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# Online Graduates in Clinical Laboratory Sciences: Are They Prepared for the Workplace?

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**ONLINE GRADUATES IN CLINICAL LABORATORY SCIENCES:  
ARE THEY PREPARED FOR THE WORKPLACE?**

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Dissertation submitted to the Faculty of the  
Marshall University Graduate College  
in partial fulfillment of the  
requirements for the degree of

Doctor of Education  
in  
Educational Leadership

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Huntington, West Virginia, 2014

## **ABSTRACT:**

Online programs are increasing in the field of clinical laboratory sciences (CLS), however there is limited research regarding how well prepared online CLS program graduates are for the workplace, given that the field is highly hands-on skills based. Prior research suggests that online CLS graduates perform as well as their traditional graduate counterparts on national registry examinations, however, there is no information on their job preparedness and performance in the workplace. A qualitative multi-site case study was performed exploring the job preparedness of clinical laboratory science (CLS) professionals with online degrees in both the Associate in Applied Science in Medical Laboratory Technology (MLT) and the Bachelor of Science in Medical Technology or Medical Laboratory Science (MT or MLS). Data collection involved interviews of laboratory managers, supervisors, educators, and online graduates in four hospital cases and two higher education online programs that provided employees to the hospitals. Interviews of participants were conducted to gain their perceptions of the preparedness and performance online education provides new graduates for the laboratory workforce. Four salient themes emerged from the findings, the first theme regarded participants' prior experiences with online education. The amount, and the quality, of the experience participants had with online education was related to their perceptions – the more experience, and the better the quality of the experience, the more positive the perception of online graduates. The second theme regarded the nature of online programs and concerns about the lack of hands-on activities graduates had during their degree programs. The third theme was the importance of online program quality and reputation. Finally, the influence of job market conditions on hospital hiring practices of CLS graduates, online or otherwise, was the fourth theme. Of the four themes, some crossed over MLT and MLS- level education, and others pertained only to MLT or MLS-level education. The implications of these findings for future research for laboratory professionals, and CLS education administrators are included that pertain to hiring practices of online CLS graduates and CLS online education program design.

## **DEDICATION**

I dedicate this work to my husband, Jay, and my kids, Jacob and Alexa. To Jay, since you were there the most with me during this journey, and saw the challenges and successes that I had, I dedicate this to you. For my kids, Jacob and Alexa, I dedicate this work to you because I want you both to see and realize that whatever you want to accomplish in life, you can – you just have to dedicate yourself, work hard, and persevere, and you will always accomplish your goals.

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# **ONLINE GRADUATES IN CLINICAL LABORATORY SCIENCES: ARE THEY PREPARED FOR THE WORKPLACE?**

## **CHAPTER ONE: INTRODUCTION**

There has been a substantial increase in the number of online higher education programs in clinical laboratory science (CLS) over the past couple of years (Freeman, 2010). There is some evidence that graduates of online programs are able to perform as successfully, or more successfully, on national registry examinations as those educated through traditional face-to-face CLS programs for associate degree Medical Laboratory Technology (MLT) programs (Hansen-Suchy, 2011) and also for bachelor degree Medical Technology or Medical Laboratory Science (MT/MLS) programs (Russell et al., 2007). Studies such as the aforementioned are essential to convince various laboratory professionals—including educators, laboratory administrators, and fellow laboratory colleagues—that online education in CLS prepares students for the workplace in a manner comparable to traditional education (Russell et al., 2007). However, what we do not know is how those graduates of online programs are performing in the workplace compared to their traditionally prepared counterparts, from the perspective of laboratory managers and other levels of laboratory administration. This study addresses any perceived differences between online and traditional CLS educational programs and probes into perceptions of quality issues between the two, both for MLT and MT/MLS programs. Laboratory directors, section supervisors, and graduates of online CLS programs in hospitals that employ graduates from both online and traditional CLS programs were interviewed regarding these issues. Additionally, program directors of online CLS education programs at both the MLT and MLS –levels were interviewed to gain their perspectives on workplace preparedness and performance of their online graduates compared to traditional graduates.

## **Related Literature**

Online education has become a more popular form of course delivery in recent years. According to a 2008 report by the Sloan Consortium entitled “Staying the Course: Online Education in the United States, 2008” (Allen & Seaman, 2008), student enrollment in online courses has grown significantly. The Sloan report states that during the fall of 2007, more than 20 percent of college students in the United States were taking a minimum of one online course. The report suggested that the recent poor economic times has prompted the return of individuals to college to seek education, or additional education for job advancement, and more online courses were being chosen due to flexibility for working individuals and rising travel expenses. Studies also suggest that students are drawn to online courses due to the technological world in which we currently live, where the Internet has become a major format for doing business, communicating, and obtaining information (Brooks, 2009). Although online learning is becoming more popular, there are still mixed views about how it compares to traditional learning. There is a substantial amount of literature regarding educator perspectives of online learning; Brooks also suggests that some believe that it is not as effective as face-to-face learning, and others believe that online learning is just as effective as traditional education. Many factors are cited as crucial for the implementation of quality online programs, such as providing adequate student support, providing adequate resources, and good faculty preparation (Gaide, 2004), however, there is not information regarding how well online educated graduates are received in the workplace after degree completion.

Online education is growing in many educational fields, including business, which like health care fields, is required to undergo specific accreditation procedures. From the literature, there is an overall sense of favorable attitude towards online business education. Some of the

advantages cited by Merriman (2006) for businesses to encourage utilization of online education for their employees are elevating the knowledge base of the workforce, better recruitment and retention, and more efficient use of money spent for education through more availability of tuition discounts with online programs. Also, online education is more attractive to businesses because it has been shown to improve employee retention and overall satisfaction (Merriman, 2006). There is literature to support the notion that online education prepares graduates for the business world, due to many similarities between the virtual classroom and global business practices (Hochberg, 2006).

Online education in health professions programs is also on the rise. Nursing programs in particular, have begun to transition towards online education formats, largely due to staffing shortages and a limited number of qualified registered nurse (RN) graduates (Smith, Passmore, & Faught, 2009). Online RN to bachelor of science in nursing (BSN) programs are being developed to provide associate degree trained RNs the opportunity to return to college to attain an advanced degree, while providing flexibility and more opportunities for career advancement (Cornelius & Glasgow, 2007). Viability of online education in health professions, such as nursing, has been viewed positively, in that nursing faculty perspectives of online instruction appear to be favorable (Christianson, Tiene, & Luft, 2002). Nursing students have also expressed positive views of online education in nursing, indicating that their overall experiences have been satisfactory. Some drawbacks to online education identified by nursing students were issues such as more interaction needed with faculty and fellow students, personal time constraints to completing required assignments, and more support from employers encouraging completion of an online degree in areas such as increases in workplace staffing and computer access (Atack & Rankin, 2002). Nursing students have also expressed their views of how use of

computers in nursing education has both helped and taken away from their overall educational experience (Kenny, 2002). Although there is a significant amount of literature related to nursing faculty and student perspectives of online education, there appears to be a lack of literature on how well graduates of online nursing education programs are prepared for the workplace.

Although one study mentioned the importance of being able to design information in an online format in a way that nursing students would be able to apply it to practical nursing situations (Smith et al., 2009), it did not explore how these methods translated to workplace preparedness.

Clinical educational programs across the country have been no exception to this trend in an increase in online learning. Due to demands in the laboratory workplace and also a push for CLS educational programs to reduce program costs, while at the same time increase class sizes, there has been a substantial increase in technology enhanced and online courses. Currently, there are 25 Associate of Applied Science in Medical Laboratory Technology (MLT) programs, and 19 Bachelor of Science in Medical Technology (MT) or Medical Laboratory Science (MLS) programs that have publically documented elements of online education (Freeman, 2010). There is some evidence of an increased viability of laboratory educational programs, in part due to educational programs exploring other modes of education delivery that provide more flexibility, such as online education (Simonian, 2007).

There is very limited scholarly literature regarding CLS educator perspectives of online education. In a case study of students in a CLS program, faculty expressed concerns about students' ability to cheat on online courses and the ramifications of such actions (Conway-Klaassen & Keil, 2010). Others believe that complete online formats may not be the best delivery method for CLS education. McCown (2010) states that most courses in the clinical laboratory sciences are better suited for a blended format rather than entirely online because of

the in-person laboratory experiences in the curriculum. However the author does also say that clinical rotations courses could be enhanced utilizing a blended format to better facilitate communication and access to needed resources between students, faculty, and clinical instructors. Two studies compared online CLS program graduate certification examination scores to those of graduates from traditional CLS programs. Both of these studies, showed that online graduates performed just as well on certification exams as traditional graduates (Russell et al., 2007; Hansen-Suchy, 2011). Given these results, and the surge in the number of online education programs, there is surprisingly little published about perceptions of those in the CLS field about this form of educational preparation, or about online graduates' job performance—specifically the perceptions of working laboratory professionals including lab directors and supervisors, who are, or will eventually be, working side by side with graduates from online programs.

To explore perspectives of those who work in a clinical laboratory setting regarding online education in the field, I conducted pilot explorative work at a local hospital laboratory. I took a phenomenological approach in this study to get a sense of what online education means to those individuals working in the laboratory, and what issues or concerns regarding this topic are important to them (Bogdan & Biklen, 2007). I chose this particular hospital because I knew the educational coordinator there and could gain access easily, and it is one of the larger hospitals in the area.

The hospital I chose was one of the main hospitals in Huntington, West Virginia. The hospital laboratory is comprised of an automated-procedures area that contains hematology and chemistry, and has separate departments for microbiology and blood bank. The laboratory does testing that is considered both at the MLT and MT/MLS level, and trains students at both levels.

There are more females than males working in this laboratory, and there is a mixture of both associate prepared MLTs and bachelor prepared MT/MLSs. The automated-procedures area was selected for my pilot work because this area was the largest in the laboratory, and had the most laboratory workers, thus more of a selection of participants to choose from for interviewing, and more of a variety of activities to observe. I first began observing the laboratory staff in their work environment to get a sense of the tasks they performed, and how they interacted with one another. I wanted to gain some perspective on any circumstances in the work environment that may influence their views of online education. A man was interviewed who worked in the hematology section in the laboratory, and on both occasions was more talkative and interactive with others in his own section and the chemistry department. The second individual selected for an interview was a female laboratory worker in the chemistry department, who always appeared very busy, but also very involved with other co-workers in making sure that work was completed, and that they were doing what they were supposed to be doing.

From the observations and interviews conducted during this pilot work, several themes emerged. From the interviews with participants, there were three common themes, as well as a wealth of information obtained from one regarding her own personal experiences with online education in the CLS field. Common themes from both interviewees were that online programs are very costly, and that there are obstacles to going to school, such as work, family life, and other time constraints. Finally, both individuals talked about how important it was that a fellow employee could be trained to do the job, despite whether they had been trained through an online or traditional laboratory education program.

Perhaps the most resonating issue raised by both interviewees was that no matter how a person comes into a laboratory educated, it is of utmost importance that he/she be able to adapt

to the work environment, and be able to be trained and competent in the job at hand. They viewed competency in basic laboratory skills and the ability to think critically in the laboratory as essential; this is why a review of documented performance evaluation data of online graduates is so important. Specific critical thinking behaviors for clinical laboratory science professionals have been identified as reasoning technologically, which includes evaluation of test accuracy and instrumentation performance documentation, and acting professionally when dealing with interpersonal communication (Kenimer, 1999). In addition to these skills, it was important to both interviewees that new employees be able to come in with a basic level of understanding of laboratory procedures and subject matter, so that they could easily be trained to work with others in the laboratory.

One interviewee talked about her experiences with an online education program. She believes she successfully learned the content that was relevant through the use of pre-recorded PowerPoint lectures and tests that were proctored, and through discussions with other students through group projects that were assigned. Concerns have been expressed about some of these methods of online education; Lorenzetti points out that certain changes must take place with online learning, and that some elements of control must be relinquished by the professor, and that students' accountability for their own work must increase, as with online assessments (Lorenzetti, 2005). Although some may be skeptical of these methods, the woman I interviewed successfully obtained her BS degree in Medical Technology, and was able to pass her national registry examination on her first attempt. Both interviewees were asked if they, or those they worked with, believed an online degree was any less reputable than a traditional degree, and both indicated that they believed it was viewed as equal; however, when not being recorded, one interviewee referred to the online degree as the "lesser degree." Based on this finding, I think it

is important to gain the perspectives of other graduates of online CLS programs regarding quality issues. In addition, since hiring decisions for new CLS graduates are primarily made by laboratory managers and supervisors, it is important to gain their perspectives regarding the equality of online versus traditional CLS programs, and how well each prepares new graduates for the laboratory workplace.

In addition to earlier pilot work, I conducted an interview with a laboratory director at a local hospital to gain information about whether my interview questions were appropriate for answering my research questions about graduate workplace preparedness issues surrounding online education. The key points that came out of the interview were that this laboratory manager was most concerned about “practical” skills that online programs would or would not be able to provide students in preparation for the workforce. The lab manager did not expect new graduates to be able to come into a laboratory and be able to perform every task immediately, but he had an expectation that each student would have a solid knowledge base and skill set in order to be trainable. He kept saying that he wanted new graduates, either from an online or traditional educational program, to be “clay” that he could mold into the technician or technologist that he needed to perform to his standards in his laboratory. The manager said that he thought it would be important to not only talk to laboratory managers about their views of online education in the field, but also to speak with section supervisors who work more closely with new graduates. He also suggested speaking to online graduates themselves about how well their online degrees prepared them for their jobs.

Although the lab manager stated several times that he did not have objections to online education in CLS, he also said that if he were in a situation where he was interviewing for a position in his laboratory and he had a new graduate from a traditional program and one from an

online program, he would try to find out during the interview process if there was a difference between the two candidates as far as educational preparedness. I asked how he would attempt to assess any differences, and he was not entirely sure, but stated perhaps in how he structured his interview questions. The lab manager also had concerns about online education for an MLT versus an MT/MLS; he strongly opposed online education for the MLT, largely due to his feelings about the MLT being the level at which core practical skills are obtained, and that this would not be easy to do online. This laboratory manager does have strong ties to my own career ladder MLT to MT/MLS educational program because he is a graduate and also hosts students from our programs in his facility, and this appeared to enter in as a personal bias. The proposed study will determine whether other laboratory managers hold the same or different views of online education as he did, including his strong feelings about online MLT versus MT/MLS programs.

