather distinct answers were received.

Mark: It’s just thinking about what they’re telling and what they’re explaining because not necessarily what people tell you might be the truth. So you gotta, like, think about what you’re doing and definitely use your brain. I mean, that’s what I understand about critical thinking, . . . and definitely have your own opinion.

Vera: As techs, you have to be very . . . you have to think very fast . . . because most of the time . . . you have to make some decisions.

Nancy: I think you would take what you have learned or already know and then be able to apply it to something else. Basically application. You’re not just memorizing. You’re not just regurgitating what someone told you, . . . but you can actually incorporate that into something different.

Mary: You take a subject, and you kind of basically brainstorm on something and then kind of grow off, grow from it. Kind of think about every little aspect of it.

Sam; Critical thinking, to me, is more like using your knowledge and being able to apply that to a real-life situation and being able to pull from multiple knowledge bases. I always think of, like, a case study, where you might give it some data and some background information, and you want to know what is going on. You want to know maybe a diagnosis. You want to know, . . . uh, . . . maybe things that could lead to a diagnosis or what test to do next. So that, to me, is critical thinking, where you are able to see things with the big picture.

The differences in these descriptions might be attributed to each participant's background from previous education or having the previous laboratory experience as mentioned previously. Using one's brain, applying knowledge, making decisions, growing in thought, and seeing the big picture are important descriptions for the concept of critical thinking.

Although there is some overlap between participant definitions, there is also some unique terminology. I found it a little disconcerting that Mark thought people might not be telling the truth. Nancy's point of not just memorizing or regurgitating information supports the concept of application of knowledge. Sam reaffirms the tool mentioned that is used in many forms of medical education--the case study. This format of providing laboratory data for interpretation is one way in which students are introduced to the role of the medical laboratory scientist, who is behind the scenes providing quality information for the patient-care team. This role is beginning to change as medical laboratory scientists participate in interprofessional education events and go on patient rounds in the hospital setting.

When participants were asked if problem-solving was the same as critical thinking, both yes and no answers were received. Mark related problem-solving to a specific department of the laboratory--blood banking--in which specific problem-solving techniques are utilized for antibody identification or blood-typing discrepancies. Mark made this comment: "You can use critical thinking to solve a problem. It's like a tool to problem-solving." Critical thinking used as a tool for problem-solving is a good interpretation of the terminology. Mary made a similar statement about using critical thinking to solve a

problem. Vera had a somewhat more difficult time responding to this question until I asked her to relate to a nonlaboratory situation.

Jeanne: So when you think of solving a problem, what comes to your mind?

Vera: (*blank look*)

Jeanne: It doesn't have to be lab-related, even.

Vera: Hmm... most of the time I try to relate. If it's something maybe out of lab, . . . if it's maybe something that has happened . . . and uh . . . or something that has happened to me before . . . or an experience that I have had or something that I've seen happen to somebody else. So sometimes it's easier for me to solve that problem because I've seen it happen. Or if I don't know and I feel like there's someone who knows how to handle the problem better I would, maybe ask that person to help.

Vera was relying on past experiences to help her resolve problems and knew that when an inexperienced situation occurred, it was time to ask for help.

Both Nancy and Sam chose to describe problem-solving as "not necessarily" the same as critical thinking. Sam suggested, "I tend to think, . . . like, oh, trouble shooting or something like that." In the laboratory environment with a great deal of instrumentation, finding a solution to a problem of why the instrument is not working properly is a fairly common task. Nancy said that "when you're problem-solving, you're trying to come to a solution, I think; . . . you're looking into a situation more deeply." Sam said that his ability to think critically had changed from when he began his clinical experience because currently "knows where the data is gathered, . . . that it is not just going to be a box in a book that says case study." The deeper understanding of application of information comes from seeing the integration of all the laboratory department data. The laboratory

environment plays a large part in finding the connection between laboratory applications and operations in order for the student to understand his or her role in problem-solving.

Participant Awareness of How Learning Occurs

Participants were asked whether or not they were aware of their own style of learning. Some could recall taking a survey about this at one time during their academic experience but did not necessarily apply what they knew about themselves to learning in clinical education. Because experiential learning relies on the interactions among student, environment, and instructor, interview questions related to learning styles were asked to obtain definitions of the process in the participants' own words.

One of the recognized models for experiential learning is that of Kolb (1984), who bases his theory on earlier teachings of Dewey and states, "Knowledge is continuously derived from and tested out in the experiences of the learner" (p. 27). Kolb believes, "Through their choices of experience, people program themselves to grasp reality through varying degrees of emphasis on apprehension or comprehension. Similarly, they program themselves to transform these prehensions via extension and/or intention" (p. 64). Kolb's different learning-style characteristics have been described in Chapter 2.

Fleming (2012) designed a different type of learning survey or questionnaire to measure learning preferences according to senses. This model, encompassing four means of communicating (visual, aural, read/write, and kinesthetic), is designated VARK. Recognition of student and teacher preferences for learning styles may serve as a means to assist both with strategies for successful learning.

Fleming (2012) describes the visual style of communication as “the depiction of information in charts, graphs, flow charts, and all the symbolic arrows, circles” (p. 1). Most of the participants considered “watching” or “seeing” something as a visual style of communication, which is not exactly how Fleming defines it. I related the visual aspect of this learning style to observation.

The process of observation during clinical education was described by all participants, and they often told me it took place at the beginning of each of the different departments of clinical education. Because each department rotation was about four to five weeks long, approximately every month began with observation of new procedures and instruments. Nancy affirmed that her learning style was more observational and talked about the process this way. “They do things, . . . they show me things anyway. I mean, pretty much after I’ve seen it, I don’t need to be shown multiple times.” Mary confirmed this when she stated, “I do think the more you get to see, the more you know what to do, basically.” Watching or observing a procedure encompasses the visual aspect of learning that many MLS students identify as important to grasping a concept.

Considering that observation is an important first step to learning in MLS clinical education, the conversation with Mark brought about the question of what makes a good observer. Mark tended to repeat my question while he thought about his response.

Jeanne: What do you think is key to being a good observer?

Mark: What’s the key? I think asking questions, . . . and paying attention to details.

Jeanne: Do you think there are some people who are not good observers?

Mark: Uh, definitely. There’s some people, . . . they don’t have patience for that.

Research in characteristics of student preparedness for clinical education (Chipchase et al., 2012) and student experiences of anxiety in the clinical setting (Melincavage, 2011) of other healthcare disciplines did not mention the need for patience during learning observation. Connie described having patience in a different context when she talked about being timid at first and afraid to ask the instructor to have patience with her if she did not understand something right away. Sam also commented on the student who is constantly asking “why” something is being done instead of having the patience to wait and see what comes next. This correlates with Mark’s comment on making the connection between observing theory and practice when he said, “You can actually observe, like, the theory being used in practical setting.”

During the first and second interviews with Sam, he provided this description of the process of learning in a department:

I think you can certainly go into a department and start watching and seeing what they do every day and learn that way. . . . Let’s say I’m in that observation stage, and I’m reading procedures, and I’m just watching tests. I know that pretty soon, I’m going to be able to do things. And so it’s not like there’s no end in sight. I can actually get more out of, um, what I’m reading because I know I’m going to be applying that very shortly. Because if you are observing something, you don’t know what’s about to happen next.

Sam confirmed that the process often begins with observation but quickly becomes application as the student performs techniques that were previously only observed. This correlates with what other participants mentioned in their strengths as being a “quick learner.” Participants agreed that the first step of the learning process is observation and, once observed, were willing to perform independently. It is the time span between

independent performance of the once unfamiliar and the feeling of confidence in performing on their own that varies according to personal attributes.

Fleming (2012) describes the aural style of communication as “preference for information that is spoken or heard” (p. 1). Vera was the only participant who described herself as a listener.

For me, I prefer when I listen, and it kinda works well for me. I’m more of a listener. Like, I tend to understand more when someone, like, especially in class, I will understand more if the professor is teaching and all that. But if I go home and study on my own, I won’t really understand things until I go to class. It’s the same thing here. When I come here, and they tell me stuff, anything they teach me, it’s very hard for me to forget because they already told me that. I’m more of a listener, and I kinda learn like that.

Vera suggested that she had difficulty learning things by herself at home. Vera also said that in the clinical setting, she listened carefully, and thus, it was hard for her to forget something she had already been told. When Mary was asked about aural learning she responded, “Basically by someone telling me what they’re doing.” Communication through the spoken or written word was interpreted by Nancy as the chance to ask questions of her instructors. She also said that after she asked questions, she would try to visualize the concept.

Fleming (2012) describes the kinesthetic preference as one in which “the student is connected to reality either through experience, example, practice, or simulation” (p. 1). This method was by far the most noted preference of all participants and was common to clinical education as a whole. The typical phrase, “hands-on,” when describing tasks was used repeatedly during the interviews. All participants described themselves as kinesthetic learners, even if they also identified with other sensory preferences. Notably, no one

singled out read/write, most likely because it is a given of the learning process and must be incorporated in all stages of learning, regardless of preference.

The Setting/Environment for Clinical Education

Physical Setting and Distractions

By visiting two hospital laboratories to observe clinical education in practice, I was able to see how learning occurs firsthand. The hospitals visited were in an urban setting, and the laboratories had not been observed for quite some time. The physical layout of each of these facilities consisted of one large room divided by partitions, modular furniture, and floor-model large instruments. In some department sections, the bench top was standing height for work, and other sections had benches set up for sitting when working. Although in such a large room, it would seem that the noise level would be very high, but it was actually not overly loud. However, there were other distractions.

One of the greatest distractions was the movement of personnel from place to place, either conversing with medical laboratory scientists or handing over specimens for testing. During the observations, no names were used, so the designation in the field notes were labeled “P1” for the first preceptor and “S1” for the first student.