### **Research Questions**

As noted above, little is known about how well online graduates are prepared for the workforce, and whether laboratory administrators view online education as a viable option for CLS education that prepares graduates well for the workplace. The purpose of this study was to address the following questions:

1. How do laboratory administrators and educators perceive the workplace preparedness of new online CLS graduates?
2. How do laboratory administrators and educators perceive job performance of new online CLS graduates?
3. How do new online graduates perceive their level of preparedness for the workplace?

## **Methods**

### ***Site and Participant Selection***

I conducted a multi-site case study involving four hospital cases with laboratories that each had a mix of online and traditional CLS graduates of MLT and MT/MLS programs. To gain a comprehensive understanding of perceptions of online education, I used purposeful sampling and chose information- rich hospital cases and interviewees (Patton, 2002). Interviews were conducted with laboratory managers, section supervisors, educational program directors, and graduates of online programs in each hospital laboratory case; between three to eight interviews were conducted per case. I selected four mid-size hospitals in the vicinity of online MLT and MT/MLS educational programs. I chose locations out-of-area where there was at least one program of each type, online and traditional, for both the MLT and MT/MLS level in these areas. One area had both an online and traditional MLT program within 40 miles of one another, and one area had both program types for the MT/MLS level in the same town. I initiated contact by sending emails first to the directors of these educational programs explaining the purpose of the study, and inquiring about what hospitals in this geographic area employ their graduates. I then contacted the laboratory directors of these hospitals and explained the purpose of the study, and asked for voluntary participation.

### ***Research Relationships***

Gaining access to the hospitals in this study required that I established contact and relationships with laboratory administrators in each laboratory. The next step was explaining the basic purpose of the study and asking permission to conduct interviews with laboratory managers, section supervisors, and graduates of online CLS programs in each hospital. I also contacted the two educational programs identified for this study, one at the MLT and one at the

MLS level, and asked permission to interview the education program directors, after explaining the purpose of the study. To ensure that findings of this study would be valid, it was important that certain validity threats, in particular in this case, researcher bias (Maxwell, 2005), was recognized. I did not have any personal relationships with individuals in the hospitals and educational programs that I studied, so there was not any bias regarding past relationships, or current clinical affiliations with anyone. Coming into settings that I did not have any familiarity with caused me to be more aware of what I was studying, and less likely to form preconceived conclusions. I asked more questions for clarity than I would if I were in a hospital that I was familiar with personally and that had my own students and graduates. Not being familiar with the setting or participants, I was not welcomed as easily as I would be at a place where people knew me, therefore, I had to make a concerted effort to establish trust in order to obtain information needed for this study.

### ***Data Collection***

I conducted ethnographic interviews (Spradley, 1979) with laboratory managers, section supervisors, educational program directors, and graduates of online programs in each of the hospital cases in the study. Spradley discussed methods to utilize during an ethnographic interview that I employed throughout the process such as asking questions initially to develop rapport, expressing interest in responses that participants offered to encourage elaboration, and expressing ignorance regarding responses to encourage participants to further explain their own perceptions regarding online education in CLS. I used a semi-structured interview guide (Bogdan & Biklen, 2007) composed of open-ended questions in general categories that pertained to the research questions in this study. Guidelines for revising and piloting these questions outlined by Glesne (2011) were followed before the actual study was undertaken.

During interviews with laboratory managers in each hospital case, I discussed competency assessments, personnel evaluations, and national registry examination pass-rates of graduates of these programs. I also had discussions with educators in this study regarding national registry pass-rates of their online graduates. Ethical issues were addressed through the course of this study. Initially, Marshall University IRB approval of the study was obtained. Also, since I conducted research within health care facilities, patient confidentiality was maintained, and some hospitals had their own policies to which I adhered to in addition to the university IRB. Participation in this study was entirely voluntary; each hospital laboratory was approached and individuals asked ahead of time of their willingness to participate and consent was obtained.

### ***Data Analysis***

I utilized inductive content analysis and identified emergent themes and patterns of data collected through open coding of interview transcripts (Glesne, 2011). Each interview I conducted was fully transcribed and then analyzed for emerging themes and key concepts. Observer comments were kept throughout the process of interview transcribing to further enrich the data and keep track of critical thoughts and perceptions that I had at different times during the data collection process (Bogdan & Biklen, 2007).

### ***Validity***

The main goal of this study was to gain a sense of how laboratory professionals truly view online education in CLS and the extent to which it effectively prepares graduates for the workplace, which is the focus of having internal validity in a study (Merriam, 1995). Merriam states that “qualitative researchers seek to understand the world from the perspectives of those in it,” which was the purpose of this study. Further, Merriam (1995) states that triangulation

strengthens internal validity of a study. The discussions about competency data for online graduates with laboratory professionals across cases and participants provided triangulation for the study. Maxwell (2005) points out specific validity threats, researcher bias and reactivity, which were addressed during this study. I had preconceived opinions about online education in the CLS field and my own presence in the laboratories in which I conducted this study could have influenced the findings.

My personal views about online education in CLS related to my experiences designing an online program in my own CLS department. I believed that if designed properly, online formats could be just as effective, or in some cases more effective, than face-to-face courses. Given that I had this perspective, when interviewing managers, supervisors, educators, and graduates of online programs about their views of online CLS programs, I had to be careful not to “show” my feelings about this issue, not to ask leading questions during interviews, and not react negatively if an interviewee spoke in contradiction to my own feelings. I asked probing questions to dig down into what my participants said in order to gain more understanding of their perspectives on issues that I had not considered, or did not feel were important. What I learned from doing a pilot study is that issues that I may not have recognized as important during the interview, were very important to the participants and became themes of my analysis when I began to group and code data. Nothing that an interviewee said was discredited.

My own presence and the effect that it had on the research participants was also something to take into account during the study. Because I was considered an “outsider,” participants were not immediately comfortable around me, especially at first, and did not act as they would in their normal day-to-day routines. This meant that gaining rich information from them was challenging. Glesne (2011) points out important strategies for maintaining field

relations, such as developing rapport with the participants and making them feel more at ease in talking by trying to fit in as much as possible, avoiding being invisible or having too much involvement, by taking a middle ground approach, that encourages participants to act and speak as they would naturally. I utilized Glesne's strategies throughout the data collection process of this study while conducting interviews with laboratory managers, supervisors, educators, and online CLS graduates.

The other validity issue—reactivity—is the idea that some participants may not feel comfortable speaking freely about their views regarding whether or not their employees, who were trained through online education, were adequately trained. Since the managers spoke about their own employees, with whom they may or may not have a personal relationship, in some cases, they did not speak freely and honestly. Some of the managers' and supervisors' personal biases towards their own employees influenced how they spoke about their preparedness in the workplace that may not have anything to do with online education quality issues. I kept this possibility of potential bias in mind while speaking with participants and asked questions to get conversations flowing in the right direction if I sensed they were going off track. Another reactivity issue I encountered during my pilot study was that a participant told me certain things while I was recording, but when I turned the tape recorder off, he began to tell me an entirely different viewpoint he had about online education and how he did not think that management would support going back to get such a degree; it was as if he was afraid to say anything against someone else in his hospital while “officially” being recorded, but once the recorder was off, he felt he could speak more freely. Keeping this in mind, I tried to establish a sense of trust and explained that identities would be protected, explained the purpose of an IRB, and made it clear my desire to learn about both pros and cons of online education.

## **Significance**

The purpose of this study was to gain the perspectives of laboratory administrators, educators and CLS online graduates regarding online education in CLS, including their perceptions of quality of instruction and how well graduates of online CLS programs are prepared for the workplace. There will be an increased number of graduates coming into laboratories across the country from online programs because these programs are increasing in the CLS field. With an increased number of CLS educational program closures, online programs have begun to increase to fill in the closure gaps. CLS traditional programs are closing due to education program budget cuts and low enrollment numbers. Online education in CLS is an option for delivery to students who may not have access to higher education otherwise, and also provides a more cost-effective means of delivery in some respects due to lower in-class supply costs. CLS programs educate students to work primarily in practical laboratory settings, therefore it is crucial to know what the most important skills and competencies for new graduates of these programs should be from the vantage point of the working laboratory professional and the administrators who hire and supervise them. Perspectives of experienced online CLS educators add important information regarding preparedness of online graduates for the workplace, and are advantageous for CLS educators in new online education program development, and the improvement of the design of existing online programs. More information is needed regarding perspectives of online education from laboratory administrators, online CLS graduates, as well as educators in the field. With information from this study, laboratory administrators will have more information to utilize in hiring decisions of online graduates for the workplace. Findings from this study also provide important information for CLS higher education administrators guiding and directing online programs. The laboratory professionals in

affiliated hospitals of educational programs work closely with CLS higher education administrators, and their experiences and insights into what is important for graduates to be able to do or know upon graduation is vital. This includes graduates from the large number of online programs that are surfacing across the country.

## **CHAPTER TWO: REVIEW OF THE LITERATURE**

Scholarly literature related to workplace preparedness of graduates of online programs is very limited, especially related to clinical laboratory sciences (CLS). It is important to understand how significantly online education has grown in recent years in higher education, and how well it has been received in certain educational programs. Business programs have experienced a surge of online education, and the business industry has in many respects encouraged the growth of such programs. In healthcare fields related to CLS, such as nursing, there has been a growth in online education, and there are mixed perceptions regarding quality and effectiveness. Most research on perceptions of online education in higher education is related to faculty perspectives, with very limited literature pertaining to student perceptions, or how workplace professionals view online education, or how online graduates perform on the job. CLS online programs have also grown, and there are studies regarding faculty perspectives and quality related to test scores that will be examined in this section; however, no research pertaining to the level of preparedness for the workplace that online education provides CLS graduates is available at this time.

### **Growth of Online Higher Education**

Online delivery has become an increasingly common format for higher education, and future growth in online education is predicted. In 2000, there were more than 1.6 million students enrolled in more than 54,000 online courses, and it was estimated that by 2003, online education would grow from a \$350 million to a \$2 billion industry (McGorry, 2003). A survey conducted by Kim and Bonk (2006) of 562 college faculty and administrators showed that most respondents believed that online education at their institutions would grow substantially for certification and recertification programs as well as associate degrees, and grow some for

master's and doctorate programs. In addition, Kim and Bonk's survey findings showed that around half of the participants' higher education institutions already provided online master's and doctorate programs, and the other half of the participants predicted that their institutions would begin to offer online master's and doctorate programs in the future.

There are a variety of reasons for this increase in online course delivery. Students who have disabilities, and those located in rural settings with limited access to higher education have stimulated an increase in development of online courses by university faculty (Maddux, 2004). Further, there are access issues with medical education in rural areas, including the distance to education facilities and decreased availability of medical content that is current (Sargeant, 2005). Online education provides opportunities for students in certain situations to obtain education, who otherwise may not have, such as those not only with disabilities, but also family, and job commitments (Brooks, 2009). Additionally, the poor national economy and rising costs of transportation are also factors that are promoting more students to choose online education (Allen & Seaman, 2008).

The technological age in which we live influences the learning preferences of students who are currently enrolled in colleges and universities, and their increased interest in online education. Many students enrolled in colleges and universities now have grown up using the Internet and technology, therefore are more comfortable with it, and may actually excel in an online course more than in a traditional face-to-face course (Brooks, 2009). The Net Generation refers to individuals born between 1982 and 1991 who have grown up with technology usage and have become accustomed to incorporating it into their lives (Sandars & Morrison, 2007). Sandars and Morrison (2007) suggested that the Net Generation is more comfortable with technology use in the classroom, and prefer to learn by being actively involved in the learning process rather

than through reading and study. They conducted a survey of first semester undergraduate students regarding three forms of Information and Communication Technology (ICT) including Internet chat rooms, blogs, and wikis. The results of the survey were favorable towards all three forms, with over half of respondents in support of the use of these technology tools in their classrooms. Sandars and Morrison (2007) suggested that the results of this survey could influence the way educators conduct activities in the classroom, with more usage of technology and active learning activities, and recommend that a combination of technology and traditional methods be utilized.

### **Online Course Effectiveness**

There are a multitude of factors that go into making an effective, quality online course. There is some research related to faculty and student perspectives of online education, with greater emphasis on faculty views. Issues with online education such as concerns for adequate faculty preparation for teaching online, increases in student cheating and loss of control in the online classroom, and individual faculty views on student success in the online classroom have been researched and will be discussed here.

#### ***Instructor Issues and the Online Classroom***

Having well- prepared faculty who understand the differences between online and face-to-face teaching and are prepared for the online environment, as well as providing good student and technical support and contact information in the event of problems or issues, is important to an effective online course (Gaide, 2004). However, with a greater demand for online courses to be developed, many faculty members are not prepared technologically to develop such courses and have not received adequate training from their institutions on how to do so (Maddux, 2004). Based on a case study of faculty members of an online master's program, Brown (1998) found

that online courses require more instructor time than traditional face-to-face courses, due to students interacting more with faculty members online than they would in the traditional classroom setting, and receiving more individualized responses from faculty. Brown (1998) also found that students require more validation from instructors in online courses because they are not receiving the nonverbal signals and traditional classroom casual feedback from instructors. Further, Maddux (2004) identified other areas of concern for faculty, such as ownership of online course materials, and ensuring that accreditation agencies develop criteria to make sure that quality online courses are developed. Maddux also suggested it is important that courses be evaluated to determine which would be best represented by full online, or partial online with technological enhancements.

### ***Prevalence of Cheating and Instructor Loss of Control in the Online Classroom***

Faculty members have differing assessments of online education, particularly regarding incidents of cheating and loss of instructor control. Based on empirical findings, Brooks (2009) discussed colleagues' and her own views of online education, saying that some believe there is a higher likelihood of cheating compared with traditional education. Others believe that if students are going to cheat they will find ways to do so in traditional courses as well and that online instructors should be tuned in to possible plagiarism or cheating through close evaluation of student responses in assignments and exams. Brooks argues that the focus should be on teaching students the importance of ethical decision-making in all aspects of education, whether traditional or online, and that effective instructors can recognize forms of student dishonesty in the online classroom.

With online education, instructors often do not have as much control over what resources students use in the virtual classroom, compared with the traditional classroom, which can lead to

instances of academic dishonesty. Based on an interview with a faculty member teaching online, Lorenzetti (2005) argued that the effectiveness of online learning is becoming more important, since the control of the classroom that instructors once had with face-to-face students is no longer there, and there is little control over the environment in which a student learns or takes exams, unlike the traditional classroom. Further, the faculty interviewee suggested that in an attempt to regain some control of the online classroom, there should be a variety of learning experiences offered for students. Examples of such learning experiences identified by the faculty respondent were portfolio assignments, assignments that require students to be able to think and problem solve, and also interaction opportunities with fellow classmates and the instructor in each online course. In addition, the faculty member suggested offering synchronous sessions, where students can arrange a time to contact the professor in real time about an assignment, or use a chat room format as an effective strategy for teaching online, as well as giving students a well-structured assignment in which they must read and understand concepts first before they can complete the assignments (Lorenzetti, 2005).

### ***Student Success in the Online Classroom***

Student success in the online classroom is also a concern for educators. One area of concern involves student characteristics that contribute to their success in the online classroom. From a review of literature of online higher education, Desai, Hart, and Richards (2008) found that success in online courses is dependent on a high level of student discipline, and also increased interaction between students and faculty compared with the traditional classroom. Brown (1998) identifies qualities possessed by the most successful online student as capabilities for independent learning, good time management, and superb verbal skills. From a review of literature related to information and communication technologies (ICTs), Sargeant (2005)

indicated that a criticism of online course design is that there is a tendency to focus more on the technology than on the students and educators, which can reduce the learning of course content. Sargeant also noted other factors that must be considered with online education and the student, such as sources of support, prior experiences of the student, and access to necessary resources that can influence success in an online course.

Course design and institutional factors are also concerns related to student success in the online classroom. There is not much information about evaluation of online courses and what an effective course should be composed of, however, in a survey of students in a part-time MBA program that is 90% online, McGorry (2003) identified factors that are important in order to be evaluated as a quality online course. These include flexibility, responsiveness and student support, self-reported (perceived) learning, interaction and participation in learning, perceived usefulness and ease of use of technology, technical support, and student satisfaction. Desai et al. (2008) review of literature regarding online education suggested that there should be good online course design to ensure instructor to student two-way communication, to discourage student isolation in an online course, and that there should be more emphasis on resources available for student learning. Based on interviews with Faye Lesht, head of Academic Outreach, and Najmuddin Shaik, research programmer, both of the Office of Continuing Education at the University of Illinois at Urbana-Champaign, Gaide (2004) identified best practices for helping students to complete online degree programs. One practice is developing an online program design to include synchronous sessions that students can access at a later time, which would decrease the likelihood of isolation, and encourage more group participation. Using cohort groups and facilitating students in team-based projects are also encouraged; many have difficulties working as groups on projects and may need guidance from instructors on the best

approaches to successful practices in this area. Student access issues are also mentioned, such as good access to library resources and needed online course content, which is maintained well and includes appropriate content links.

Based on reflective conversations with educators of occupational therapy online education program, Boerema, Stanley, and Westhorp (2007) reported two major findings regarding student success in the online classroom—the importance of arousing of student interest and concerns over large online class sizes. First, educators interviewed in this study believe that arousing student interest in the online classroom is key to success; therefore, invoking student curiosity is a primary factor in designing course content for the online course. In the program Boerema et al. (2007) study, the course content was designed to invoke student curiosity and help students become more involved in their own learning processes. Also, activities were designed to be relevant to practical applications, which involved developing case studies based on real situations in the clinical setting. Collaboration was also incorporated into course design to encourage students to interact with each other and provide peer feedback, with the notion that peer feedback was as beneficial as feedback from an instructor or tutor, and helps students to develop critical thinking skills.

A second finding of the Boerema et al. (2007) study related to online class sizes. The study suggested that students should be broken into small groups for discussions in order for the instructor to provide adequate feedback. This enabled instructors to better monitor online discussions at various times of the day and evening. Additionally, effectively managing electronic submission of assignments requiring instructor feedback was a concern with larger student groups; educators spent more time printing and grading electronic submissions for online courses.

## **Online Education in Business and Healthcare Fields**

Online education has become a popular form of course delivery in areas of business and in healthcare fields. Both business and healthcare fields share a commonality, in that both program areas must adhere to professional standards, external to university standards for program accreditation, which can be extensive. To meet these accreditation standards, programs must design online programs in such a way that will fulfill stated accreditation criteria. For these reasons, an examination of literature regarding online programs in business is included. Nursing is an allied health field that is similar in structure to clinical laboratory science, therefore, a closer examination of online education in nursing will follow. There is limited prior research regarding online education in clinical laboratory science, however several relevant sources are discussed following the section pertaining to online education in nursing.

### ***Online Programs in Business***

Scholarship regarding online education in business is overall very favorable, and many benefits have been identified. Online education is attractive to businesses because it has been shown to improve employee retention and overall job satisfaction and to provide employees with opportunities to pursue advanced degrees who otherwise would not have sought additional education through traditional means (Merriman, 2006). Further, Merriman cited some of the advantages for businesses to encourage utilization of online education for their employees as elevating the knowledge base of the workforce, better recruitment and retention, and more efficient use of money spent for education through more availability of tuition discounts with online programs. Partnerships between businesses and providers of online education have resulted in tuition discounts in some cases and these partnerships have also led to specifically designated online programs that meet the company's needs (Merriman, 2006). In addition,

online programs are a growing form of education for business as many individuals are seeking Master of Business Administration (MBA) degrees to remain competitive in the workforce (Hochberg, 2006). Based on a study of students who successfully completed an online business education course, Smith and Rupp (2004) identified benefits such as better writing skills due to everything being submitted through typing and writing on the computer. Also, there is more time to think and edit responses before submission. Another benefit of online education for business, according to Smith and Rupp, is that discrimination may be less in the virtual classroom because classmates are unable to “see” physical differences or disabilities. Smith and Rupp even suggested that incorporating more online learning into businesses is “strategic thinking” in an attempt to become more successful in student recruitment and increasing continuing education. Potential employees look favorably on companies that are willing to support pursuing advanced degrees through online education, which offers a more flexible option than traditional education, for those who have work and family commitments or have transportation issues due to living far from colleges or universities (Merriman, 2006). Furthermore, distance education appeals to employees of global businesses because of the similarities between the online format and the worldwide distribution of workforce, technology, and modes of communication, as well as the similarities between virtual groups working together in the online classroom and those who work together in global business (Hochberg, 2006).

Although many advantages have been identified regarding online education in business, some are still skeptical and have concerns. Whereas senior learning executives predict online education in the business field will continue to grow, 51% perceived online education as having less worth than traditional education; conversely, 49% felt that the degrees were equivalent (Trierweiler & Rivera, 2005). Many respondents in this study favored a mix of traditional and

online methods for the future of education in the business field (Trierweiler & Rivera, 2005). One participant who had earned a bachelor's degree several years earlier through a traditional institution initially had reservations about online education until he obtained his own master's degree that way, after which he had positive perceptions. This participant had good experiences with online professors who also ran businesses and used real-life business cases in the course. Overall, Trierweiler and Rivera's study found that the three factors most influential on participant views of an online business program are their views of its integrity, accreditation, and expense. Furthermore, although most participants' companies in this study spent more tuition dollars with traditional education, many are willing to invest more into online education if opportunities exist for partnership with online institutions for tuition discounts and customized educational programs tailored to meet industry needs.

In addition to accreditation standard similarities between healthcare fields and business, both fields are also applied. As is true in healthcare, the business field is one in which individuals must possess a high level of problem-solving skills in order to successfully handle real-life problems, therefore, education practices in the field should include opportunities for application-based activities, such as case-based learning (Lee, Lee, Liu, Bonk, & Magjuka, 2009). In a study of both students' and instructors' perceptions of case-based learning in an online MBA program, Lee et al. (2009) found that the online environment in a business course is perceived to provide an authentic format for evaluating cases in which students have access to real-time information and resources in order to work through problem solving, and that case-based learning in the business online environment is as valuable as in the traditional classroom if there is good course design.

### ***The Emergence of Online Education in Nursing***

The driving forces for emergence of online education in nursing are very similar to those in clinical laboratory science. As in clinical laboratory sciences, there is a shortage of highly skilled nurses in the United States, and nurses who possess advanced degrees such as a bachelor's or master's have more abilities for higher level thinking, which has been shown to result in decreased patient mortality (Smith et al., 2009). Due to this phenomenon, an increased number of associate degree prepared nurses are deciding to continue their education to the bachelor degree or higher while in the workplace, and have a need for flexibility in education options. As a result, many online nursing programs emerged across the country (Smith et al., 2009). Access issues are a concern for nurses pursuing additional education due to shift work, family commitments, and distance from educational institutions (Atack & Rankin, 2002). Drexel University in Philadelphia, PA developed an online RN to BSN program based on access issues with the majority of working RNs. Many work full-time while having family obligations and could not meet the traditional course requirements for travel to campus and restricted class time offerings (Cornelius & Glasgow, 2007).

### ***Nursing Perspectives of Appropriate Teaching Methods in Online Education***

Given the aforementioned issues which have influenced the growth of online education in nursing, there have been some questions as to whether the online format is well-suited for nursing education. For example, a 1999 White Paper on Distance Technology in Nursing Education questioned whether or not online education was appropriate for a practice-based field such as nursing, in which the "human" element is crucial (Christianson et al., 2002). In a study by Smith et al. (2008), online teaching styles of different academic disciplines were examined, and more specifically, the online tools utilized, such as chat, assessments, and discussions, over a

five year period at a major metropolitan university across disciplines. Disciplines were classified as “hard” or “soft,” hard disciplines pertaining to field such as mathematics and natural sciences such as chemistry, and “soft” relating to social sciences. Hard courses used more test and pool online tools, whereas soft or more applied courses utilized more document, or writing tools. Nursing was categorized as a “soft-applied” field, in which information taught is to be applied to the human element, which requires students to be able to think critically and make decisions dependent on the specific human, or patient, situations encountered. Because nursing involves this applied element, online course design must take this into account, and appropriate activities should be included in online course development accordingly (Smith, Heindel, & Torres-Ayala, 2008). Based on examination of an online nursing program at Drexel University, Cornelius and Glasgow (2007) argue that nursing is a clinical-based field, therefore, online courses need to be interactive and allow students to demonstrate their abilities to react appropriately in real-life patient case scenarios. To facilitate this, Cornelius and Glasgow (2007) offered effective methods utilized by Drexel University such as synchronous discussion and discussion boards, wikis and blogs, and case-based learning activities coupled with methods traditionally used in the classroom. Based on a qualitative study of perceptions of instructors who taught at least one online nursing course and instructional designers of such courses, Smith et al. (2009) argued that nursing faculty have concerns about appropriate methods in online courses that could be utilized to assess students’ practical skills. The study found that nursing faculty had concerns regarding authenticity of online courses, specifically, online nursing courses being too heavy in theory content, and lacking in application components for real nursing scenarios. Additionally, a specific example of a medical scenario that the nursing faculty had concerns about pertained to cultural differences in dealing with medical situations, and how best to teach nursing students

“psycho-social” skills to deal with such scenarios in online courses. Further, faculty in the study believed that in addition to scientific theory content, there needs to be an interactive way to assess how students deal with real-life nursing scenarios. Moreover, the study revealed that some faculty believed one way of keeping the human element present in online courses was to have students working together in online classes in groups and participating in synchronous discussion sessions.

There are recommendations from nursing faculty for best methods for design of didactic content in online nursing programs to best address the practice-based aspects of nursing education. In a study of 171 nursing faculty who were teaching online courses, findings showed that most faculty believe online courses need to have a very structured design, with instructions for assignments and expectations clearly defined for students (Christianson et al., 2002). Nursing faculty in the Christianson et al. (2002) study also identified the most preferred methods for assessment in the online classroom as writing assignments and project-based assignments instead of objective examinations, due to the increased difficulty in designing objective exams for online courses and the increased possibility of cheating on exams. Although some faculty expressed concerns regarding utilizing examinations as an assessment in online learning, others in the Smith et al. (2009) study believed that online examinations are good preparation for future online nursing certification examinations. In addition, participants in this study noted that “mature” students—those students who have greater standards of honesty and truthfulness—handled online exams the best.

### ***The Transition to Teaching Nursing Education Online***

Shifting from teaching in the face-to-face classroom to teaching online has meant some significant changes for nursing faculty. A qualitative study of graduate nursing program faculty

perspectives regarding transitioning from a classroom to online format included 12 nursing faculty, most of whom had not taught online in the past (Johnson, 2008). In Johnson's study, findings showed that as faculty members began teaching in the online format, they admitted that they would need to change their philosophy of teaching and their approach in the online classroom, by becoming more inquisitive of students in the online environment to stimulate discussion in order to gain a sense of student understanding of content, rather than relying on traditional classroom lecture to deliver course content (Johnson, 2008). Faculty also admitted that time management is different with online courses; there is definitely more time involved in preparation in the beginning when setting up the online course compared with a traditional course. Faculty members in this study suggested that faculty new to online teaching should seek out a faculty member who has developed and taught online courses in the past as a mentor (Johnson, 2008).