People are moving around, but P1 and S1 are focused on the task. P1 has a checklist of things to cover. Other instruments are running but are not loud. Blood units are delivered, and the delivery man passes through the section. Several former students are working in the lab and wave or say “hi.” Multiple people are in and out of the area, checking computer screens. Venders are working on installation of new equipment. (Field notes 1)

Another distraction was the pneumatic tube system that was used to transport specimens, labels, and even blood products from hospital wards to the laboratory and vice versa. The shoots for tube arrival were located in several of the sections and could be noisy when they arrived. However, the overall noise level was comfortable for normal conversations. I also noticed that there was no background music or radios playing, and the intercom paging of doctors that is present in many facilities was apparently not used in the hospitals I visited.

Another distracting feature in the laboratory was phone calls. One facility had cordless phones placed on almost every benchtop. The other facility had placed desktop phones with caller ID strategically, which was useful for the medical laboratory scientist answering the phone. In the field notes of the second observation, the designation “H1” was used for Preceptor 1 to differentiate from the other observation.

Phone calls have different ring tones for each section. Sounds are loud. In general, medical laboratory scientist takes calls, not students. H1 takes a call because she knows it is the infectious disease Dr by caller ID. Looks up report on the computer, and gives it out. (Field notes 2)

Students were not expected to answer the phone during their internship, and some of the participants mentioned the fear of having to answer the phone.

Observation included watching personnel stand for long periods of time in some sections and walking repeatedly around instruments in other sections. One practitioner told me that she was able to reach 10,000 steps in one eight-hour shift of walking around the instruments. These excerpts from the field notes of the second observation provide some insight related to workload and physical factors.

There are many tubes of blood to be processed. The big rush comes after 11am. There is noise from the two large instruments and the centrifuges, phones. Everyone is focused on their work. There is a lot of walking about the instruments to put samples in racks and check computer screens on the laboratory information system (LIS) and on the instrument. There is no background music. One student comments on feeling different temperatures in different part of the big room. (Field notes 2)

Participants indicated that the way they showed interest and involvement in learning was by asking instructors questions through every step of the process. This process was observed during the hospital visit. Field notes from this visit provide insight to the interaction between preceptor (P1) and student (S1).

Some areas of teaching required long periods of time sitting at a microscope reviewing slides. Every bench had numerous workstations that were organized with computers and screens, along with all the other tools necessary for that particular bench. Students were required to learn how to operate the laboratory information system and programs associated with instrument being learned, which required keeping track of multiple identification codes and passwords. A notebook kept by the student was helpful in keeping track of all the procedures learned. Checklists were used by both instructors and students to make sure no items were missed.

Although these facilities were laid out in this arrangement, not all laboratories are one open room. Some smaller rural hospitals may have individual rooms for different sections. However, it is common to have a combination of the sitting bench and the standing bench for working. At most universities, students do not have much input in the selection of their placement for clinical education. The complex scheduling that is involved in placement of students for clinical education may involve increased travel time.

During interviews, I asked questions to find out if the size of facility and location in an urban or rural setting had an impact on student learning. Most of the participants told me they were happy with their location. If a participant liked the setting, he or she was more apt to say he/she had a positive learning experience. However, Mark did mention the stress of being on time early in the morning. Along with this challenge is the variation of start times for various departments of the laboratory. The participants may have found this somewhat stressful at first until they became accustomed to a routine.

The hospital setting as a learning environment for clinical education is a completely new experience for most students in healthcare programs. Only those who may have been employed by a hospital or who had served as volunteers had an idea of the typical atmosphere in this setting. Moving to an educational environment such as this may be stressful to students who have been accustomed to sitting in a classroom with peers. Because students are already stressed about being in new territory, their minds may go blank when required to answer questions related to procedures and techniques.

Scheduling of clinical education can be an important factor for students, especially when there is a change in shift for the educational experience for students working part time. Most laboratories operate on three shifts, namely 7 am to 3:30 pm, 3:00 pm to 11:30 pm, and 11 pm to 7:30 am. In some departments, various tasks, such as instrument maintenance mentioned earlier, are performed on the second or third shifts. In order for a student to learn how to do a particular task, he or she may be asked to come in on a different shift from the routine day shift.

Referring to the physical layout of the laboratory, departments may require personnel to spend most of the time sitting or standing. Participants also mentioned differences among laboratory departments as they related to manual or automated procedures. Automated procedures include using highly technical instrumentation that requires careful examination of patient specimens for identification and integrity prior to loading them in racks to be placed in the instruments.

Many of the participants described themselves as kinesthetic learners and appreciated the manual procedures, which required much more technical manipulation of supplies. However, the manual techniques could also be more challenging for them. One of these challenges was related to the variation experienced by various clinical instructors. In most cases, the student would be assigned to one technologist for a day of clinical instruction, but that could vary to as many as five or six people in a given week. One of the participants described working with different clinical instructors as follows:

Jeanne: Did that bother you if one tech said “Do it this way” and another one said “Do it another way?”

Connie: Oh that did bug me a little bit. Especially if I found out my own way of doing it from Tech No.1, and I was like, . . . I really like this technique, and then the other one comes and says, “Why are you doing it that way? That’s not how we do it.” Okay, so then I had to alter my technique to satisfy Tech 2. That’s one thing, but it was kinda nice to see how different people do things. But then they expected me to do it their way and their way only. That was one negative thing. But it was nice to see different ways to do it.

Connie was able to find a positive outcome from being shuffled back and forth between technologists and their preferred techniques. This is a prime example of utilizing a positive attitude when it comes to interpersonal relationships and teamwork.

Sam described a more stressful situation with multiple instructors when he said, “It’s like now I am more focused on doing it the way they want me to do it rather than learning the test.” Certainly, the emphasis needs to be on “why” something is being done because there will be multiple “hows” to do it. Mark liked having multiple instructors and provided this reasoning:

I liked it because, well, everyone has a different way of doing things. So I like to see what people do and compare it and find my way. That works for me. So it’s kind of good to meet more people because they can give you different advice and different little clues that can help you. And then you can use that. So I actually enjoyed it, . . . having more people ’cause I can see the different point-of-views.

With this comment, Mark was beginning to demonstrate recognition of the value of socialization and teamwork that takes place between students and practitioners during clinical learning.

Workload Effect on Learning

In addition to working with various clinical instructors, one of the key factors related to learning during clinical education was the workload of the facility. Mark described the workload as “intense,” which could be interpreted as “very busy.” Connie mentioned that she was not prepared for the atmosphere she experienced in clinical education. When asked to explain what she meant by “atmosphere,” she explained that she expected the laboratory to be extremely busy and stressful. Connie believed that the combination of work and people could sometimes seem almost “chaotic.” She suggested that during preclinical education, there should be more emphasis on what kind of laboratory atmosphere the student can expect to experience.

Participants indicated that the way they showed interest and involvement in learning was by asking instructors questions through every step of the process. This process was observed during the hospital visit.

P1 begins the instruction by explaining to S1 how the blood gas instrument works. S1 occasionally interrupts to ask questions, to show she is interested. P1 answers question as they proceed with instruction. At no time is a question dismissed as not being important.

Most clinical instructors are not dedicated only to student instruction but must also complete the assigned work during the time that the student is present. Therefore, the workload of the laboratory was an aspect of the environment that participants mentioned as having a great impact on learning. Although workload is not something that can be predicted, it is clear that if a student must stand to the side during an emergency protocol, he or she is not able to ask questions. In this instance, the attribute of careful observation can be valuable. This happened to some participants, and they happily reported that after the emergency or event, the preceptor was able to explain what had taken place during the time when the student was on the sidelines. Through observation and social interaction with preceptors, students can gain a sense of comfort that can relieve some of the stress associated with learning the unfamiliar.

Another way in which the workload had an impact on clinical education occurred when there was a breakdown in technology. Sam described a situation he remembered.

I remember one time, a chemistry analyzer sucked up a clot or something, and that certainly was a big thing. So we have to take that one down, and we got everything opened up. But the thing was, I wasn't in that department when it happened, so it was like, okay, I am over here watching this, and I don't know what I'm looking at, but I know it's causing them a great deal of stress.

Situations such as this can be stressful for both the instructor and the students as a backload of testing builds up as they wait for a solution to the problem. At this point, a student can utilize the opportunity to learn about troubleshooting as part of critical thinking in that particular department if the instructor is able to involve the student. The sequence of typical day activities that participants described could change in situations such as a heavy workload or even a trauma that caused time-sensitive work. Instructors know that students in the learning phase cannot be expected to perform tasks to the same extent as seasoned practitioners, so they provide the student time to use observation skills to absorb the activities taking place. Connie mentioned that during highly intense situations, she “didn’t want to get in the way.” Certainly if a student is afraid to be in a technologist’s way or ask questions, the quality of educational experience will be less than when the instructor is fully engaged with the student.

Opportunities for Unique Experiences

Some aspects of the clinical environment can be unpredictable, and to students who have spent two years or more of their education in a classroom, the clinical setting, as mentioned earlier, can be stressful. At the same time, the clinical setting is an opportunity to see unique learning events and practice more complex procedures that cannot be done at a university. Some of the scenarios of unique experiences described by participants were focused on the type of learning that occurred or a special case. Other examples included patients and other personnel. Mark shared an experience of being able to spend time in an area of enrichment that is not available to all students.

It was a good experience, and also, I get [the chance of] observing the histology and other [of that kind of other] stuff; . . . that's considered an enrichment lab, and not all clinical sites, they do that. [This hospital] does, so that's great.

Before beginning his clinical education, Sam spent the summer working at a reference laboratory as part of an internship program.

Actually had a very unique experience at [this reference lab] because we had a gentleman who was deaf in our lab. So it was really neat to be able to see how they interacted with another member of their team and communicate; . . . they were communicating things about lab work. It was very interesting . . . to see that.

Sam also shared an experience that involved a coroner's case that he was able to follow from the beginning of the investigation to what resulted. This type of situation does not occur often.

The students present at the hospital during observation were students from my MLS program at NIU, so they were comfortable with my presence. During one of the observations in the chemistry department, this interaction between preceptor (P1) and student (S1) was noted.

P1 shows proper placement of the sample. Some humor is used to talk about experiences with past students and blood on the ceiling tiles if the sample is opened wrong. (Field notes 2)

This same instructor was observed later when a new sample arrived, and a student was given the opportunity to analyze the sample.

A new blood gas sample is brought to the instrument. P1 and S1 both examine the sample and mix it by rolling between the hands. P1 mentions to S1 that this is her "rooky voyage" on the instrument, meaning it is her first sample run. S1 operates the analyzer as shown.

Another unique finding from participants was the interaction with patients during clinical education. Several participants mentioned selecting the MLS profession due to the

limited interaction with patients. The most common situations reported involved collection of specimens such as blood, urine, or cultures. Although this was not the most important aspect of clinical learning, situations did make an impression. Nancy shared this scenario on performing a venipuncture (blood draw from a vein) from a patient.

I go in, and I start to draw, and he wakes up in the middle of the draw . . . and starts to curse at me. I called for backup, and I mean, he was still a little out of it but was very . . . his word . . . his language was very hostile and basically told us never to come back again, and then the other phlebotomist who was with me said, “That’s something you have to discuss with your doctor.” So I just kind of just backed away after I drew his blood. I backed away, and she handled the rest, . . . ’cause I wasn’t expecting him to be (*laughs*) so hostile.

Although Nancy could laugh about this event in the interview, at the time that it occurred, it was scary for her.

During one of the observations, I was able to see what kind of patient interaction took place when one of the students at the clinical site was sent to the outpatient drawing area for some more practice in phlebotomy. This is an area of clinical education that may or may not be included in each facility. The student being observed was being mentored by an individual with several years of experience in phlebotomy. During the period of observation, the student was faced with the challenge of talking to a patient’s daughter who was stressed about getting her geriatric father to the hospital. The father was in a wheelchair and was hard of hearing. The preceptor and student for this observation were different individuals from previous field-note comments, so the notation of preceptor (P4) and student (S4) was made.

The first 20 minutes, P4 talks through the phlebotomy process and asks S4 if she has done certain tests. P4 tends to talk out loud as she runs through the computer, which is a great way for the student to learn. P4 and S4 go to the waiting room to retrieve

the patient. It turns out the patient is in a wheelchair from the hospital and it is too wide to fit through the door to the drawing area. Then P4 goes to find a different wheel chair, and the patient has to be moved. The patient's daughter is concerned with what is going on and how everything can get done. She is also concerned about the urine specimen which is hard to obtain from her father.

This is an example of a unique situation in which the student is required to be outside the comfort of the laboratory and think on his or her feet to solve a problem. Being able to handle difficult situations with patients is learned through experience and would be difficult to simulate in a university student lab. This student was also asked to collect nose swabs for methicillin resistant *staphylococcus aureus* (MRSA) testing and needed to be ready to answer questions posed by patients. The level of quick thinking and skill to deal with a diversity of people who may be coming in for surgery or just a checkup can only be learned by exposure to the situation.

In addition to performing a venipuncture, other examples of unique learning shared by participants included observation of a bone marrow aspiration performed in a patient's room and how to perform a sweat chloride test for cystic fibrosis on a child. Many university programs attempt to simulate the real clinical setting on campus, but these examples demonstrate situations that cannot be reproduced. Although participants may have believed they were unprepared for certain situations, they recognized the value in being exposed to new things and were proud to become part of a team that was making a difference in people's lives.

The current trend is to introduce students to interprofessional education in which an MLS student may have an opportunity to interact with patients and other healthcare professionals for the good of patient care. One observed facility started a practice of

including MLS students in patient rounding of assigned wards along with other healthcare professionals and administrators to give the students a chance to put names and faces to blood tubes with a bar code labels.

Preparation for Clinical Education

Although academic instructors try to prepare students for clinical education before they begin the experience, it is not unusual for students to state that they do not know what to expect. Many MLS programs ask students to visit hospital laboratories in preparation for clinical placement. That visit may be limited to a quick tour. Participants in this study responded that they either knew what to expect from previous laboratory work experience or thought the learning would be more of a “shadowing” experience with limited hands-on work.

Participant responses for how preparation occurred revealed a variety of responses. Nancy gave an explanation for how she prepared for clinical learning:

Oh, . . . um, . . . studied a little bit. (*laughs*) Studied some things. As far as entering the program, I didn't prepare at all. I just . . . you know . . . I mean, 'cause I already had my degree, so I didn't know what I was expecting, as far as rotations go. I look over notes before I start and constantly go over notes while I'm there, but I don't know. There's a whole lot of stuff. I bought scrubs! (*laughs*)

Nancy confirmed that she did not know what to expect and, therefore, did not know exactly how to prepare. Having the appropriate dress apparel (i.e., scrubs) is one of the first steps to success. When she had begun the practicum, she knew more about how to prepare for subsequent departments.

Participants reported that one way in which they prepared was by reviewing notes from lectures. Some participants also reported that they reread textbooks or reviewed

charts and/or graphs prepared during academic courses. Most participants were well prepared for clinical education from the academic courses completed at the university, but Vera shared this comment:

Actually, before . . . most of the students that we had in my class were a little scared to come for the clinical because they felt that they were not prepared because it is more of a clinical setting than what we have in school, which is more of teaching . . . and, you know, a few labs here and there. But when we come to the lab, it's . . . that's all you do full time, you know, so when I came here first, I was a little scared because I didn't know if I knew what I needed to apply and all that. But so far, it's been good.

Just as Nancy and Mark discussed the need to have personal attributes of organization and attention to details to facilitate learning, organization of preclinical materials to prepare for the clinical experience also affected learning success. Participants also commented that a student must have an attitude of focus, commitment, and interest in what is taking place day to day.

Relationships with Instructors

Relationships with preclinical instructors and the ability to experience some laboratory procedures in a nonthreatening student lab was enough to help the student feel prepared for some aspects of clinical education. There was a strong distinction between familiar and unfamiliar which had a lot to do with manual techniques versus automated equipment. Very few academic institutions are able to introduce students to a variety of automation prior to the clinical experience. The student can find this stressful until the preceptor takes the student under his or her wing. It was clear that preclinical preparation is

sufficient if the student is organized, focused and has a good attitude, similar to personal attributes that contribute to successful learning during clinical education.

Other participants were not sure whether the academic preparation was going to be enough for the clinical setting and believed they were ill prepared. More than one participant mentioned a “fear” that he or she was not prepared. What emerged as an explanation for this fear was not knowing what to expect. The university student laboratory provided opportunities for students to become familiar with basic techniques in a nonthreatening environment. However, university laboratories usually lack the vast array of instrumentation students encounter at the hospital laboratory. Participants made a clear distinction that familiar versus unfamiliar was an important component of clinical education.

Instruction of students at the clinical facility was handled by practitioners working in the discipline and required a collaborative relationship with academic faculty. Clinical instructors may be seasoned professionals with 20 years or more of practice or recent graduates of an MLS program. Some participants stated a preference for older, more experienced preceptors, and others preferred working with younger ones who were fresh out of school and could advise the student on expectations of the academic faculty. Mark provided this perspective:

I think, . . . well, again, it depends on the personality, but I kinda noticed that the more experienced techs are better at teaching rather than the new techs. They kinda, . . . I enjoy working more with, like, older techs . . . 'cause they have more experience, . . . 'cause they definitely have experienced more and saw more in the lab rather than freshly graduated techs. Although some freshly graduated techs that are hired, . . . they are really knowledgeable and very competent.

Mark expressed that he believed he learned more from the experienced people but was not ready to discount the learning that occurred with younger practitioners. Nancy liked being mentored by the new professionals because of their sharing of university expectations.

I mean, they would even say things like “I remember what it was like to be a student” or “this is what helped me do this when I was learning.” They would give, like, advice. Um, you know, at [the university], they will be looking for you to know this for your comp; . . . you want to focus on that . . . this particular bit of information.

Vera was not particular about the level of experience as much as she believed that the instructors at the clinical site should be welcoming to the student. Exposure to socialization as a member of the work team and a chance to demonstrate professionalism were important aspects of the learning process. The relationships that developed between the participants and practitioners during clinical education had an impact on the level of learning and confidence experienced by the participants.

It is also important for practitioners working with students to be cognizant of the present-day diversity of students completing healthcare programs. Many of the more experienced preceptors may have never attended a class on teaching methods or how to engage students in learning activities. These preceptors may not recognize the need for treating each student individually and teaching them according to personal attributes and learning styles. Although the process of teaching may be the same, successful learning by each student varies.

Although all participants in this study were completing a clinical practicum, they were at various stages of completion. During the interviews, I discovered that the participants had various methods of preparing for clinical education. Some participants

were self-directed and secure in their level of preparedness before beginning each department practicum. However, not all participants were comfortable in the clinical setting.

Once a student enters clinical education, the environment is unfamiliar, the people are unfamiliar, the automation is unfamiliar. This can create a level of fear or stress for the student upon entering this environment. Fortunately, this fear dissipates rather quickly after the student has spent some time in a department. Sam expressed his feelings of fear as looking like a “fool.”

I mean, when I first got here, I was terrified to ask questions. I was terrified to look like a fool. You know, I didn't want somebody to think, oh, he just got out of school, and he doesn't know this or this or this.

As mentioned under the section on knowledge and skills, participants with previous clinical laboratory experience did not express the same amount of fear. The participants' beliefs regarding their level of preparedness related to familiarity with the hospital laboratory environment. Even having already performed some basic laboratory tasks such as specimen processing helped with the experience of being prepared as the student recognized familiar people and areas. Some of the issues expressed by participants related to “prepared versus unprepared” and “familiar versus unfamiliar” were related to the relationship between the university professors and personnel at the clinical education facility.