A few studies reveal that nursing faculty have mixed views of teaching online, and have changed their views with increased online teaching experience. In Johnson's (2008) study, concerns over losing traditional lecture instruction and other traditional teaching methods that had been used for years previously were expressed by a faculty member. However, with more experience gained in the online environment, the faculty member realized that alternate, effective, online methods could be utilized by becoming more innovative. Additionally, Johnson's findings showed that faculty personalities influence views of teaching online; introverted faculty appeared to favor more online teaching, where extroverted faculty preferred not to teach online courses exclusively. Some faculty in Johnson's study missed the in-person contact with students, but realized they were experiencing more in-depth discussion in the online classroom. Finally, faculty perceived that students in online courses have to take more personal

responsibility for their learning, and most believed that the online environment fosters an appropriate environment for critical thinking and a greater level of student participation (Johnson, 2008). In the Christianson et al. (2002) study, a majority of faculty surveyed preferred teaching online to the traditional classroom and believed they had more flexibility in instructional strategies in the online environment. Additionally, most faculty surveyed had positive experiences and success with teaching online, although in many cases they also noted they did not have adequate preparation time to develop courses. Other faculty who at first did not think that online teaching was well-suited for their courses later believed that online is a good format for course delivery, and that the online course experience they had was “falling above their expectations” (Christianson et al., 2002). The findings of the Christianson et al. (2002) study were in support of online instruction in baccalaureate level nursing education; overall faculty perceived online instruction as positive and believed that students participated in highly interactive experiences.

### ***Nursing Practice-based Learning and Online Instruction***

How to handle clinical internships in nursing programs has been a concern in online programs. The National Organization of Nurse Practitioner Faculties (NONPF) Criteria for Evaluation of Nurse Practitioner Programs specifies that supervision of student clinical internships is acceptable either through direct or indirect means, meaning that students can be supervised by nursing faculty or through preceptors within health care institutions (Johnson, 2008). In a study of perceptions and utilization of online learning among nursing and midwifery faculty, there are views expressed regarding utilization of online learning in practice-based courses. Some believe the actual face-to-face skills should be included with real-life scenarios, and that simulated virtual experiences are not the same; the element of “caring” present in

nursing does not exist (Blake, 2009). Some of the academic nursing staff had concerns regarding how well suited online learning is for practice-based learning in nursing; Blake (2009) suggested that these concerns may be due to the staff's lack of experience with online education. Some respondents in the Christianson et al. (2002) study believed that practical hands-on skills are best taught through face-to-face activities. Some faculty in Johnson's (2008) qualitative study of nursing faculty perceptions of teaching online believed that they had lost some control of the classroom due to nursing students' being taught clinical components by preceptors rather than nursing faculty. In contrast, in the same study, regarding relinquishing the clinical practice teaching to preceptors, a nursing faculty made the statement, "I am delighted to not have the sense that somehow I am responsible for delivery of specific content. I am delighted to give that up. I don't feel a sense of loss in any sense of the word" (Johnson, 2008, p. 20).

### ***Student Experiences in Online Nursing***

Most research regarding online education in nursing is focused on nursing faculty perspectives; there is very limited research examining students' perspectives. One Australian study involved 21 students who were interviewed regarding their experiences in an online health informatics course as part of a nursing curriculum (Kenny, 2002). At the beginning of their online course, many of the students in this study expressed feelings of anxiety over using a computer, and many of them had limited computer skills. After the completion of the online course, many students reported that their self-assurance with computer usage had increased. Further, students in the study enjoyed the greater accessibility to their courses through being able to log in at times convenient for them, and also used terms such as "addictive" to describe their experiences with interacting with other members of the online classroom (Kenny, 2002). Students also reported that they had a high degree of active learning in the online course, and

knew the names of all the students in the class; they also described their experience with the instructor as “working together” rather than a traditional student to lecturer relationship (Kenny, 2002).

Overall, scholarship regarding online education in nursing revealed favorable attitudes and outcomes. Online learning provides health care students more opportunities for education in situations where they cannot leave the workplace to attend classes (Blake, 2009). Further, professionals in health care are expected to keep current in their respective fields through continuing education, and there is evidence to show that online formats are acceptable to help meet this goal. A study by Coose (2010) involved a survey of nursing students, over three years between 2005-2007, in the last year of an associate degree nursing program at the University of Alaska Anchorage. The study involved 71 on-campus students and 94 distance education students, in which the didactic component of education was delivered through technology methods. The Coose (2010) study revealed that distance students perceive more benefits from their education method than the on campus students, citing mainly convenience of location and an increase in their computer competency through taking courses. On campus and distance students in the Coose (2010) study showed no significant differences in examination pass rates for nursing. Despite the overall favorable perception of online education in nursing education, there is not literature that addresses how well prepared online nursing graduates are for the workforce, and how fellow nursing employees view their preparedness and skill level. Coose (2010) suggested that there should be additional studies in nursing education to assess whether a difference in job performance exists based on method of nursing education delivery, and whether distance and on-campus nursing graduates perform at the same level on the job. The following

section discusses research directly related to clinical laboratory science, in which there are some similar findings.

### **Online Education in Clinical Laboratory Sciences**

In an attempt to recruit more students, clinical laboratory sciences programs across the country are beginning to offer online elements. Hospitals now are less willing to accept students into clinical rotations, primarily because of low staffing. Online programs help to alleviate some of these student clinical rotation placement challenges by allowing working students to fulfill these required clinical experiences within the hospital laboratories in which they work (Hansen-Suchy, 2011). In addition, many in the CLS workforce are beginning to retire, leaving a shortage, and laboratory administrators have turned to educators of potential CLS graduates to offer solutions. This, in turn, has also led to an increase in online degree programs (Simonian, 2007). Research regarding online education in clinical laboratory science is very limited. For the most part, published literature on online education relates to perspectives of CLS educators, and refers back to general literature about online learning. Some of the specific concerns that CLS educators have raised are cheating on examinations and assignments, online formats being matched appropriately to CLS content, and competency of graduates of online programs based on outcome measures such as certification examination scores and grade point average (GPA). In studies that have been conducted, there have been recommendations for additional studies of online programs in clinical laboratory science.

#### ***Cheating on Examinations and Assignments***

As previously discussed with concerns in general with online education formats, the increase in online degree programs in CLS has raised the issue of student cheating. Conway-Klaassen and Keil (2010) discussed a case within a CLS education program in which a group of

students were suspected of working together in a group on online exams. Students who were confronted regarding the alleged academic dishonesty, were made aware of the university sanctions related to their actions, were encouraged to be accountable for actions, and to essentially confess to the instances in which this had occurred. At first, students did not think that working as a group on online exams was a problem, however, faculty discussed how their superior scores on exams did not match their individual inability to adequately discuss the same topics, and most of these students began to understand the gravity of the situation. Some students were dismissed from the program permanently with academic dishonesty documented on their transcripts. The department policies were updated as a result of this incident to include more specific guidelines for academic dishonesty. Remaining students in the program were interviewed after the new guidelines were put into place and many had never realized some activities they had taken part in before, or had thought about taking part in with online courses, were considered cheating. As a result of this case, online test formats were changed to minimize dishonesty. There included randomizing test question sets so that all students get slightly different test questions, reducing time limits for testing, displaying one question at a time instead of the entire test with no ability to go back and review previous questions, and test grades released after all student tests were complete. Conway-Klaassen and Keil (2010) suggested that the majority of students in classrooms today who have been brought up in a very technological world may have a vastly different perception of appropriate use of online or internet-based resources, and it is up to academic institutions to set specific written guidelines for such use in CLS programs.

### ***Online Formats for Clinical Laboratory Science Education***

An increasing number of CLS faculty are using a mix of online elements and traditional methods, in what are known as blended or hybrid courses. Research shows that online instruction can be just as valuable as traditional, and further that “blended” instruction can be more effective than traditional courses, largely due to the increased time and student participation that may be required in such courses (McCown, 2010). From a review of literature regarding blended courses, CLS educator McCown (2010) concluded that most courses in the clinical laboratory sciences were better suited for a blended format rather than entirely online because of the in-person laboratory experiences in the curriculum. However the author also said that clinical rotations courses could be enhanced utilizing a blended format to better facilitate communication and access to needed resources between students, faculty, and clinical instructors. Additionally, McCown (2010) identified the most common challenges for blended courses, which included increased time spent by both instructors and students, which can be beneficial if students are learning more with increased time commitment, lack of technological support for faculty, and student difficulty in navigation through online course modules. The author also concluded that self-directed learning activities, often included in online courses, help students take more responsibility for their own learning and also help to motivate non-traditional students. Further, McCown (2010) reported that students in her CLS program posted journal reflections weekly as part of clinical rotation experiences, discussing these experiences through articulation which benefits the student, faculty, and clinical instructors.

## *Assessment of Student Competency and Job Preparedness in Online Clinical Laboratory Science Programs*

There have been a few studies conducted within the field of CLS to assess whether graduates of online programs are as academically well-prepared as their on-campus counterparts, mainly based on test score and GPA outcomes comparisons. Hansen-Suchy (2011) compared certification examination scores of on campus and online associate degree Medical Laboratory Technology (MLT) students between 2004-2006 and 2007-2009. On campus students in the 2004-2006 group scored slightly higher than online students, and the 2007-2009 group had the same outcome; however, with the latter group, the results of the study showed no significant difference between the scores of the two groups. Additional demographic information was also factored into the study and showed that most of the online students were older and had more laboratory experience than the on-campus group. Hansen-Suchy concluded that online students were just as prepared for the workforce as on-campus students.

A survey given to faculty members of seven CLS programs across the country by Campbell (2003) showed that a slight majority of respondents believed that online students performed better on certification exams than on-campus students, perhaps because the online student is usually older and has more laboratory related experience as compared to the on average younger and less experienced on-campus student. Three of seven programs responded that their online students performed better on the certification examination, and four of the seven stated that online graduates were just as employable as on-campus graduates. A limitation of the Campbell study was that the programs surveyed were still very new to online education and were only in the beginning year or two of offering such programs. As a result, it was recommended to follow up the study in a few years to include more graduates.

Additionally, a study by Russell et al. (2007) compared online students from a bachelor's degree Medical Laboratory Science (MLS) program designed to accept those students who already had an associate degree in MLT to an on-campus MLS program, in which students were not initially MLTs, which was cited as a limitation. In Russell's study, overall GPA and certification examination scores were compared between the two groups and there were no significant differences between the outcomes of the two; the online students actually slightly out-scored the on-campus students in one category of the certification examination. The online students were on average older than the on-campus group.

Both the Russell et al. (2007) and Hansen-Suchy (2011) studies showed that distance CLS graduates were just as prepared academically as on-campus CLS graduates, and both researchers stated that studies such as these could help to increase the confidence of laboratory professionals such as laboratory directors, accrediting agencies and educators that online CLS programs can provide quality education. However, both Russell et al. and Hansen-Suchy recommended that additional research involving multiple educational programs across the country be conducted to further support this claim.

In an effort to gain the perspectives of laboratory administrators, educators, and recent online graduates on how well students from online CLS programs are prepared for the workplace, the current study involved participants from four hospital cases, which employed online and on-campus CLS graduates at both the MLT and MLS levels. This study adds to the limited body of knowledge on preparedness of online CLS graduates for the workplace. Further it provides laboratory professionals with information to make informed decisions regarding hiring practices of such graduates and higher education administrators with information about how their graduates are perceived in the workplace.

## CHAPTER THREE: METHODS

Online education in clinical laboratory sciences (CLS) has increased in recent years, providing students with opportunities for degree advancement in the field that otherwise would not have pursued degrees due to work commitments and travel barriers (Simonian, 2007). National registry examination scores and GPAs of online graduates and examination pass rates of online graduates are at least equivalent to those of traditional graduates (Hansen-Suchy, 2011; Russell et al. 2007), however, this may not always predict how well graduates will perform on the job. From initial pilot work, there were mixed perceptions from participants regarding quality of online education and the level of preparedness that such programs offer new graduates for the workplace. This study adds to the body of knowledge regarding preparedness of online CLS graduates, by addressing the following research questions:

1. How do laboratory administrators and educators perceive the workplace preparedness of new online CLS graduates?
2. How do laboratory administrators and educators perceive job performance of new online CLS graduates?
3. How do new online graduates perceive their level of preparedness for the workplace?

Using information gained from this study, laboratory administrators can make better decisions regarding hiring practices of graduates of online programs versus traditional graduates, and CLS higher education leaders of online programs and accrediting agencies will have additional information regarding how well their online graduates are performing, aiding in effective program design and development.

## **Research Design**

This was a multi-site case study involving four hospital laboratory cases that each have a mix of online and traditional CLS graduates of Medical Laboratory Technology (MLT) and Medical Laboratory Science or Medical Technology (MLS/MT) programs. A multi-site case study involves two or more settings or depositories of documents or data (Bogdan & Biklen, 2007). Yin (1989) states that multi-site case studies are regarded as more “robust” and overall, more convincing than single-case study design. Therefore, for this particular phenomenon of perceptions of job preparedness that online education provides, a study of multiple hospital laboratory sites was used. In order to gain a stronger sense of how hospital laboratory administrators, supervisors, and recent online graduates perceive the preparedness for the workplace that online CLS education provides, the study was conducted in four hospital cases, and data collected were analyzed both within and across cases. Bogdan and Biklen (2007) suggested when selecting additional cases for comparative case study, selections should be based on the presence or absence of a specific attribute of the study. In this study, hospitals with similar characteristics were chosen. All four of them employed both online and traditional graduates in their laboratories, and laboratory managers and section supervisors in all four had experience working with both types of CLS graduates, and thus were able to share insights regarding their preparedness. Replication in multi-site case studies is also essential, in that cases should be chosen that are likely to produce similar findings, meaning if results are different, there is an anticipated reason or explanation (Yin, 1989). In the cases chosen for this study, each hospital case was composed of the same hierarchy of laboratory personnel, who had similar experiences with online graduates and whose perceptions were influenced by similar variables.

## Sampling

Given the purposeful focus on hospitals that employ both traditional and online CLS graduates, I searched the National Accrediting Agency for Clinical Laboratory Science (NAACLS) website to identify online CLS programs for both the MLT and MLS levels. From the directory of online CLS programs on the NAACLS website, online programs of both types were identified. In light of personal travel and budget constraints with this study, programs were identified on the east coast, and within a reasonable driving distance. An online MLT program out-of-state was located, and also a traditional MLT program, which are about an hour drive from each other. Given that these programs were so close in proximity, there were hospitals near each of them that employed graduates from both institutions, or at least both online and traditional graduates generally. With the same idea in mind, an out-of-area online MLS program and a traditional MLS program also within the same town were identified. One limitation of comparison of the MLS programs is that the online program is entirely college-based, meaning that all instruction and courses are offered through the university, whereas the traditional MLS program had courses offered both on campus, and also taught at a hospital. The MLS traditional program was affiliated with seven different universities, all of which the first three years of general studies coursework is taken on campus, and then a twelve month internship is completed at a teaching hospital; the coursework specific for MLS is taught at the teaching hospital. All CLS programs identified for this study were NAACLS accredited programs, meaning they all must meet the same accreditation standards regardless of where and how courses are taught for each program. These settings were chosen because they were removed from my own geographic location, removing any pre-established relationships or conflicting roles that could potentially influence the research. Glesne (2011) cautioned about choosing a site for research that is very

familiar, where there are already established relationships and expectations between the researcher and participants that could enter in as bias. This type of “backyard” research can present confusion in the research setting, which can affect data collection and analysis.