There was also a considerable difference in the experience of preparedness from the beginning of clinical education to the end, which is consistent with time spent in a learning environment. Having the socialization experience with clinical instructors/preceptors was a

great contributor to the feeling of success upon completion of clinical education. The difference among hospital settings, environments, and laboratory departments was a component of preparation for clinical education and was discussed in the section on environment.

Preparation for clinical education is complemented by how well theory from the university setting can be applied to the clinical setting. Four of the five summaries from participants described the transfer of learning from the university to the clinical setting.

Mary: My clinicals really opened my eyes to what we do in the lab compared to what is learned in the classroom or, in my case, online.

Nancy: I try to make the most of my clinical experience because performing the tests and procedures help to make everything make sense.

Mark: Clinical practicum is focused on the practical part of the program. I liked when the theory explained in the chemistry course was described by the tech in the lab and explained how the instrument works based on that particular theory. It was very interesting to realize how both practicum and theory correlate.

Sam: Throughout my clinical experience as a medical laboratory science student I have learned new skills, reinforced concepts that I learned as a student in a classroom setting, and expanded upon the elementary techniques that I was taught in a student laboratory.

The participants shared similar viewpoints during the interviews when asked about correlation of theory to practice. Sam mentioned that due to time and supply constraints at the university student laboratories, he never achieved the same experience of success that he had at clinical. At the first interview, when we talked about how learning occurs, Nancy made the connection between the classroom and the clinical setting this way:

It doesn't become real until we actually get to rotation. Like, you remember things from class, but once you actually get to start to see the machine and how things are

done, it makes . . . it pieces everything together, and I actually remember things more when I'm actually doing it and seeing it.

Every participant mentioned differences from student laboratory to clinical laboratory due to the amount of automation. Vera also mentioned that, in the university setting, she had a classroom full of peers to communicate with and in the clinical setting she was alone as a student. Sam talked about the consequences related to patient testing in a real-world setting versus sample patient testing in a university student laboratory where testing does not always produce results as planned. Although this may also happen in the clinical laboratory, problem-solving techniques are put in place to resolve unexpected results.

The Role of Grades and Evaluations

Depending on the academic program, students may not have exams or quizzes during the clinical experience. Students usually have a checklist of items to be covered and may have worksheets or homework to complete. During one of the observation visits, the use of procedure checklists was described.

The process of [the organization] checklists is described. Each department has them, and they are set up by instructors at the hospital. Once the checklist is completed, the instructor signs and dates and the student signs and dates.

Many academic programs provide their own checklists, but some hospitals prefer to use an orientation checklist in the event that the student taking part in a clinical practicum is hired. Because of the type of learning taking place, assessment of student performance in cognitive, psychomotor, and affective skills is often determined by a competency evaluation that is completed at the end of each department rotation. This evaluation may or

may not include a practical exam in which students perform testing on unknown specimens. Practical exams usually take place at the end of a practicum in a department, and the student's testing results on patient samples are compared to the results of the technologist.

Some participants described relief from the pressure of taking weekly exams and quizzes that are part of the university component of the program. Nancy commented on some stress related to practical exams and whether unknowns were performed for a grade or just performed for practice. Use of graded or ungraded unknowns can have an impact on a student's confidence when trying to achieve competency in required activities. Nancy also discussed the use of checklists generated by the university program officials to make sure that all components of a discipline in clinical education are covered.

In academic classes, students are accustomed to a syllabus listing topics to be covered, assessment techniques, and criteria for success. Depending on the MLS program, the practicum may or may not have such clear-cut criteria as the student is exposed to a real-world environment. Sam was particularly concerned with the process of grading or evaluation during clinical education prior to actually starting the experience.

I didn't know how I was going to be graded. I mean, [the university] had told us there's these evaluations that they do and you can expect them to be watching you complete at the benchwork as well as answering questions about what you are learning. So, uh, I didn't know, . . . is the same person going to be grading me all the time? What kind of questions? Am I going to have sit-down tests? Am I going to have to go to a different room to take tests? Am I going to, you know, have a practical? And I, I guess it's a little bit of both, everything, you know. I get evaluated here by . . . at the end of the rotation and it is, it's a little bit of a practical, it's a little bit of answering questions, . . . because it's basically what you've been doing. It's learning through repetition.

In the university setting for MLS programs, grades are an important component of progressing through the program, so student concern for earning good grades is paramount.

The unexpectedness and/or unfamiliarity with how evaluations are going to be done in the clinical setting can be scary for some individuals.

Preceptor Role

The final component of student success during clinical education is how the role of the instructor or preceptor contributes to learning. The actual process of learning in clinical education begins with a preceptor who serves as an instructor with either one or two students at a time. It is the preceptor who monitors a student's progress, provides feedback, and serves as a general mentor for a student. The nature of clinical education requires close interaction with professional practitioners who may also serve as coaches or cheerleaders. As mentioned, some participants reported differences in their preferences for working side by side with more experienced practitioners or with recent graduates of MLS programs. Recognition of the wealth of knowledge a practitioner accumulates over time was noted by the participants in my study, who also noted that not all preceptors had a choice of whether or not they were involved in teaching students, and that may have had an impact on the level of learning that transpired.

According to participants in this study, students first observed instructors who demonstrated proper procedures and then allowed students to perform the tasks on their own as the instructor observed the student. Participants described that, through repetition of tasks, they became confident in their work. Participants also indicated the need to gain independence in their work as they strove for competency. Skills such as time management, problem-solving, and critical thinking were recognized by participants as

important to becoming successful practitioners. Participants described a variety of emotions that they experienced when learning during clinical education, ranging from being scared to having fun.

At the beginning of each department rotation, students usually experience anxiety from not knowing what to expect from the personnel. After a few days or weeks of repeating tasks, a student is more likely to take an active role in the team. Having a friendly and welcoming atmosphere in each laboratory department enables students to perform to their best ability. During clinical education, the stress of testing and grading becomes less of a focus as students strive to master the hands-on practice of medical laboratory science.

Addition of humor in the way of cartoons or funny stories is one way to improve the mastering of scientific content in healthcare programs that is quite rigorous. This was noted during the observation when a student was learning a new instrument. The student (S1) expressed a “fear of pushing the wrong button and losing everything.” The instructor tried to ease the student’s fear, and when a sample to run was received, the instructor said, “Here you go on your ‘rooky voyage.’” In another observation, a student (H1) was sitting beside an instructor, performing a task independently with some coaching by the instructor. At the completion of the task, the instructor said “good job” and clapped her hands. Through socialization with clinical practitioners, students become more comfortable in relationships of a technical nature and may be more willing to ask questions to become confident and independent in their skills. Learning from mistakes is much easier if there is a positive relationship between the student and clinical instructor.

Each participant had a slightly different way of describing the process of a day of clinical education. Students first observed the instructor, who often talked about what he or she was doing when demonstrating procedures. Later, the instructor observed the students performing the tasks demonstrated. Mark described the process in his rather broken English.

I contact the tech, and they start explain what they do there. What this bench is about. They go through the LIS system. I observe what they do. After, like, say, two hours, they let me do stuff, and they observe I'm doing what they're doing . . . for a little bit . . . that interchangeable, so, . . . copying them and that kind of stuff.

Participants described the process of learning in departments with a high level of automation as beginning with demonstration of the instrument. The process of learning in the microbiology department, which had a high level of manual techniques, was described by participants in a different way. Because of the number of manual methods that needed to be learned, this rotation was also one of the longest of all departments. Connie described a day in microbiology.

I would usually sit down with one of the techs that was at the "h and o" bench 'cause they're separated by last names. And towards the beginning she would . . . I would go through some of the plates with her, and she would show me. "What do you think this is?" But then towards the end, she would actually give me plates on my own, and I would have to go through and do all the testing I needed to, and then I would compare it to what they put into the computer.

Vera broke down the process week by week and described a day in a general fashion and then in the microbiology department.

Usually what happens is, . . . the first week they will try and show you. Then, the second week, they will try and now ask you "what do you think?" because they have showed you one week. The next week, they will want you to try and remember what they have told you. For example, in micro, if they give you a plate that they've, . . . if they have told you from last week this plate is this and that. Next week, they will give you the plate, but they won't tell you what is there. So you

have to kinda figure out what is on the plate. And when they ask you “what do you think?”, you should be able to, to tell them. Now if you don’t know, they will try and explain it to you.

What this participant was trying to express was that when a student has been shown something, there is an expectation that the information will be recalled in the future. Even if the concept is a difficult one and takes additional time to learn, preceptors are to work with students to ensure success.

Sam gave a somewhat different perspective of how he approached each department in the laboratory because he was interested in personality and the interpersonal interaction. He also had a list of questions in his mind.

Once I arrive, I have a certain checklist. As I get more acquainted with a department, I can do more things independently. Um, well, usually when I start a new department, sometimes there are some techs in there that I haven’t worked with before. That makes it especially challenging because, you know, how personable they’re going to be. How much leadership they’re going to give you into a certain a department, I guess. How are they help you out, or are they going to expect you to know more things. Are they going to ask you questions and have you come up with answers, or are they going to kinda allow you to learn on your own. So kinda for me, the process, was always I would start in a department, and I would start learning things, how they had it set up. I would first establish how the work flow was set up. I would, um, like, in micro, I would come in, and I would see, I spend the first couple of days kinda understanding where things go, . . . where things get incubated, kinda just the workflow, um, and as I start to know the tech more and I start to know the workflow more, I feel more comfortable, and I feel more confident--okay, this is how we’re going to get you through this department. Having a road map is very helpful, and also, having a well-designed road map is very helpful. I think you can certainly go into a department and start watching and seeing what they do every day and learn that way. Or you can have a list of things and start checking off things as you go, looking at it, glancing at it to make sure you are learning the things you’re supposed to be learning and kinda just go from there.