It is important when beginning a research study to determine how to gain access to desired research sites, and to identify the “gatekeepers,” or persons who give the permission to begin research in a site, and there can be several types and layers of these (Glesne, 2011). I made initial contact with the program directors of each online MLT and MLS program by sending a brief email to the director of each of them explaining the general purpose of my study, and saying that I would like to follow up with a phone call to discuss more details. Bogdan and Biklen (2007) discussed the importance of using an overt approach when initiating research, which involves open disclosure of research interests to participants when requesting cooperation in the research process. Further, Bogdan and Biklen (2007) recommended keeping open communication with everyone involved in the research study to ensure better access, and ultimately better data collection. The purpose of contacting the directors of each program was to solicit their help in identifying hospitals in their general location that employed many of their graduates, and also ask for some assistance in gaining access to the hospital laboratory managers, since the educational program directors knew them well, and had well-established relationships.

### ***Site and Participant Selection***

I identified two hospitals in the vicinity of the online and traditional MLT and MLS programs. The hospital cases identified were mid- to large-sized institutions, because they had adequate levels of laboratory management, and therefore, more individuals to interview for the study. I utilized purposeful sampling and selection of information rich subjects who provided insight into the particular phenomenon of interest in this study (Patton, 2002). Careful selection

of participants and settings that will lead to answering research questions of the study is most important in qualitative research (Maxwell, 2005). Furthermore, Maxwell states that a goal of purposeful sampling is to choose participants that will be information-rich, but will also represent variations of the population in the study, to ensure broader, in-depth data collection.

In determining variations of the population in my study, within most hospital laboratories, there is normally a standard laboratory administration hierarchy. Most laboratories have a laboratory manager, who oversees all laboratory operations. Additionally, there are section supervisors who manage individual sections and work specific to those sections. The laboratory managers normally conduct performance evaluations on employees within the laboratory, and sometimes enlist the input of section supervisors, who in many cases work in closer proximity on a daily basis with employees. It was preferable that both the lab managers and supervisors be interviewed regarding perceptions of preparedness of online graduates for work in their hospitals to gain perspectives at each level of management. In addition, online graduates who worked in these hospitals were interviewed to gain their perspectives on their level of preparedness for the laboratory workplace. Individual interviews, rather than focus group interviews, were conducted with online graduates because there were only one to three online graduates in each hospital case. Finally, higher education administrators at the two identified feeder institutions were interviewed regarding their perspectives of preparedness of their online graduates for the workplace. The two feeder institutions identified included one at the online MLT-level, and one at the online MLS-level, nearby to the hospital cases.

### ***Research Relationships***

In each of the hospital cases that were chosen for interviewing, I did not have prior relationships with participants, so rapport had to be established, as well as a good working

relationship with each. According to Glesne (2011), a relationship of trust needs to be developed with participants of a qualitative research study in order to encourage “comfortable” exchange of information. To begin establishing a relationship with participants, higher education CLS administrators who had an existing working relationship with laboratory managers of each hospital case were contacted, and then contact was made with each laboratory manager to discuss the purpose of the study and research interests. As part of discussions with laboratory managers in each hospital case, an interview schedule was created that worked within the laboratory’s time constraints and workflow.

### **Data Collection**

Once the education administrators of the online MLT and MLS programs were contacted, hospitals in which interviewing was conducted were identified, and their approval to proceed with this study was obtained. At this time, IRB approval was initiated to begin the data collection process. IRB documentation, including the informed consent form and approval letter are included in Appendix A. Once IRB approval was obtained for the study, initial email letters explaining the purpose of the study were sent to the laboratory manager of each hospital. In the letters, Glesne’s (2011) recommendations were followed. I included key elements in the research summary that clearly explained the purpose of the study. These elements included clearly identifying myself and what the study would be, why the study had been chosen, and why the particular participants and site were chosen. Following the advice of Glesne, I also provided an explanation of how the results of the study would be utilized, along with assurance of confidentiality at all points in the research process. In addition, information about how many interviews and the length of each, as well as permission to audio record sessions was included in the research summary. This letter explained that between three to four interviews, which would

last approximately one hour each, would be conducted per hospital case. A copy of the letter sent to each laboratory manager is included in Appendix B. The request for a follow-up phone call to discuss details of setting up interview dates and times was included in the initial letter, as well as my intention to work closely with the laboratory managers to schedule interviews at times that were most convenient and non-intrusive to work-flow, which is a key element identified by Bogdan and Biklen (2007). The same letter and process was also followed to request interviews with CLS higher education administrators from identified feeder institutions for this study.

### ***Interviews***

Once laboratory managers in each case were contacted and permission was given to conduct interviews in each hospital laboratory, I conducted interviews with the laboratory manager, and at least two to three section supervisors of each laboratory. Interviews with graduates of an online CLS program who were working at each hospital laboratory were also conducted. Additionally, interviews with two higher education program directors, one MLT-level and one MLS-level, for online programs were conducted. Ethnographic interviews with an open-ended interview question format were utilized. Spradley (1979) defined an ethnographic interview as a particular “speech event” that has three distinctive components, including a particular purpose, explanations, and specific types of questions, yet is very similar to a friendly conversation. During the interviews for this study, it was made clear from the beginning what the purpose of the interview was and what information was desired from the participant. In addition, an explanation was given on the need to record the conversation. A semi-structured interview guide was utilized during this process. Glesne (2011) defined a semi-structured interview guide as one in which the questions have a specific focus, but they are open and can

lead into other more probing questions to gain more information or insight into another desired topic of interest. Probing questions such as “explain that more?” or “how so?” were used to follow up with questions and to signal that more information was sought from the participant. Glesne (2011) stated that open-ended interviewing leads to more in-depth understanding of the particular phenomena being studied, and in this study, this approach was used to gain full understanding of how participants perceived the workplace preparedness of new CLS online graduates. Maxwell (2005) recommended pilot testing interview guide questions on individuals similar to participants who will be in the study to see if they are effective at gaining the information sought. For this study, pilot work was conducted utilizing the interview guide intended for this study, and revisions were made based on responses received during this process. Examples of interview guides used for this study are included in Appendix C—one for the laboratory managers and supervisors, and one for graduates of online CLS programs.

The interviewing process for each hospital case took one to two days. Each interview lasted approximately one hour, and interviews were scheduled by working closely with the laboratory manager in order to choose the best times that fit most appropriately with the workflow. Because multiple interviews were conducted in each hospital case, and multiple interviews conducted per day, I was aware of the possibility of becoming fatigued during the interview, and made efforts to remain focused and clear throughout each interview. Rubin and Rubin (2005) recommended establishing a “conversational partnership” with participants, in which the exchange between interviewer and participants is optimal to achieve research goals. In this partnership, how the interviewer acts during the interview process can have a substantial effect on the outcomes of the information obtained. Further, Rubin and Rubin suggested that the interviewer be relaxed, which can put participants more at ease, and lead to more in-depth

conversation. Strategies such as practicing relaxation techniques before and in between interviews were recommended, as well as being aware of interviewer personality characteristics that could influence interview outcomes, such as showing interest and empathy towards participants (Rubin & Rubin, 2005). For the current study, interviews were scheduled in conjunction with the laboratory manager at times that were convenient, with every attempt made to take into account appropriate spacing of interview times and researcher personality traits that could possibly influence research outcomes.

### **Data Analysis**

Thematic analysis of the data generated through interviews was conducted. This involved identifying themes and patterns from the interview transcripts (Glesne, 2011). Since this was a multi-site case study, each hospital case was analyzed separately before proceeding to the next case. According to Yin (1989), multiple cases should be analyzed utilizing “pattern-matching,” meaning that patterns from each case are compared, and if similar patterns are observed between cases, this strengthens the study’s internal validity. In order to discover emerging themes in the data, open coding using key words or phrases to capture meaning or general themes was used initially with the interview data per case study. Data from fully transcribed interviews were coded and sorted into categories that had common themes. At that point of the data analysis process, the coding was very specific and many codes existed. Once data from a case were analyzed with open coding, a re-coding process took place, and coding categories were narrowed down to include broader themes, and data reduction and reorganization took place. Cross-case analysis of the data from four hospital cases was then performed and overall themes were determined. Additionally, observer comments, thoughts, or perceptions that I as the researcher had regarding phenomenon through the research process were recorded.

Glesne (2011) referred to observer comments as reflective memos that should be recorded throughout the research process to capture moments of clarity in understanding concepts and perceptions that the researcher has. In addition, Glesne stated these comments are essential to the data analysis process. Observer comments were also categorized into open coding categories initially. As I analyzed data from this study, it was important to take into account any issues that may have affected the validity and reliability of the results, which will be discussed in the following section.

### **Validity and Reliability**

It is important to be aware of validity and reliability issues that can affect the outcomes in qualitative research. Merriam (1995) defined internal validity as the results of the study being consistent with “reality,” or what is really happening. Further, Merriam referred to reality as something that is “constructed, multi-dimensional, and ever-changing,” and which each researcher may interpret differently. One strategy Merriam suggested for strengthening internal validity is triangulation, which has been discussed previously. Another strategy suggested by Merriam is awareness of researcher bias in relation to the phenomenon being studied. Maxwell (2005) also identified one validity threat as researcher bias—an element that could enter into the research process and influence results. It was important that I addressed my own researcher bias in relation to online CLS education, since I teach in such a program. Because I had feelings and beliefs regarding how well online education prepares graduates for the workplace, it was important that I entered into this data collection process with a clear, unbiased plan. In regard to interviewing, I was aware of my own bias as I asked questions, and because of this I asked questions on “both sides” of the issue, such as asking “what are the strengths of online programs,” and “what are the weaknesses of online programs.” Rubin and Rubin (2005)

cautioned researchers to be aware of personal bias during interviewing, and the notion to not follow up on questions that may not be congruent with researcher beliefs, and to be prepared before the interview process by formulating questions to counter any researcher bias. I also asked probing questions to gather more information from participants, and did not assume that I fully understood responses, therefore probed in depth into responses, regardless of whether or not I agreed with them, for further clarity.

Another threat to the internal validity of a qualitative study identified by Maxwell (2005) is reactivity, which is how the presence of the researcher in the research setting can have an effect on the findings of a study. Awareness of reactivity in this study was important, especially since the participants did not know me personally, and may have answered questions, or acted in particular ways, as a direct result of my presence. An example was that participants knew that I was a director of an online CLS program, therefore, when I asked how they felt about the preparedness that online education provides new graduates for the workplace, they in some instances, initially, answered positively just because it is what they thought I wanted them to tell me. In order to overcome this particular barrier, I asked both strength and weakness questions, and probed deeply for any areas in which I suspected participants were not fully disclosing their true beliefs. This involved being very aware of non-verbal signals and pauses that suggested the participant may have wanted to share more with me, but may not have been comfortable sharing because of who I am. I did not know these individuals personally, therefore, it took time initially to build rapport with them, in order for them to become comfortable with me, and openly share their responses to questions.

External validity in qualitative research relates to the ability of the “reader” or “consumer” of the research to apply concepts or results to other situations (Merriam, 1995). To

strengthen external validity, Merriam (1995) suggested providing a “thick description,” or complete accounts of information, from which readers can make decisions regarding how the particular phenomenon studied relates to similar phenomena, internal sampling variation, or multiple-site designs. For this study of laboratory professionals’ perceptions of the job preparedness of recent online graduates, these suggested strategies were utilized. Full descriptions of the details of my research settings and participants, the data collection process, and the process by which I analyzed the data are provided in following chapters. Modal comparisons have been made by discussing how the findings of this research can be applied in the field of clinical laboratory science. Different levels of laboratory management were interviewed, including directors and supervisors, as well as CLS higher education administrators, and recent online graduates themselves to provide sampling variation in the study. Furthermore, research was conducted in multiple hospital laboratory cases for a multi-site case study.

Reliability in qualitative research refers to how congruent the findings of the study are with the actual data collected (Merriam, 1995). To ensure that the results of a study are reliable, Merriam suggested strategies such as triangulation, peer review of data, and clear explanations of the data collection and coding processes that can be clearly traced. Triangulation is a process by which more than one source of data is utilized to support the findings of the study (Bodgan & Biklen, 2007). Further, Merriam cites triangulation as one strategy to strengthen the internal validity of a qualitative research study, in other words to validate that the findings of this study are consistent with what is really taking place in the research setting. Triangulation with multiple sources of data collection, through interviewing a variety of participants in multiple hospital cases, including CLS higher education administrators, was sought. The dissertation chair was involved in periodic review of data throughout this research process. Lastly, a very concise

account of this research process, including data collection, coding, and analysis was recorded and can be clearly traced by other researchers or consumers.

In the following chapters, a detailed description of the hospital cases and participants in this study is included, as well as the findings. The findings of this study are divided into two chapters—one for the two MLT-level hospital cases, and one for the two MLS-level hospital cases. There were two hospital cases at each level, with one education program director included in each level as well. Finally, a cross-case analysis of all four cases, featuring four themes that emerged from this study is presented in chapter seven. In addition, limitations of this study, implications for practitioners and higher education leaders the clinical laboratory science (CLS) field, and conclusions are also included.

## **CHAPTER FOUR: DESCRIPTION OF CASES AND PARTICIPANTS**

To address the research questions, I interviewed participants in hospital laboratories located in the vicinity of online programs in Clinical Laboratory Science (CLS), and that employed some of the graduates. I interviewed hospital laboratory staff who work in proximity to both online Associate degree in Medical Laboratory Technology (MLT) programs and Bachelor of Science in Medical Laboratory Science (MLS) educational programs, as well as program directors at MLT and MLS educational institutions. This chapter provides a description of the four hospital cases – two of which had online graduates at the MLT level, and two with online graduates at the MLS level. Additionally, descriptions of the primary online educational institutions and participants in the study are provided. Pseudonyms have been used to protect the identity of the cases and participants in this study, and to provide confidentiality.

### **Medical Laboratory Technology (MLT)-Level Cases**

Two cases were chosen for the MLT-level online graduates. The cases were Mountain Rural Hospital System and Western Rural Hospital. These hospitals were located approximately 30 miles apart, and in close proximity to Mountain Community College (MCC), which offered an online Medical Laboratory Technology (MLT) associate degree and served as a source of graduate employees. Both hospitals served small rural communities, which is not surprising given the geographic makeup of the state in which they were located. There were graduates from MCC's online program at both hospitals; however, there were also a significant number of traditionally educated graduates from other programs in the area: Central Community College (CCC), which offered an associate degree in MLT, and Mountain University (MU), which offered a Bachelor of Science degree in Medical Technology (MT). The BS degree program in MT was discontinued three years earlier due to low enrollment numbers. Each of the hospitals

and higher education programs, as well as interview participants, are described in the following pages.

***Case One: Mountain Rural Hospital System***

Mountain Rural Hospital System consisted of Rural Clinic and Mountain Rural Hospital, which shared a common medical director. Mountain Rural Hospital System served a small mountain rural community with a population of approximately 1400 people. Mountain Rural Hospital, a non-profit public 189- bed hospital, was originally established in 1927 with specializations in women's care, emergency medicine, orthopedics, cardiology, general surgery, and behavioral health. The laboratory at Mountain Rural Hospital consisted of 12 laboratory employees, eight of whom were bachelor prepared MTs and four were MLTs. The management hierarchy in the laboratory consisted of an administrative director, a laboratory manager, and four section supervisors. The laboratory offered a full range of services in hematology, microbiology, urinalysis, coagulation, and blood banking.

Rural Clinic joined Mountain Rural Hospital to form the Mountain Rural Hospital System in December 2011. Rural Clinic included 11 physicians and one nurse practitioner specializing in internal medicine, neurology, rheumatology, gastroenterology, and pulmonary medicine. Rural Clinic also housed a smaller laboratory, providing testing in chemistry, immunoassay, hematology, urinalysis and serology. The laboratory at Rural Clinic employed three laboratory technicians, two of whom were graduates of MCC's online MLT program, and one who was a graduate of a traditional MLT program. One of the MLTs in the lab served as the supervisor, overseeing all operations, and the medical director from Mountain Rural Hospital oversaw the supervisor. Five individuals were interviewed at Mountain Rural Health System, two from Rural Clinic, and three from Mountain Rural Hospital. The two individuals from Rural

Clinic were both online MLT graduates of the program at MCC, one of whom was also the supervisor of Rural Clinic. The individuals interviewed at Mountain Rural Hospital were the medical director, the laboratory manager, and the blood bank supervisor, all graduates of traditional programs. Online graduates were not evenly distributed between these two affiliated institutions; there were no online graduates working at Mountain Rural Hospital.

***Rural Clinic.*** The two individuals interviewed at Rural Clinic had different experiences with the program. The supervisor of the Rural Clinic lab was a non-traditional, older student with a child returning to school, whereas the other was a young student fresh out of high school. The supervisor chose the online program route because of convenience factors, due to the fact that she had a child who was busy in activities, and she also wanted to be able to work at the same time. The supervisor graduate searched for online programs in health care, found the MLT program at MCC, and decided to enroll. Although she had graduated from the online program seven years earlier, the supervisor was still able to recall her educational experiences and give insight into her preparedness for the field from her online education; she attributed her ability to complete the online program to her own self-motivation and independence.

The other online graduate was a recent graduate of the MCC online MLT program who finished in May 2012. The new graduate had originally enrolled in a medical assisting program at MCC and graduated from that program, however, she could not find a job in that field. Because she had enjoyed the lab component of the medical assisting program, she decided to pursue the MLT degree for job possibilities in that field. The new graduate did not choose the MLT program specifically because it was online as the supervisor of the clinic had, but because it was offered at the same community college in which she was already enrolled.

***Mountain Rural Hospital.*** The three individuals interviewed at Mountain Rural Hospital were the laboratory manager, the blood bank supervisor, and the medical director. The laboratory manager had only been employed at this hospital for the past three months, directly after a time when the laboratory had a great deal of staffing turnover and changes. Because the manager was relatively new, he was not as familiar with the culture and history of the hospital laboratory as the blood bank supervisor and medical director, who had both been there for a number of years.

Although the manager had only been at Mountain Rural Hospital for three months, he had a great deal of clinical laboratory experience. The manager had been in the laboratory field for close to 30 years, and had obtained a Bachelor of Science degree in Medical Technology from a traditional program out of the area. After obtaining his BS degree, he began his laboratory career working in a large 700-bed hospital in the blood bank area for a few years. During this time he began working on a master's degree in Health Care Administration. After obtaining his master's degree, he worked in a variety of health care related areas, including health care consulting, hospital administration, and also had previously been a laboratory manager at another hospital before coming to Mountain Rural Hospital. The laboratory manager was very business-oriented and looked at things from a productivity and financial standpoint, with a lesser emphasis on laboratory skills; he had a strong hospital administrative perspective which focused on how much money was being made and laboratory efficiency. He was concerned with good laboratory skills, but kept referring to finances and productivity as what was best for the lab. He did not have personal experience with online education or graduates, but he did believe that online education provided needed graduates in the field to fill shortages, and for MLTs wanting to continue to the MT level online.

The blood bank supervisor at Mountain Rural Hospital was also interviewed and was a traditionally educated graduate of MU's Bachelor of Science in Medical Technology program, which included one year of on-campus lecture content and one full year of hospital clinical training. The supervisor had worked at another hospital for a short time before coming to Mountain Rural Hospital, had been at Mountain Rural for a number of years, and had previously served as interim laboratory manager. At the time of this study, he served as an unofficial assistant laboratory manager, in addition to his role as blood bank supervisor, and was considering advancing his education through pursuing an online master's degree. The supervisor admitted that he had not had personal experience with online graduates, however did offer his views about online education in CLS.

The medical director interviewed oversaw both Rural Clinic and Mountain Rural Hospital labs, and had been the medical director for a number of years. He mentioned that he had participated in a clinical laboratory rotation as part of his pathology residency years previously, and at the time of this study worked with the laboratory manager and supervisors on a daily basis with a variety of laboratory related issues. Although the medical director did not have any personal experience with online education or graduates, he had definite views about important qualities for future laboratory employees to possess, and was involved in interviewing and hiring decisions within the laboratory. Each of the participants in this study appeared to respect and value the medical director's opinions, and looked to him for guidance.

### ***Case Two: Western Rural Hospital***

Western Rural Hospital was the second hospital visited for this study. Western Rural Hospital, a rural non-profit 86-bed hospital, has provided a full range of health care services since 1929. Like Mountain Rural Health System, Western Rural Hospital is located in a small,

mountain rural community about 30 miles west of Mountain Rural Health System, with a population of approximately 2600. In the laboratory, there were a total of 18 employees, a mix of both medical laboratory technicians (MLTs) and medical technologists/medical laboratory scientists (MTs/MLSs). There was one laboratory manager and one lead technologist, which is equivalent to an assistant laboratory manager position. The laboratory did not have supervisor titles per se; however, it did have medical technologists who took on additional supervisory duties, without the title. There were five online MLT graduates of the 18 working at Western Rural Hospital, all graduates of the Mountain Community College (MCC) online MLT program. There was also one online MT graduate from another institution. Like Mountain Rural Health System, Western Rural Hospital's laboratory offered a full range of services with testing in all primary areas of hematology, blood banking, urinalysis, serology, microbiology, and clinical chemistry. This site was rich in online graduates and supervisors with experience working with these graduates. At this facility, I interviewed six individuals—the laboratory manager, the lead technologist, two other supervisory technologists, an online MLT graduate of MCC, and one graduate of another online MT program. The online MT graduate had worked in the lab previously, however at the time of this study was the infection control coordinator, as a result of obtaining an online advanced degree in Medical Technology. Many of the participants interviewed had been at Western Rural Hospital for a number of years and had a great deal of clinical experience and first-hand knowledge of online graduates in the field.

The laboratory manager interviewed was from the local area, and began her college at Mountain Community College (MCC) taking general courses and then transferred to Mountain University's (MU) traditional BS in Medical Technology program. After graduating from that program in 1993, she was offered a midnight position in the laboratory and worked other various

shifts and positions over the past several years, becoming the laboratory manager five years earlier. She had a great deal of experience with online graduates from the MLT program at MCC over the past ten years.

The lead technologist interviewed also served as the microbiology supervisor in the laboratory. She obtained a traditional associate's degree at a local community college and then transferred to MU where she obtained her BS in Medical Technology. She had been working at Western Rural Hospital for 23 years, and was able to offer a view from both a manager and supervisor standpoint since she had duties in both areas in her position. Because she had been at Western Rural Hospital for so long, she was able to give examples of preparedness of students from the MLT program at MCC, both before and after it became an online program in 2001.

The chemistry supervisor interviewed at Western Rural Hospital had been there for about 18 years. She began by pursuing her associate's in MLT degree at MCC in the early 1990s before the program was online, and was also associated with Central Community College's (CCC) MLT program, so she took classes towards the degree at both institutions. She graduated with her associate's degree from MCC in 1992, with the intention of continuing on to pursue her BS degree in MT from MU, however she started working in the field in order to begin earning an income. At that time, MU offered an outreach program to obtain the BS degree within six years, and students had to attend class every Monday night on campus. Due to her work schedule, she was unable to attend these classes and did not obtain her BS degree. The chemistry supervisor provided information about her own preparedness from the traditional MLT program at MCC and the preparedness of the online graduates from the MCC program. She also worked with traditional BS degree students from the program at MU, which had closed three years earlier, and made comparisons across these groups.

Another supervisor of hematology and coagulation was interviewed at this site. She graduated from MU's traditional undergraduate MT program, and did her clinical rotations for that program at Western Rural Hospital. After graduation, she moved away and worked in various positions in at least two other large hospitals in the state, and had supervised other areas in those hospitals before coming back to Western Rural. She had been working at Western Rural for about 20 years, however some of this time was part-time, and eight years were at a doctor's office owned by the hospital. She also had opened an outpatient lab for a satellite site owned by the hospital, so she had a great deal of experience in a variety of capacities in the field. The supervisor also had taught as an adjunct professor in the MLT program at MCC before it was online, however was unaware that the program was now online.

An online graduate of the MLT program at MCC who finished in 2004 was interviewed at this hospital. She did her clinical rotations at Western and had been working there as well for the past nine years. She had decided to go into the CLS field after she took a forensic lab in high school and talked with a faculty member about the MLT program at MCC. She decided to take an introductory course in the MLT program during the spring semester while still in high school. She chose to go through the online MLT program because it was the only program she knew of that was available. She had not been purposefully seeking an online degree, and was not aware of other programs in the area for MLT. In fact, the program at MCC was not online during the time she initially inquired about it, but was converted to an online program during the year she was admitted; she was in the first online class to graduate from the program. She had a broadly informed view of online education because she was a graduate of a newly developed online program and had also been working in the field for a number of years with other online

graduates. She was able to compare her own online experiences with those of other online graduates she observed in the workplace over the years.

A graduate of an online undergraduate program in Medical Technology (MT) was also interviewed at Western Rural Hospital. She had worked in the laboratory as an MLT for over ten years before deciding to further her education by pursuing an online undergraduate degree in MT. She started out as a traditional student at MU in their MT program, but was unable to finish it. She worked night shift and could not handle going to class all day with no sleep, so she sought out an online program for more convenience and flexibility, finding one at Eastern University (EU), located approximately four hours east of Western Hospital. She graduated from the online MT program at EU in 2008 then left the laboratory and became the infection control coordinator at Western in 2009. Although she was not an online MLT graduate, this online MT graduate provided information about her online experiences and how that prepared her for the workplace responsibilities expected of her at that level.

Cases one and two at the MLT-level hospitals were very different in their experiences with online graduates. The cases were chosen based on conversations with the online MLT educational institution, who indicated that there were online graduates in both hospitals. Upon arrival at case one, Mountain Rural Hospital system, it was apparent that the online graduates were only at the clinic, and none were working in the hospital. For case two, Western Rural Hospital, there were more online graduates working, and the employees had more experience working with online graduates. In both cases, participants offered views of preparedness of online graduates, however, case two participants were able to offer more of their own experiences with online graduates.

## **Medical Laboratory Technology (MLT) -Level Educational Institutions**

For each of the hospital cases in this study, it is important to mention the educational institutions that serve as sources of employees for the laboratories. The three schools in the area that provided graduates employed by the hospitals were Mountain University (MU), which closed their Bachelor of Science degree in Medical Technology program three years earlier, Central Community College (CCC), which has a traditional associate degree in Medical Laboratory Technology (MLT), and Mountain Community College (MCC), which offers an online associate degree in MLT. A mix of graduates was employed in each of the hospitals; however, the institution of interest for this study was MCC, which offered the online MLT program. During this study, the program director at the online program at MCC was interviewed to gain information about the structure of the program, as well as her perceptions about the preparedness of online graduates for the workplace.

### ***Mountain Community College (MCC)***

Mountain Community College (MCC), founded in 1964, is a fully accredited community college serving several rural counties in the region. MCC offers over sixty associate degree, diploma, concentration, and certificate programs in career technologies, college transfer, arts and sciences, and health sciences. In addition to the main campus, MCC has a satellite campus, as well as four additional educational centers throughout a three-county regional area. As of fall 2013, there were approximately 2600 enrolled students in credited courses and 5500 enrolled in various continuing education programs offered by MCC.

The program director of MCC's online MLT program described the structure and other aspects of the program which includes five semesters over two years of online courses and hospital practicum. The online program has been in existence a little more than ten years. It is

structured such that the courses are taught online and clinical skills are initially taught either on campus once per week for local students within a specified driving distance, or entirely in a hospital setting for distance learners. Distance learners are required to identify their own hospital sites for clinical practicum and submit them for approval within the first semester of the program. The program accepts students from all over the country.