During observation of clinical education, I was able to see how instructors used a checklist of items that were signed off by the instructor and the student to make sure that all procedures were covered to meet the standard of practice.

Because preceptors were described as such an important factor of student learning during clinical education, I asked the participants what they believed made a good instructor. Vera gave this response.

I think they have to be well trained. They must have experience, too. They have to be friendly. They have to be open-minded. Um, they have to sacrifice 'cause most of the time, they're busy in the lab, so they get to sacrifice a lot of time for teaching students, too, and, uh, kind of be, . . . like, in case I have questions, you know, . . . don't take it a bad way, . . . like, in a bad way or don't feel like they don't need to answer those questions. But usually, most of the time, I don't have a problem with that here. I feel that because of the experience I've had for the first few months that I've been here, they all seem to know everything because they've worked here a long time. So they have experience in the lab and all that.

Vera also mentioned that she was thankful for the technologists who “sacrifice their time to teach.” Mary mentioned that she “loved interacting with the techs” and was impressed with technologists who would offer tips and helpful hints even if they were not the students' mentors. Going the extra step made an impression on the students.

Socialization

Like Sam, I was interested in the personal interaction or socialization between students and medical laboratory practitioners during clinical education and how participants would describe the affect on learning. As mentioned earlier, facilities that have student interns regularly often employ preceptors who are at ease with clinical instruction. But that is not always the case. Some of the participants described technologists who either had become tired of teaching or were sometimes annoyed by student questions.

One attribute of preceptors that all participants were looking for was “friendliness.” Vera described her experience with clinical instructors:

They are all friendly. That is one of the things that has really impressed me. But I can say that they are all involved. There are some more involved in teaching you than others. Usually you find when they have enough time and they don't have so much to do they are definitely be there 100%. But when they have a lot of things they have to do at the same time, teach a student, it becomes kinda overwhelming for them . . . because they are doing many things at once.

Recognizing that the instructor is taking on the role of teacher in addition to completing the technologist work of the day is important for students to understand. This role of instructor often leads into other roles, such as coach and mentor for a student. As was pointed out by the research by Nickle (2007), the clinical instructor acts as a model and coach who then fades away to allow the student autonomy as he or she gains confidence to work independently.

Communication, Professionalism, and Teamwork

Many would argue that more important than socialization in the workplace is the degree of communication that takes place. Because the participants were observers, I wanted to find out what they had witnessed in the areas of communication and professionalism. In his reflection summary used as an artifact, Sam commented on how his skills in communication were put to use.

In my opinion, my strengths as an MLS student are my organizational, listening, and communication skills. After recognizing that I had these strengths, I was able to use them to help with areas that I was not so strong in, such as confidence in certain laboratory techniques.

Professional behavior with an element of communication was addressed in the study by Bruhn (1987), who determined that students were not as prepared as they could be. When I asked participants for a definition of professionalism, I received such terms as

“being prepared,” “focused,” “respectful,” “courteous,” “well dressed,” “how you relate to coworkers,” and “overall, doing your best.” Nancy made the comment that she thought it was easier to identify unprofessional behavior than to list all the traits of a professional person. We discussed the fact that students, as well as practitioners, need to look and act professionally. This is a trait that should begin in the university and carry over into clinical education.

Not surprisingly the topic of good communication described by Mary as “essential” for the laboratory surfaced during the discussion of teamwork. Participants described good teamwork as a trait exercised when there is good communication and interpersonal relationships to enable quality service to customers. Vera made an interesting comment about nonverbal communication.

I feel like your facial expression will express a lot. For example, if you ask me if I've done this, and I tell yes but I haven't done it, you can definitely tell from facial expression, like, you know . . . or if you try to explain something to me, or the techs try to explain something to me, and I don't really understand, and I say that I understand, but my facial expression says something else. So usually it's how you respond, and how you . . . you know, your gestures and all that.

Experienced clinical instructors are often able to “read” a student and direct him or her in a way to ensure successful learning. This was recognized especially as the participants moved from one department to another. After spending a few weeks in a department and starting to be confident in the testing being done, a student is moved to a different department to begin the process all over again. Participants described the process as one that became easier as time went on but did require preparation so that the goal of independence in each department could be accomplished with confidence.

Gaining Confidence

Because the ultimate goal of clinical education is to prepare students for a career in the laboratory, a student must learn to have confidence in what he or she is doing, which goes back to the beginning of being self-aware. When Mark was asked how he became confident in one of the instructional departments, he shared this scenario.

Jeanne: How did you feel confident in phlebotomy?

Mark: Oh well, I didn't at all when I first started. Definitely, experience builds your confidence. Once you get experience, you practice on person, 'cause that's how it's done. That builds your confidence. Also, the supervisor that you work with . . . they tell you kind words, and that helps to build your confidence. Like, so, uh, knowing that they're there, observing, and if something, . . . to kinda, like, help you.

The most common comment for area of improvement in the self-reflections submitted by participants was to build confidence in all departments of the laboratory. Learning how students achieve the needed level of confidence that enables them to enter the professional career as medical laboratory scientists is an area for future studies. Participants described that being able to practice skills on a daily basis with many repetitions helped to improve techniques and build confidence. Connie said it well with her comment, "I've done this before; I can do it again."

Independence and trust by clinical instructors contribute to a student's level of confidence. When I asked Sam how he became confident in an area, he responded with an interesting analogy of having a dog on a leash or teaching a child how to swim.

I think that's my biggest, uh, factor that I look at. How independent I am in a certain area. You know, I start hematology, and I am doing certain things. . . . Then they grant me that certain . . . it's kinda like being out on a leash a little bit and letting out, you know, further and further. Or like a parent teaching their child how

to swim. It's nice because I'm always asking, always verifying what I'm doing with them to make sure I'm doing something correctly. As time goes on, I'm verifying less and less, and I'm learning more and more.

Nancy talked about the fact that she was more comfortable with the people she had interacted with socially. This eventually led her to be more confident as she was not afraid to ask questions.

I also asked participants to share any situations when their confidence may have been challenged. The most common response involved interaction with the clinical preceptor. If the instructor used a professional manner to handle a mistake made by a student, the confidence level did not plummet as low as it might have if the student was reprimanded. Most clinical preceptors understand the importance of providing constructive feedback to students.

I did ask the participants if they had encountered any clinical instructors who did not seem to like working with students, and there were a few responses from those who had.

Nancy made a comment and a suggestion for academic programs.

I wish there was better communication between my instructors and the sites, too. 'Cause I noticed, like, almost none of them know how long we're supposed to be in rotation. They, you know, they might see our checklist, and they might be like "I don't know. What do you want me to write for this? What should I do for that?" So if they had, you know, like, a packet of materials that we have that they will be seeing from us and then just have some kind of small orientation, just to let them know what our sites are looking for, . . . then we would not have to explain things so much.

This restates the essential component of communication between students and professors, as well as between professors and clinical instructors. Clear expectations at all levels provide the best environment for successful learning.

Clinical instructors are often the ones who facilitate learning and motivate students. According to Hayden-Miles (2002), the clinical instructor plays an important role in creating an environment in which students can be comfortable and apply their knowledge. An important aspect of student-instructor relationship is one of trust and respect. Through observation and interview, Hayden-Miles found that trust between clinical instructor and student was at the forefront of building a relationship.

Participant perspectives from this study indicate that the role of professionalism and interprofessional communication must continue to be introduced early in the MLS curriculum. Effective teaching in healthcare professions, whether in the clinical setting or the classroom, hinges on development of professionalism. Open communication in practice is a strong medium by which to demonstrate professionalism. Some of the participants were not comfortable talking to physicians and nurses and believed that more practice at the university prior to starting clinical education would be beneficial.

Discovering MLS as a Profession

Besides providing evidence to support answers to the research questions, participants described their path to discovering the profession of MLS, which is significant to the recruitment and retention of future MLS students. Comments from these participants on their respective paths to the MLS major shed light on the problem of public awareness faced by the MLS profession. Specifically, three of the six participants had not been aware of the MLS profession until after they had graduated with another degree. As stated in the demographics, four of the participants already had bachelor of science degrees in biology.

During the first interview, I asked participants what their experience in higher education had been so far and why they had chosen biology as a major. Mark said,

What made me in biology? I was always fond of chemistry, and I had feeling that was my passion since high school. Once I move here, I was looking into different, like, professions and stuff, and I thought the biology degree would benefit me more as a future career. So I decided to . . . at that point, when I applied to undergrad, I wasn't sure if I wanted to do pharmacy, electrical engineer. I was thinking about getting my MS eventually.

In the case of Mark, he was planning to get a degree in MLS at the bachelor-degree level, but the program was closed at the university in which he was enrolled, and he had to select another major.

The situation with Nancy was different because she did not know about MLS.

I went to [university]. I have a BS in biology, with a minor in physics. I did a little bit of research in undergrad. Genetic research, and so that's when I realized I liked lab things. I didn't know anything about MLS before entering undergrad. (*laughs*) Otherwise, I probably would have gotten a BS in that. Then when I graduated, I realized that I wasn't qualified, even after research experience, for a lot of clinical labs. I need to go on for more education, so that how I entered this program.

Because the profession of MLS is one that has limited patient contact, young people often do not consider the possibility of this career unless a friend or coworker, or sometimes a professor, brings it to their attention. The lack of public relations regarding the MLS profession is one reason why students may not discover it until looking into the job market.

Connie said,

In 2008, I began my BS degree in biology, and I received that in 2012, and then I wasn't satisfied with that. It was too broad. Biology, . . . there was so much you could do with that--you could go the ecology route, you could go the research route, you could go--but I had a hard time finding a job, and I just didn't really feel happy with this so . . .

Connie, like many other students, discovered too late the requirement of certification to work in a hospital laboratory. This had an effect on Mary, as well, who graduated with her biology degree and went to work in a hospital laboratory, not as a medical laboratory scientist but as a specimen processor who did not require certification. Because of her interest in the technical end of laboratory work, it was actually her coworkers who directed her on the path to MLS.