The program director described her experiences with developing the online program at MCC. The program, which has been live since 2000, faced initial resistance from laboratory professionals working in area hospitals, mostly the more traditionally educated ones. Gradually, the resistance lessened because of more experience with online graduates and word-of-mouth about quality. The program director indicated that she would not have chosen to go online for the sake of going online, but did so in order to keep the MLT program thriving and provide educational opportunities to rural areas that sometimes do not have access otherwise.

The program director explained logistics of the online program and how courses were taught, which included mastery learning repetitive activities given to students weekly, online and proctored exams, where students were responsible for finding their own test proctoring site. The program director believed the biggest indicator of success in her program was a better GPA based on an internal study she had conducted several years ago. She had raised her GPA from 2.0 to 2.5 three years ago, and plans to raise it to 2.8 next year. Student pools have gotten better since the increased GPA change, and pass rates have gone up. She believed that one of the biggest challenges with developing the online program was working through a university system that was originally designed for traditional students in areas of admissions, registration, and financial aid, and the requiring of on-campus visits and in person signatures. She has raised issues with the university as to how this will not work with distance education so this is an

ongoing process of change. Overall, the program director was very positive about her online program and pleased with the outcomes.

### **Medical Laboratory Science (MLS)-Level Cases**

The two hospitals utilized for the MLS level were Eastern Rural Hospital and Eastern Urban Hospital, which are approximately two hours away from each other. Both hospitals were mostly staffed with traditional graduates in the laboratory, however, there were some online graduates at both institutions. In fact, one of the online graduates was the laboratory manager at Eastern Rural Hospital. Both hospitals were affiliated with the online Bachelor of Science program in MLS offered at Eastern University (EU). There was not a single institution that most of the traditionally educated graduates working in both hospitals had attended; many were from different areas of the state or the country who had moved to the area for employment. The two MLS-level hospital cases, as well as EU, the supplier school for online graduates, and the interview participants for each, will be described in the following sections.

#### ***Case Three: Eastern Rural Hospital***

Eastern Rural hospital, a 220-bed private, non-profit rural hospital, has offered health care services for over 83 years. Eastern Rural served a small rural community with a population of approximately 4100, which was typical given the geographical makeup of the state. Health-care services offered by Eastern Rural included surgery, orthopedic and sports medicine, outpatient imaging, rehabilitation, women's health, emergency, cancer, home health, and also centers for wound care, stroke, and heart and lung care. The laboratory at Eastern Rural employed a combination of 17 technicians and technologists. A full range of laboratory testing was offered by the laboratory in the areas of hematology, chemistry, coagulation studies, serology, clinical microscopy, blood banking, and microbiology, as well as a small number of

molecular diagnostic tests. The management hierarchy in the laboratory consisted of a laboratory manager, an assistant laboratory manager, and five section heads of specific departments. There were two online graduates, one from the MLS program at Eastern Rural Hospital, and one graduate of an online specialty program in blood banking who served as the blood banking supervisor. Another MLT who was finishing an online Bachelor of Science degree in an unrelated field provided information about online education in CLS. I interviewed seven individuals at this hospital—one lab manager, the assistant lab manager, three supervisors (one of whom was the graduate of the online blood banking specialty program), and two generalists. Although not supervisors, the laboratory manager selected one of the two generalists as an interview candidate because she was pursuing an online degree in an unrelated field, and had some experience with online education.

The laboratory manager at Eastern Rural Hospital had begun his education by pursuing an MLT degree through a traditional program. A Gulf War veteran who was unemployed after the war, he decided to go back to school to obtain an associate's degree in MLT utilizing the Trade Readjustment Assistance program. After graduation from the MLT program, he began working in another hospital outside of the area, and after five years, the hospital offered financial assistance to support obtaining an advanced degree. At that time, he chose to pursue a distance education undergraduate degree in MT from Northern University (NU). He chose the online program at (NU) because he was working full-time and had a wife and young daughter at the time and could not attend a traditional campus-based program. The NU program was more hybrid than completely online, and he had to travel to campus one Saturday a month for courses, but the rest was through online course delivery and distance methods. The lab manager had no direct experience working with online graduates, however was on the advisory board for the

Eastern University (EU) online MLS educational program. He provided valuable information for this study, because he was a graduate of an online program, he was a laboratory manager, and he had a good deal of knowledge about online education in CLS.

The assistant laboratory manager at Eastern Rural had a great deal of varied experience in the field. She had been in the field since 1980, and had obtained a traditional BS in Biology out of the area, then completed a year-long clinical laboratory internship in a hospital, after which she obtained her MT certification. She worked a number of years in several hospitals before coming to Eastern Rural Hospital, and had been a chemistry supervisor previously. She had also been a laboratory instrumentation trainer, and traveled all over the country training hospital laboratory employees. She was aware of the online BS in MLS program at EU, however, she had no direct experience with their graduates. Although she had not worked directly with online graduates, her perspective was valuable because she was in a management position in the laboratory, was involved in hiring decisions, and had views of online program graduates versus traditional program graduates.

The blood bank supervisor at Eastern Rural had considerable previous experience before taking this position. After graduating from a traditional Bachelor of Science in Medical Technology program out of state, he worked in a number of other hospital laboratories, and held two other blood bank supervisor positions before coming to Eastern Rural Hospital. Ten years previously, he had obtained a specialty certification in blood banking through an online program, and decided recently to begin working on a master's degree in immunohematology through an online program also out of state. He decided to continue his master's degree education online because he was familiar with the format from his specialty program, and for convenience. The

blood bank supervisor's role involved input into hiring decisions of new employees, and given his own unique experiences with online education in CLS, his views on this subject were helpful.

One of the staff MLTs interviewed was also pursuing an online Bachelor of Science degree in psychology. She originally was trained through a traditional MLT program from which she graduated in 1997. After graduating, she worked at another hospital for approximately ten years before coming to Eastern Rural Hospital. This MLT was a generalist in the laboratory, and not a supervisor, however was involved in peer interviewing for new employees. Going back to college and obtaining a bachelor of science degree was a long-time goal for her. She chose to get an online degree in psychology because of the flexibility and convenience it offered, and because of her interest in doing counseling for her local church. Had she known about the online Bachelor of Science in MLS degree offered at EU at the time she was considering her options, she would have chosen to go that route instead of the psychology degree. As it was, she was too far into the psychology program when she learned of the online MLS degree to make the change. Although she was getting her online degree in psychology and not in CLS, she provided helpful information about CLS online education.

Another interviewee was the section head of the coagulation and urinalysis departments, and had been working at Eastern Rural Hospital in the laboratory since 1988. She had an undergraduate degree in biology as well as in Medical Technology from traditional university programs in the state. She had worked in the state at two other hospitals as a generalist for about five years each before coming to Eastern Rural Hospital. At previous institutions in which she had been employed, she had experience working with online MLT graduates, but not MLS graduates. In her current role at Eastern Rural Hospital, she did not work with online graduates.

She was, however, involved in hiring decisions and her prior experiences with online graduates allowed her to offer her views of the preparedness of such graduates for the workplace.

The hematology section head at Eastern Rural Hospital was also interviewed for this study and had been in that position for the past five years. She was a traditionally educated MLT, who obtained her associate's degree from a local community college in 1986. After obtaining her degree, she worked several other positions at other hospitals before coming to Eastern Rural Hospital. Although she did not have direct experience with online graduates, she did have views of online education in CLS, and was involved in peer interviewing for new employees in the laboratory.

The laboratory manager, who assisted in selecting participants for the study at Eastern Rural, recommended that I interview a generalist who had obtained her MLT degree through a traditional program a number of years ago. It was not clear the reason he had selected the generalist as a participant since she was not in a supervisory role and did not participate in peer interviewing of potential employees. Nonetheless, she did provide helpful information regarding online education in CLS.

#### ***Case Four: Eastern Urban Hospital***

Eastern Urban Hospital, a not-for-profit 536-bed teaching hospital, has been offering health services since 1953. Eastern Urban Hospital served a larger metropolitan area than the other hospital visited for this study. Eastern Urban served an area consisting of five counties, one of which included a large city with a population of over 275,000, one of the largest cities in the state. Health services offered by Eastern Urban included a Level II Trauma Center, pediatrics, urgent care, inpatient rehabilitation, general internal medicine, and centers of excellence for heart and vascular, stroke, orthopedics, and neuroscience. Unlike other

laboratories in this study, the Eastern Urban laboratory was only an urgent testing laboratory, which included the areas of chemistry, hematology, urinalysis, and blood banking. Other laboratory services offered by the other laboratories, such as microbiology, serology, and special chemistry testing, were sent to a reference laboratory that had been established by Eastern Urban Hospital off-site. Since the hospital was so large, however, there were a significant number of employees working in the laboratory—32 in the rapid response area including chemistry and hematology, and ten in the blood banking area. The laboratory hierarchy consisted of a site director who was responsible for overseeing all laboratories and personnel associated with Eastern Urban, including the urgent laboratory at the hospital and the off-site reference laboratory. There was also a rapid response lab manager, blood bank manager, third-shift supervisor, and weekend supervisor. In addition, there was a training coordinator—responsible for training all laboratory employees in all sites—who was involved in hiring decisions. There were four online graduates of the online MLS program offered by Eastern University (EU) working at Eastern Urban Hospital laboratory, and one MLT currently working towards the online MLS degree at EU, with an anticipated graduation date of May 2014.

Four individuals were originally scheduled for interviews, however the site director was unable to interview on the day scheduled due to an illness, so only three interviews were conducted. Although the interview pool was small compared to the other hospitals, the participants offered a great deal of valuable information pertaining to online education in the CLS field, due to their experience with graduates working in the hospital. The three participants included the rapid response lab manager, the training coordinator for the laboratory sites, and a graduate of the online MLS program at EU.

The rapid response laboratory manager had been in this position for about three years. He was a traditionally educated graduate of a large university in the area, with a bachelor of science in Medical Technology. He also obtained a master's degree in Business Administration (MBA) through a combination of on-campus and online courses at a large for-profit university. He also served as a Lieutenant Commander for the Navy Reserve. He had a great deal of experience in the CLS field, working at three hospitals before coming to Eastern Urban Hospital seven years earlier. As the rapid response laboratory manager, he was involved in hiring new employees, often making the final decisions for hiring, and had experience working with online graduates from the MLS program at EU. Based on his experiences with online education obtaining his MBA, as well as his experiences working with online CLS graduates, he was able to offer valuable information about the preparedness of online CLS graduates for the workplace.

The training coordinator for the Eastern Urban Hospital laboratory sites was a traditional Bachelor of Science in Medical Technology graduate from a local university who did her clinical training years previously at Eastern Urban. Because there were no positions available after completion of her degree, she worked at another area hospital for a few years until a position became available at Eastern Urban. She has been working in a variety of capacities at Eastern Urban since 1989, including generalist, and supervisory, and has been the training coordinator for the past five years. As part of her role as training coordinator, she was involved in hiring new employees and then overseeing their initial training. She also served as a liaison for students who train in the laboratory at Eastern Urban, and coordinated placement of students within the sites. She had worked with online graduates from the online MLS program at EU, and had also worked with graduates of traditional programs in the area, both at the MLT and MLS level, making her a knowledgeable informant about the preparedness of online graduates.

A graduate of the online MLS program at EU who graduated in 2012 was interviewed for this study. He had originally begun his laboratory career by obtaining a traditional associate's degree in MLT from a local institution, but wanted to further his education in the field in order to have more career possibilities. He learned of the online MLS program at EU from the program director at EU, who also worked part-time on the weekends at Eastern Urban Hospital laboratory. The online MLS program was appealing to him because of the flexibility it provided with his work and family commitments. He spent three years in the online MLS program, going to school part time, in order to obtain his degree. He shared his experiences as an online student in the MLS program, and offered views on his own preparedness for the workplace.

Cases three and four were somewhat different in their participant experiences with online education in CLS. Case four participants at Eastern Rural Hospital had less overall direct experience with online graduates, however, did have employees who had obtained online degrees in other fields, or related CLS specialty areas, who were able to offer views based on these experiences. Case four, Eastern Urban Hospital, although having fewer participants than case three included individuals with more direct experience with online graduates on which to base their views about the job readiness of such graduates.

### **Medical Laboratory Science (MLS)-Level Educational Institutions**

For the MLS-level hospital cases, unlike the MLT-level hospital cases, there was not one specific school, or even a few schools from which the employees graduated. Rather, many were educated out of the area, some were educated locally, and then eventually began working at each hospital. The online Bachelor of Science in MLS program at Eastern University (EU), however, was identified as the primary source for online MLS graduates for the hospitals in this study, and will be described in the following section. The educational program director for the online MLS

program, who was also interviewed for the study, explained the structure of the program and offered her views of the preparedness of online graduates for the workplace.

### *Eastern University (EU)*

Eastern University (EU), a public state institution established in 1892, has historically been an African American constituent institution. EU offered more than 43 undergraduate degrees in a variety of fields ranging from health sciences, business, sciences, and computer technology, and offered ten graduate degrees. EU was located in one of the largest cities of the state, with a population of approximately 229,000. EU was located approximately 45 miles from Eastern Rural Hospital and approximately 25 miles from Eastern Urban Hospital.

EU offers both online and traditional Bachelor of Science in MLS programs. The online program in MLS is the oldest in the country, beginning in the early 2000s, but not growing exponentially until the past five years. To meet admission standards for the online MLS program, students must possess an overall GPA of 2.5 and must have graduated with an associate degree in MLT accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), which is the accrediting body for CLS education programs. Additionally, eligible candidates must have their national certification as an MLT, and must be working as MLTs in a hospital laboratory. EU has articulation agreements with many of the community colleges in the state that offer MLT degrees for admission into the online MLS program, and the admission criteria are the same. The articulated online MLS program takes about four full-time semesters to complete once a student has been accepted.