Okay, so I had my BS from [university]. Premed, biology. I've worked in the lab ever since, and, I don't know, things changed from where they were supposed to go. So then, I used to work up at [a laboratory facility]. . . . Some of the people up there know me and told me there is an online program for med lab students, . . . and I decided to do it.

At the time I interviewed Mary, she had finished her online degree and was considering a different position in the lab as a medical laboratory scientist. The dilemma was that because she had progressed in her current position to supervisor status, the new position would not necessarily benefit her financially.

For the two students who were completing their bachelor-of-science degrees in MLS, one had started at an out-of-state school in radiation technology and discovered something about himself. "I realized that it wasn't kinda exactly what I wanted out of being an allied health professional." I believe it is common for young people to start something they think they will be happy with only to find out later that it is not exactly what they expected. Vera had a family to consider, which led her in some different directions. Not unexpectedly, she thought about nursing first because the nursing profession is much more visible to the general public. Vera said,

I was very, you know, I always wanted to go to medical school. But, um, I think after I had a few classes, I decided that it may not be the best thing for me to do. So

I started pursuing other medical programs that I can do, . . . and first, I thought of nursing, but nursing was very competitive in [university] to get in. So I tried a couple of schools, but I was always on the waiting list, and plus some of my friends, so when I came to Illinois and I tried to get to the nursing program, I was kind of late to apply for that year, so they told me to wait until the next cohort, which is one more year for me to be able to get in. So when I went through their course list and all the majors they have, I saw medical lab science, and when I went through the curriculum and tried to see all the description of the program, I kind of liked it. . . . So I just decided to continue in MLS, and so far I've loved it.

Each participant of this study took a different path to find the program in MLS.

This is not an uncommon finding among MLS programs and is discussed in the recommendations.

Summary

This chapter presented the four major findings discovered by this study. Findings were organized according to the research questions. Data from interviews and artifacts revealed student perceptions through descriptive explanations of the questions investigated. Field notes from direct observation of the physical setting supplemented the descriptive words of the interviewees. Numerous quotations from the participant interviews were included in this chapter. Blocks of descriptions from the field observations notes were also included to supplement the interview quotations. Through the words of the participants, significance of the findings is recognized.

The primary finding of what contributes to learning during clinical education was described by student participants as self-awareness of individual strengths, personal attributes, and knowledge or skills. Some participants identified previous laboratory work or internship experience that enabled them to catch on quickly in the hands-on approach to

learning that occurred during clinical education. Participants demonstrated an awareness of how learning occurs and the importance of maintaining a positive attitude and focused attention to details. Knowledge of personal learning styles and critical-thinking skills also contributed to the students' reported success in learning. A point of pride from participants was the recognized change seen in their level of confidence from the beginning of the practicum to the end.

The second finding answered the research question of the environment's role and included a description of the physical setting and how learning was affected by various factors. Participants described the process of showing initiative and focus by asking questions of instructors, which were affected by workload issues. Day-to-day patterns of how learning occurs relies on the process of student observation of procedures followed by student performance of procedures. In some cases, students had opportunities to interact with patients by learning and practicing blood collection techniques. Even those participants who did not describe learning phlebotomy were able to recall interesting case scenarios that could be experienced only in the clinical setting.

The third research question to be answered asked how students prepared for clinical education. Findings revealed that there is little preparation that occurs immediately prior to the start of the practicum, but as the experience progresses, the participants draw on preclinical theories and basic skills to help with the learning process. Participants reported the need to be organized with preclinical materials to study in the form of notes and tables to be used during the learning process as needed. Findings also showed that relationship-building with clinical instructors helped the students become part of the team.

Collaboration between clinical instructors and academic faculty helped to make sure that expectations were met by clinical education. These expectations also needed to be communicated to the students. Although students may not need to worry about taking exams during the clinical practicum, performance evaluation of learned skills related to competency achieved.

Although this research study focused on student perspectives, the role of the preceptor during clinical education emerged as an important factor to student success in learning. Whether preceptors are seasoned and experienced practitioners or new graduates fresh from clinical education, participants attributed them with facilitating their learning experience. By acting as mentor, coach, and team leader, a preceptor serves as a role model for the student. Professionalism is modeled by preceptors as they demonstrate effective communication with students and practitioners, as well as members of the broader healthcare team.

The final finding reported in this chapter is how participants discovered the MLS profession such that they came to study in a clinical practicum. Various paths and reasons for choosing the career provide evidence for recommendations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this qualitative study was to explore the phenomenon of clinical education from the perspective of students completing a practicum experience. The conclusions from the study follow the research questions, and the findings address four areas: (1) student self-awareness of personal strengths and skills facilitates learning; (2) factors of the clinical environment, such as the physical setting, workload, and unique situations and events, affect learning; (3) how a student organizes resources and materials to prepare for clinical education and the relationships that evolve with instructors so that clear expectations are understood affects learning; and (4) the preceptor role as professional mentor and coach communicates to the student the importance of teamwork to build confidence in the learning process. An additional finding not related to a research question but relevant to the profession of medical laboratory science is included in the conclusions and recommendations. A discussion of the findings and conclusions drawn is followed by recommendations and a final reflection of the study.

Perceptions of Student Self-Awareness

According to participants of this study, success in MLS is being able to self-reflect in order to identify one's strengths and skills. Students who are successful in clinical

learning are aware of how learning occurs and of personal traits they possess that can assist with learning. Findings indicate that students with positive attitudes who show initiative and focus when in the learning environment make an impression on those who are teaching. Having experience working in a laboratory as a volunteer or in an internship program or an area outside of the medical laboratory testing departments was an advantage for students. Students who were aware of what critical thinking implies and how to apply it in the community of practice were successful learners. A conclusion can be made that an individual who approaches learning with a positive attitude and is able to apply critical-thinking skills will be a successful learner.

Findings indicate that if a student is aware of content area in which he/she may be somewhat weak, he/she can use knowledge of his/her strengths to identify ways to improve in the skills needed. A student who can describe himself/herself as a fast learner takes pride in the fact that he/she comes to understand procedures in a timely manner. A conclusion can be made that students who are organized and are able to multitask are successful learners, as the time given for clinical education in each department is limited.

Because self-reflection is valuable to self-awareness, student use of journal writing to reflect on experiences of the day can be a method for keeping track of activities and accomplishments. Chirema (2007) and Boud (2001) suggest that journal writing as a reflective practice can help a student return to the lived experience when it has passed. Williams and Wessel (2004) also value the use of reflection to recall how learning occurred to provide feedback. Another conclusion can be made that student self-reflection during clinical education is a valuable learning tool.

Environment Factors

The next important finding from this study is the impact of the environment on student learning during clinical education. Because the physical setting is so different from the preclinical component of the program, a period of adjustment that must take place for a student. The number of unfamiliar people, procedures, and instruments can be intimidating or even scary in the beginning. This type of experiential learning, described by Dewey (1938), is the process of learning and meaning-making from the lived experience. When student have become comfortable with the people and environment, a more focused process of learning can take place. Findings indicate that when people in the environment are receptive and welcoming to all types of students, the adjustment to learning occurs rather quickly. A conclusion can be made that when a student experiences a friendly and welcoming environment, successful learning is the result.

Because clinical education requires student progression through a variety of medical laboratory departments within one practicum experience, findings indicated a strong variation between departments, whether related to the people, the process, or the physical requirements of sitting or standing. The impact of each department is also determined by the level of automated or manual procedures being taught. Findings indicated that one of the processes of student learning is asking questions of clinical instructors who can be affected by the workload. Because workload is not predictable, a conclusion can be made that students should be advised that some valuable learning takes place through observation during unusual situations. Another conclusion can be made that unusual and nontypical situations can only be experienced during clinical education.

Findings also indicated that some patient interaction may occur during clinical education. Students may be asked to step out of their comfort zones to address communication issues or other situations that require critical thinking and problem-solving. A conclusion can be made that it is important to help students understand what variables occur in the clinical environment that are not controllable.

How Students Prepare

The MLS curriculum is rigorous and requires student development of theoretical knowledge and skills in a preclinical setting that must be applied during clinical education. Application of theory and skills learned in the classroom and student laboratory becomes a reality as a student puts that theory into practice in the clinical setting. Findings regarding how students prepare for clinical education resulted in a variety of responses. For those individuals who did not have prior laboratory experience, a visit to a clinical laboratory to observe medical laboratory scientists working was important to help them visualize the clinical learning environment. Participants indicated that notes and guides provided during preclinical education were helpful when relating theory to practice during clinical learning. Basic skills practiced during preclinical student laboratory exercises allowed the student to progress through the initial stages of the learning process quicker. However, some comments were still made about the students' fear of being unprepared. A conclusion can be made that preclinical education prepares students for clinical learning to a certain extent but it could be improved.

Identification of learning gaps between readiness for clinical education and application of knowledge was found for some departments of the laboratory. Participants also described stress related to grades and evaluations for clinical education. Students who were accustomed to the format of syllabus and schedule of textbook reading assignments with scheduled quizzes and exams found that the open format of daily attendance at a hospital laboratory presented a new method of evaluation. A conclusion can be made that student anxiety and stress over grades and evaluations can be avoided by thorough explanation of assessment by performance competency evaluation during clinical education.

Students may have some input on the decision-making of where their clinical education is to take place. The final decision is often made by program directors. Just as students face the hardship of financial burdens for university tuition and fees, the costs surrounding transportation to and from the clinical practicum in the form of a commute may cause sacrifices to personal and family life. Students may also have part-time jobs to balance on top of everything else. Recognition by faculty and preceptors of the level of student commitment that is required to complete clinical education is important. A conclusion can be made that students need the support and understanding of all instructors in order to be successful in clinical learning.

Perception of Preceptors

Findings show that a preceptor's interpretation of a student's attitude and focus as the student becomes part of the social organization of the clinical facility can have an

impact on the learning process. One of the responsibilities of a clinical instructor is to help students feel safe in this unfamiliar environment and not succumb to superiority conflicts. Preceptors need to understand the value of the feedback they give the students. Giving constructive criticism as needed and encouraging students to ask questions are important factors of clinical instruction. Making sure that students record important information rather than trying to remember every detail from day to day can influence successful learning. Students who are empowered rather than dominated are more likely to accomplish their goals of completing school and becoming a healthcare professional. Just as Nickle (2007) describes the process of modeling, coaching, and mentoring of nurses, medical laboratory scientists as preceptors should become educated about the important role they play in the education of students. A conclusion to be made from these findings is that preceptors may need to be educated on their role in student learning during clinical education.

Additional findings indicated that students valued immersion in the organization and became members of the team. Preceptors help students identify their professional role through communication and socialization. Preceptors are also key to the transition from novice to competent practitioner through confidence building in the student. According to Delany and Bragge (2009), the BUILD strategy for teaching and learning between preceptor and student results in student learning. The conclusion from these findings is better recognition of the preceptor value to student learning.

The Issue of Recruitment

The finding from this study not related to a research question is information on how students are recruited to the career of MLS. With the constant need for medical laboratory scientists, consideration of the path to education programs is worth sharing with MLS educators and the public. At the CLEC in February 2015, sponsored by ASCLS, Karen Brown (2015), executive committee chair of the ASCP Board of Governors for certification, presented the most recent data on the number of certified medical laboratory scientists in the presentation, "ASCP BOC Update." Brown reported that there are currently 251,346 certified medical laboratory scientists worldwide. The decrease in NAACLS-accredited programs, as reported previously, has a large impact on the production of certified professionals. Compared to other certified or licensed healthcare professionals, this number may be considered small. A conclusion to be made from this finding is that improved visibility of the MLS profession is needed through sponsored events and activities.

Another finding from the study indicated that students investigating healthcare programs, and specifically MLS programs, refer to the Internet to search for information. The current trend of students finding locations of programs through links to common Internet browsers is a key factor to program recruitment. This fact was an important take-away from many of the participants' comments and provides an opportunity for MLS programs to be clearly identified on university and accrediting body websites. The conclusion to be made is that MLS program websites must have quality information and be easy to navigate.

Recommendations

Recommendations are based on the findings, analysis, and conclusions of this study. The recommendations that follow are for (a) students in MLS program, (b) preceptors, (c) academic faculty for MLS programs, and (d) further research. Considering the multiple factors that affect college students and their choice for academic programs of study, some of the recommendations may already be in place.

Recommendations for MLS Students

Students enrolled in MLS programs have made the decision that MLS is the best career path for them. In order to be a successful learner during clinical education, MLS students should:

1. Reflect on strengths recognized during preclinical education and learning-style techniques that were most helpful;
2. Review basic skills mastered in preclinical education or previous laboratory experience;
3. Make logistic plans related to transportation and housing during the clinical practicum to relieve financial stress;
4. Communicate with instructors and embrace new situations and learning opportunities that arise during clinical education;
5. Prepare for clinical education by reviewing preclinical materials and making sure that methods of evaluation are understood; and

6. Carry a pocket notebook or journal to jot down daily events that make an impression for later reflection.

Recommendations for Preceptors

Conclusions from this study indicate the role of clinical preceptor to be an extremely important factor of MLS student learning during clinical education. In order to facilitate successful student learning, the following recommendations are made for preceptors. Preceptors should

1. Take advantage of continuing education opportunities related to teaching diverse student populations and inform their supervisors of the amount of time dedicated to being a preceptor;
2. Be friendly and welcoming, keeping in mind that most MLS students are not familiar with the clinical environment and may be intimidated by people or instruments;
3. Recognize that asking questions is a student's way of demonstrating focused learning on the topic, and give the student frequent feedback on his/her performance;
4. Speak their thoughts out loud so that students can follow their critical-thinking pattern, which is one of the best ways to transfer a process to a student;
5. Be a role model for professionalism and teamwork and provide constructive feedback regularly;
6. Demonstrate proper communication procedures with other healthcare professionals; and

7. Remember that although students may be slow at first, they will gain speed, and encourage them to be serial monotaskers instead of insisting that they multitask.

Recommendations for Academic Faculty

Recommendations for MLS program academic faculty who prepare students for learning in clinical education are as follows:

1. Follow up on gaps of learning reported by students as they reflect on the transfer of learning from the university to the clinical laboratory;
2. Maintain positive relationships with clinical staff where students are placed;
3. Prepare an instructor manual or orientation session for clinical instructors that can guide inexperienced preceptors;
4. Offer continuing education events for preceptors;
5. Give students preparing for clinical education detailed descriptions of the clinical environment and the assessments that will take place;
6. Practice communication skills during preclinical courses through role-playing and situational simulations; and
7. Offer students preparing for clinical education guidance in strategies for coping with change and stress.

Further Research

Data collected from this study provide evidence important to the profession of medical laboratory science by showing how clinical education contributes to the goals of

accreditation standards and expectations of the profession. Recommendations for further research in this area include the following:

1. Expand the amount of data on learning during clinical education, interview more students, and observe more laboratories where learning takes place;
2. Investigate an assessment tool to measure student success in clinical learning;
3. Investigate the process in which teaching laboratories select preceptors and how they can receive better recognition of their efforts; and
4. Investigate the use of BUILD strategies presented by Delany and Bragge (2009).

Researcher Reflection

The findings and conclusions from this study confirmed some of my understanding of the process of clinical learning and also provided new insights. Collaboration between academic institutions and hospital laboratories that provide the setting for clinical learning must be an ongoing partnership. The increased interest in MLS programs is welcomed because the need for educated MLS practitioners continues to be a great. One of the possible reasons for this growth is likely due to the fact that graduates are being hired by their clinical education facility or are able to find jobs in a timely manner. The diversity of students in MLS programs indicates the need to collaborate with preceptors taking on the role of clinical instructor to help with understanding of the diversity of learning styles. This study's findings support the value of the investigation of learning styles with MLS students

to help them succeed in clinical education. The use of student reflection is also supported as one way in which students can connect meaning to experience. My program has been using student reflection for some time, and this study reaffirms the value of this process.

I find that obtaining perspectives of students from interviews is useful as a tool and is highly dependent on the interview guides being used. The technique for successful interviews depends a great deal on the person being interviewed and on the skills of the interviewer. This study's findings helped me realize the importance of ensuring that the students are well prepared before starting the practicum and the need for helping students understand the value of critical thinking.

Completing this study provided ideas for further research on clinical education that may be applicable to other healthcare profession programs. One thing that stands out is the value of social media and the necessity of having a clear and user-friendly website that students can find through a variety of links. I am grateful for all that I learned from this study and continue to learn as a researcher.

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APPENDICES

APPENDIX A

RECRUITMENT LETTER TO PROGRAM DIRECTORS

July 22, 2014

MLS Program Director
Illinois

Dear _____

I would like to introduce to you a research study that I will be conducting in the next year. "Medical Laboratory Science student perspectives on learning during clinical education" is the title of my study for fulfillment of the Ed.D. in Adult and Higher Education at Northern Illinois University. The purpose of this qualitative interview study is to examine the process of learning by MLS students through the lived experiences of clinical education as it relates to student characteristics, the workplace environment, and transfer-of-learning from the classroom to the clinical setting.

We know, as educators and practitioners, that hospital laboratories may be hesitant to provide student clinical education opportunities due to staffing shortages, equipment changes, or information system upgrades. My goal with this research study is to collect data that provides evidence of learning that can occur only during clinical education.

This is where I need your assistance. I would like to recruit an additional 8-10 MLS student volunteers to participate in this study who are currently completing their clinical internship. Anticipated data collection will be in Fall 2014. I will conduct two interviews per student at an agreed-upon location, with each interview being approximately 60-90 minutes in length. In addition, I will be asking the participants to write a summary of their clinical education experiences to supplement the interview findings.

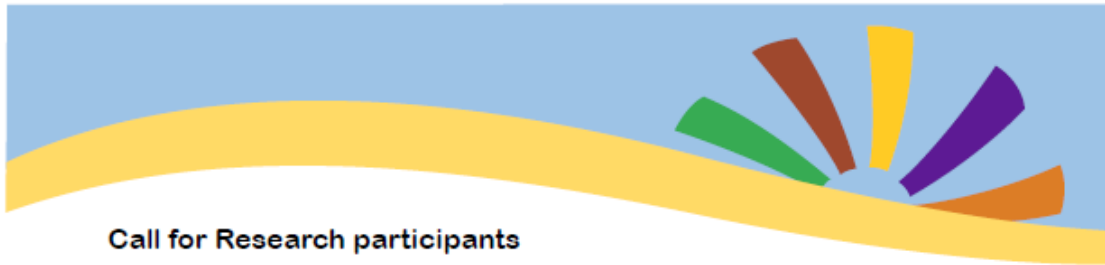
I would like to request that you announce this study to your classes and post the accompanying flier to invite students to participate. Please provide my email address: [email address], and phone number: [phone number], to interested students so that I can communicate expectations and set up interview schedules. Thank you for your assistance. I look forward to hearing from your students.

Sincerely,

Jeanne M. Isabel, Graduate Student
MLS Program Director and Associate Professor
Allied Health and Communicative Disorders
College of Health and Human Sciences
Northern Illinois University
DeKalb, IL

APPENDIX B

PARTICIPANT RECRUITING FLIER



Call for Research participants

“Medical Laboratory Science student perspectives on learning during clinical education”

Northern Illinois University (IRB #HS14-0082)

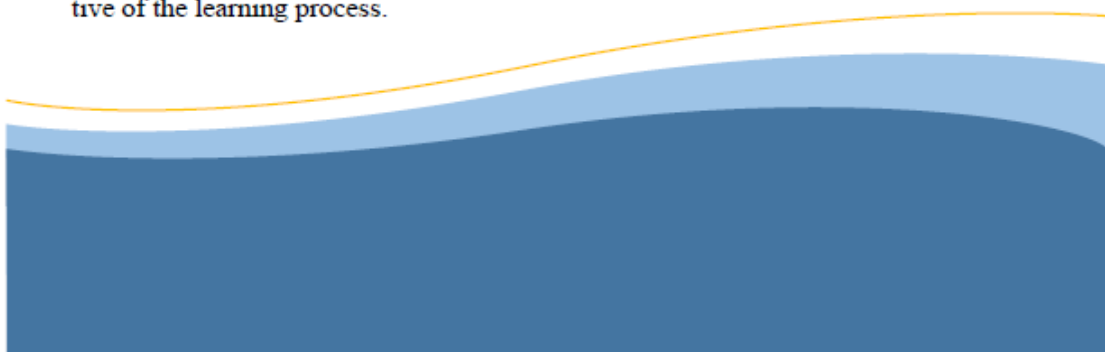
Allied Health and Communicative disorders

Contact: Jeanne Isabel
Jisabel@niu.edu

Eligibility criteria: MLS student currently completing clinical education in a hospital laboratory.

Participants will take part in 60-90 minute interviews at two separate times and write a reflection of the clinical experience.

The purpose of this qualitative phenomenological study is to examine the process of learning by MLS students through the lived experiences of clinical education. By understanding this process, new strategies for preparing students for their role as professional practitioners may be identified. How the MLS student gains confidence to enter professional practice can be analyzed through descriptive narrative of the learning process.



APPENDIX C
CONSENT FORM

Consent Form

Consent to participate in the study “Medical Laboratory Science student perspectives on learning during clinical education.” #HS14-0082

You are invited to participate in a research study investigating student perspectives of clinical education for Medical Laboratory Science students. The research is being conducted by Jeanne M. Isabel, associate professor and program director for Medical Laboratory Science at Northern Illinois University.

The purpose of this qualitative interview study is to examine the process of learning by MLS students through the lived experiences of clinical education. There is a need to provide evidence of how clinical education prepares MLS students for their role as professional practitioner. Student individual characteristics, the workplace environment, and the connections between the classroom and real-life setting all contribute to the learning process provided by clinical education. Students gain confidence to enter professional practice through the intricate melding of theory, practice, and socialization. MLS students often encounter unique learning experiences during the clinical internship, which varies within each department of the laboratory.

Students eligible to participate in this study will be in the process of completing their clinical internship in a medical laboratory of a hospital facility. Participants will be interviewed two times, with the length of time between interviews to be determined by the researcher and participant. The first interview will focus on the participant’s background and initial perspectives of MLS clinical education. The purpose of the follow-up interview will be to expand on comments from the first interview and ask questions related to professionalism, the workplace environment, teamwork experiences, and social interaction that takes place during the educational experience.

The interviews will be about 60-90 minutes in length and will be digitally recorded for transcription at a later date. The time and location for the interviews will be agreed upon through email or phone communication between the researcher and participant. Recording transcripts will be kept for a period of five years on an encrypted flashdrive kept in a locked desk belonging to the researcher. The participant may be asked to review the transcript for authenticity. Additional follow-up interviews may be scheduled if deemed necessary. Participants will also be asked to write a summary of their clinical experience to be submitted electronically to the researcher. Guidelines for the written summary will be provided to the participant.

You understand that participation in the study is voluntary and will have no effect on your grade for the clinical internship.

You agree to have the interviews recorded for later transcription. _____ signature of participant

You may contact the researcher, Jeanne M. Isabel, at [phone number] with any questions related to the study.

You may also contact the Office of Research Compliance of Northern Illinois University at 815-753-8588 if you have questions about your rights as a research participant.

You understand that all information collected from the interviews and summary of experience will remain confidential, with pseudonyms given for all participants.

You understand that there are no foreseeable risks involved with participation in the study.

Benefits of the study will be providing evidence of learning that takes place during clinical education that can provide insight to MLS academic faculty and clinical instructors.

By signing below you agree to participate in this study.

_____ (to be signed and submitted at
the first interview) Printed name Date

Signature

APPENDIX D

REFLECTION SUMMARY GUIDE FOR STUDENTS

MEDICAL LABORATORY SCIENCE STUDENT PERSPECTIVES ON LEARNING DURING CLINICAL EDUCATION

Dissertation Research of Jeanne M. Isabel, MEd, MLS, SH (ASCP)

Associate Professor of MLS and Graduate Students

Northern Illinois University, DeKalb, IL

IRB# HS14-0082

As you are a participant of my research study, I ask that you complete a reflection of your clinical education thus far. There is no minimum or maximum length. This summary will be used as an artifact in conjunction with the face-to-face interviews.

Reflection Summary Guideline

Clinical education of medical laboratory sciences students include objectives related to knowledge, readiness to learn, communication, professionalism, skills, and personal attributes necessary to function effectively as a member of a diverse healthcare team. This written summary will complement the interviews conducted with you by the researcher. A reflection on your experience in clinical education can provide insight for ways to enhance this experience.

Items to consider:

- Describe your strengths as an MLS student.
- Describe something about yourself that you would like to improve before starting your career as an MLS.
- Give an example describing how your clinical experience provided additional knowledge/skills that supplemented the theory learned in the classroom.
- Give an example of events that occurred that provided a unique and valuable learning experience.
- Describe how your clinical experience helped with your interpersonal or teambuilding skills. List any concerns or unprofessional behavior you encountered, and provide a suggestion of how the concern might be addressed. (*Note: These are not shared with the clinical site.*)
- Give an example describing how the clinical experience enabled you gain competency in your techniques, manage time, and organize work.
- Give an example describing how the clinical experience enhanced your problem-solving and critical-thinking skills.

Please email your reflection to me at [email address] after our first interview. Thank you for your time and participation.

Jeanne M. Isabel
[phone number]

APPENDIX E
FIRST INTERVIEW GUIDE

First Interview Guide

1. Tell me about your higher education experiences.
2. What led you to a degree in MLS?
 - a. Do you know someone in the field?
 - b. Do you have a relative who is an MLS?
3. What did you expect clinical learning to be like?
 - a. What personal attributes do you have that will influence this type of learning?
 - b. How do you demonstrate initiative, desire to learn, independence?
4. How did you prepare for the clinical experience?
5. Describe how learning takes place in the clinical setting.
 - a. Tell me how learning at the university and clinical learning compare or differ.
 - b. Can you think of an instance when you applied something learned in the classroom to your clinical experience?
6. Walk me through a typical day in your the lab.
 - a. Tell me how you demonstrate willingness to learn.
 - b. If you identify a knowledge gap, what do you do?
 - c. How do you interact with clinical instructors?
7. Describe a not-so-typical day in the lab.
 - a. Describe how you feel on days that are not typical.
 - b. How does your interaction with clinical instructors change in these circumstances?
8. Can you give an example of a particular situation that made an impression on you?
9. Describe how you become confident in performing lab procedures.
 - a. What experiences contribute to giving you confidence?
 - b. What experiences have challenged your level of confidence?
10. What do you like most about the clinical education?
 - a. Describe how this experience has met your expectations?
 - b. Describe how this experience has not met your expectations?
 - c. How do you think location of the hospital affects clinical learning?
11. What do you like least about clinical education?
12. What strategies would you suggest to prepare a future student beginning clinical education?

APPENDIX F
SECOND INTERVIEW GUIDE

Second Interview Guide

1. How would you describe your current level of knowledge and understanding of MLS ?
 - a. How did you feel about reflecting on your clinical experience?
 - b. how would you describe your ability to think critically?
 - c. What learning strategies did you identify?
 - d. Describe how knowledge of your learning style preference helps you in your
clinical experience.
2. How do you think clinical learning varies within different lab departments?
 - a. How do instructors demonstrate understanding of your learning needs?
 - b. How does the number of clinical instructors help or hinder your learning?
 - c. What part does organization and time management play?
 - d. What observational skills do you use?
3. Describe how the workplace environment affects your learning.
 - a. What makes a good clinical instructor?
 - b. How does instructor feedback affect your performance?
 - c. How do you apply constructive or not-so-constructive feedback?
4. How would you describe demonstration of teamwork during clinical education?
 - a. What role does communication play?
 - b. How does diversity affect teamwork?
5. How would you define professionalism?
 - a. How do you demonstrate being professional as a student?
 - b. How do the clinical instructors demonstrate professional behavior?
 - c. Can you describe any behavior that you consider unprofessional?
6. Describe how social interaction with peers or instructors might affect your learning.
 - a. Describe what effect social interaction may have on your level of confidence.
 - b. Has there been an experience since we last met that challenged your level of
confidence?
7. What type of stress have you encountered during clinical education?
 - a. How do you handle changes during your clinical education?
 - b. Describe how being flexible affects your learning.

8. What are you most proud of?
 - a. What has caused you the most concern?
 - b. How do you feel about starting your career in a few months?

APPENDIX G
OBSERVATION GUIDE

Observation Guide

Hospital _____ Department _____ Begin Time: _____ End
time _____

Diagram of the room/ space, objects/people sitting or standing

Number of people _____

Roles _____ Personnel other than Lab

Direction of communication/conversation

Who speaks to whom

Who listens

Silences

Nonverbal behavior

Sequence of activities

How long for each activity

Watching others

Independent work

Direct quotations

Telephone usage

Other distracters: radio, intercom, other

APPENDIX H

OBSERVATION ACTIVITY TABLE

Observation Recording Table

| People Staff code | Communication paths | Activity 1 | Activity 2 | Activity 3 | Activity 4 | Activity 5 | Distractions | Noise level | Phone calls |
|----------------------|------------------------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|----------------|
|----------------------|------------------------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|----------------|

Instructor/s
code

Student/s
code