The program director of the MLS program at EU also worked part time on the weekends as a technologist in the laboratory at Eastern Urban Hospital. She discussed different aspects of the online MLS program, and various types of coursework that students would complete coming

from an MLT background, such as advanced coursework in each discipline of clinical laboratory science such as hematology, clinical chemistry, microbiology, blood banking, and molecular diagnostics. In addition, students would have to participate in other activities related to laboratory management research, and participate in a community clinical experience in their hospitals of employment. Students were also required to participate in a seminar capstone course and produce research posters to present at professional meetings for the field. If the online students could arrange to attend in person that was encouraged, if not, they could present their research online to invited, approved guests. To fulfill clinical experience requirements for the field, the program director discussed using more “virtual labs” for the molecular diagnostics hands-on requirements for students in MLS programs. She explained how faculty at EU have become creative in developing virtual labs to meet many skill requirements, and described websites available to utilize.

The program director described the growth of the online program and the issues that arose both from individuals working in the field, and within the university. She said that it is also very important for the infrastructure of the institution to be technologically adequate in order to support online students, particularly admissions and the registrar’s office, so that the student enrollment and progression through the program is efficient. The program director offered important information regarding online graduate preparedness for the workplace given her positions as an educational director of such a program and as a working professional in the field. She discussed many factors that play a role in the success of a graduate, and offered supporting examples and scenarios.

## **CHAPTER FIVE: MLT-LEVEL CASE FINDINGS**

There were a variety of participant perceptions regarding online education in Clinical Laboratory Science (CLS). This study includes four hospital cases and perceptions of job preparedness and performance by laboratory professionals, online graduates, and educators examined both within and across the cases. Two of the cases were hospitals that employed associate degree Medical Laboratory Technology (MLT) online graduates, and two cases were hospitals that employed Bachelor of Science degree Medical Laboratory Science (MLS) online graduates. In this chapter, the two MLT-level case findings will be examined. In chapter six, the two MLS-level cases findings will be presented. Cross-case comparisons, including emerging themes and conclusions for all four cases, will be presented in chapter seven.

In this chapter, discussions of findings from the two MLT-level cases have been grouped into categories that align with the research questions of the study, which include laboratory administrators,' educators,' and online graduates' perceptions of online graduate job preparedness and performance. The categories for each case include laboratory administrators' perceptions of job preparedness and performance, hiring practices of online graduates, and online graduates' perceptions of their preparedness for the workplace. Finally, a discussion of the MLT-level educators' perceptions of online graduates' preparedness and performance for the workplace from the feeder institution identified for this study will be provided.

### **Case One: Mountain Rural Hospital System**

#### ***Job Preparedness and Performance of Online CLS Graduates: A Case Divided***

Views about online education in CLS were varied in this case, and appeared to be influenced by the level of individual experience with, or exposure to, online learning. The medical director at this hospital did not want students from the online MLT feeder school

because of quality issues that previous supervisors had told him about with past students. Therefore, no students or online graduates were employed at the hospital. However, the supervisor at the associated Mountain Rural Clinic, who was herself an online MLT graduate, had a more favorable view of online graduates. She believed that success of the online CLS graduate was based on the individual, and that online graduates were not at a disadvantage to “seat-based” graduates in terms of receiving a quality education. Based on the initiative and independence that it takes to pursue and obtain an online degree in CLS, the supervisor felt that those qualities would prepare a graduate well for the workplace. Based on her own experiences, she gave an example of a laboratory scenario for an online graduate:

I think because you have to have the initiative to do your homework and to get those online submissions and to be on top of your game in an online setting, that you are going to be more prepared when you – not necessarily more prepared – but you are going to be as prepared as someone who is in a seat-based class when you come to your clinicals, because if you don’t know something, you are going to do the research either before or after you leave so if you run across something during the course of your day. ... You are going to go home and study that and you are going to do what it takes so the next day when you show up you don’t feel unprepared.

Of the individuals interviewed in the two sites that were part of this case, she is the only supervisor who had direct experience with online graduates, and felt that overall, they were just as prepared as traditional students, and also performed at the same level on the job. The other supervisors and managers who were at the hospital had less favorable views of the preparedness of online graduates. Their skepticism seemed based, at least in part, on their lack of personal experience with online education. The blood banking supervisor at Mountain Rural hospital conveyed the general views of other staff in that laboratory:

I’ve not had any experience at all with online with my graduates. ... I can almost guarantee they [laboratory staff] probably feel the same way I do. ... I think if you already have the background and you are furthering your education, this I think is more than appropriate enough to online distance learning kind of thing but if you are coming

into it fresh, brand new [as an MLT] and you don't have any kind of background at all in laboratory science and you are trying to do it on a distance learning basis, I think it would really be a challenge for that person to be as qualified as someone who is on site learning it. Just the little things you would pick up being taught specifically, seeing things, doing things manually, that kind of stuff that you would see.

The supervisor at the clinic admitted that she may have a bias towards online since she was herself a graduate; however, she believed that being a graduate also gave her a deeper understanding of the online graduate, which the others interviewed in this case, did not have.

### ***Hiring Online Graduates in CLS: "They Will Have to Prove Themselves"***

Other supervisors and managers in this case were at the affiliated hospital, Mountain Rural Hospital, and did not have direct experience with online CLS graduates, or personal experience with online learning. They however, did, have views about the preparedness of such graduates for the workplace, which was directly tied to their views on hiring of such graduates. Because of the lack of direct experience with online graduates, the laboratory manager, medical director, and laboratory supervisor articulated they would need to be convinced of the preparedness of online graduates for the workplace. The online graduates hired would have to prove themselves through interviewing skills and actual job performance. Initially, the management staff would favor the traditional graduate before interviewing candidates for a position. An issue that the blood bank supervisor and the medical director brought up regarding hiring online graduates was researching the online educational program to learn more about the reputation. The supervisor was also concerned about clinical experiences that were provided through the program and the structure of the program curriculum, mentioning the importance of having an "expert" in each of the laboratory areas of hematology, blood banking, chemistry, and microbiology to act as a source of help and information for students. The medical director was concerned with similar issues, and stressed the importance of the student having adequate hands-

on training in each of the main laboratory areas, especially microbiology, which relies heavily on good decision making and critical thinking abilities in practice. The supervisor and medical director agreed that the interviewing process of the online graduate would be crucial and both would ask questions directly pertaining to the amount of hands-on training the graduates received in their programs, and specifically about what hospital they did their required clinical rotation training in. The reputation of the hospital for training was very important for the supervisor and medical director.

Like the blood bank supervisor and the medical director of Mountain Rural Hospital, the laboratory manager also shared concerns about hiring online graduates. Because the laboratory manager did not have direct experience with online graduates, he was skeptical, and said that the first online graduate hired would set precedent for future hires:

To me it would be a lot of pressure on the first person I hired. Initially I would give them all the credit and chances [that I would give] anyone with a traditional background or traditional degree. If that person showed themselves to be weaker than traditional, it would definitely influence my hiring practices going forward. If that person showed they had the background, education, and abilities that traditional degree person has, that would bode well for eventually moving forward with those kinds of resources.

The lab manager stated that other supervisors and the pathologists in the laboratory participate in the interviewing process of a job candidate, online or otherwise. The interviewing team collectively offers input regarding perceptions of general preparedness based on interviewee responses to questions about clinical training and general clinical laboratory science content knowledge.

Additionally, the lab manager stressed the importance of new graduates being able to communicate effectively as part of their job with other health care professionals, such as nurses and physicians. He had concerns about how this would be addressed in an online program, and feared that online graduates would become isolated due to lack of face-to-face contact with other

students and professors. The lab manager believed that laboratory professionals, often by nature, are introverted and that an online education environment may foster this introversion. Therefore, he suggested that it would be beneficial for online students to reach out to other students in their program, and even be required to meet face-to-face at least once with other students, to share ideas and experiences in order to protect from isolation.

***Online Graduates' Perceptions of Their Job Preparedness: "Prepared Enough"***

In the Mountain Rural Hospital System case, there were two online graduates, of a total 11 employees, interviewed regarding their views on their own preparedness for the workplace. One of the online graduates had seven years of job experience and was the supervisor of Mountain Rural Clinic. The other graduate, who also worked at the clinic, was a fresh graduate of less than one year. Both graduates discussed aspects of their educational programs that prepared them for the workplace, and other aspects that could have been enhanced to provide a better educational experience. Both graduates also offered advice for future online students in CLS for success in such educational programs and in the workplace.

Both the supervisor and the recent online graduate believed they were prepared for their first job in the laboratory as a result of their online education. The supervisor, an older student who already had a business degree, felt she was more prepared than the new graduate, who was coming straight into the program out of high school with no previous college work or background. The clinic supervisor believed that she had received adequate preparation for the workplace, but also mentioned that often times, it depends on the individual student, and their individual dedication and commitment to the program. The new graduate said that she was "prepared enough" for the workplace:

I think it prepared me enough to where I don't feel like an idiot for lack of better way to say that. I'm still learning every day and I'm still thankful we didn't learn everything because I didn't want to come into a job thinking I knew everything. I come in every day hoping to see something different, to see a different case and learn more. My weakness point was actually Urinalysis. The first two months I was here we really hit at that and I feel really confident reading urines now as opposed to when I came in. You can't really get a specimen and look at urines in [an online] class. We weren't allowed to donate our own, unfortunately. We didn't have a lot of chances to look at urines. When I came in I really didn't feel prepared for that portion. Everything else, I do feel somewhat prepared from the course. I think that no matter where you go you have different instruments, you have different cases, different patients.

The program was structured so that lecture content was delivered online for all students, and depending on the geographic location of the student, labs were offered on campus, or in the hospital setting. For students who lived within a close radius of the college, on-campus labs were offered; otherwise, students had lab experiences at hospitals close to where they lived. Both the supervisor and the recent online graduate, both of whom were local, participated in the on-campus labs. The online graduates at this site both talked about the good accessibility of the college faculty who were very willing to assist them with difficulties they had, and to explain concepts they did not understand. The new online graduate noted that the online case studies offered in the program were the most helpful in learning key laboratory concepts.

Both graduates also discussed their registry exam success after completing the online program. In the CLS field, like many other health professions, there is a national certification examination that students take after completion of a degree program that certifies them to work in the field. The clinic supervisor reported that she did not pass the registry on the first attempt because she chose to wait a prolonged period of time after completing her online education to take the exam. She did not believe her failure was due to lack of preparation from the online program itself. The supervisor did, however, pass her registry on the second attempt, after more

closely reviewing the material again in preparation for the exam. Conversely, the new online graduate passed her registry exam on the first attempt shortly after completing her degree:

I felt prepared. Like I said, they would give us all kinds of questions. For chemistry, we had a bank of 600 questions. We would have an on-line quiz that we would take over and over again until we saw the questions and then we had the option to print them all out, print out the answers to study. ... So I did feel pretty prepared but then once I took the exam there were a few things I remember we didn't go over. I don't know if those are the more difficult questions as it scaled up for me. Just the wording of the questions sometimes the questions were a little confusing on the exam. I passed first time so I guess I was prepared – more than I thought. I did feel pretty prepared. I went in thinking I would pass.

The online graduates in the Mountain Rural Hospital System case had advice for success for future online CLS students. Both believed that having good computer skills was essential to being successful. The clinic supervisor mentioned specific computer skills such as basic knowledge of spreadsheets and word documents, and the new graduate mentioned the importance of being able to navigate through the online courses successfully and the ability to utilize online website resources for CLS content effectively. The clinic supervisor also stressed the importance of being self-motivated, and not procrastinating to successfully complete an online CLS program:

If you are not one who meets your goals, if you procrastinate, I don't think it's [online] the best way to learn. Even if you can do your homework at 2 a.m. in your pajamas or whatever, if you're not motivated and you need someone who is constantly there – if you are honest with yourself, you know whether or not you are that way. If you need someone sitting there telling you, "Ok, make sure you have this in by tomorrow or make sure you review this tonight," then I wouldn't say to take an online class.

Overall, both online graduates believed that their online MLT program prepared them for the workplace. They thought they were viewed as equal in preparation to their traditional MLT graduate co-workers. Both graduates discussed how they were received and treated in the laboratory by other co-workers. The clinic supervisor said that she was well-received for the most part; however, an older, now retired supervisor admitted to being skeptical of online

graduates and referred to her as “the only successful one.” The new graduate discussed how she was well-received in the laboratory, and has never been treated any differently from a traditional graduate, based on her online degree.

### **Case Two: Western Rural Hospital**

#### ***Job Preparedness of Online CLS Graduates: Prepared, but Need More Orientation***

At Western Rural Hospital, three supervisors and one lab manager were interviewed regarding their views of online graduate preparedness. In this hospital case, all of the staff interviewed had worked directly with online graduates, and had them as students doing internships at the end of their education program. At the time of this study, there were four online graduates working at Western Rural Hospital. Overall, the supervisors and manager believed that online graduates were somewhat prepared for the workplace; however, they were still skeptical that this was as good an education delivery system as the traditional route. All of the supervisors and the manager had obtained their degrees through traditional means. The supervisors and managers discussed a variety of issues dealing with preparedness of their online graduates.

Although there was some skepticism regarding their job preparedness, the supervisory staff believed that online graduates were more self-motivated than the traditional graduates they hired to work in their labs. The lead technologist had comments about being self-motivated to be able to make it through an online program:

The biggest thing I see, I guess it depends on the individual mostly. If the person is very self-disciplined, they can do well and not have any problems as far as, you know, there are still some things that you miss not face-to-face or like hands on. As far as like, for example, microbiology. I mean you can look at a picture but sometimes if you are actually seeing an actual specimen there and that is where it might be lacking. ... Other than that, I think, the online courses they are able to pick up methodology that refer to chemistries and hematology and stuff like that but then again, I look at it being again a

very self-disciplined person even to be able to do all that on their own. Of course, I mean, there are some people that in class [it] takes some discipline in getting things done there too.

When asked about specific qualities that online graduates possess that relate to their education, the chemistry supervisor at Western Rural gave an example of one of the current online graduates working in the lab:

She does a wonderful job. She is very dedicated, you know, very disciplined. You know she follows through. I saw that in her as a student and she shows that as a tech or an employee that we've hired. ... She can follow direction like if you know you don't have to ask her, you know, you don't have to ask her to do something. She jumps right in and tries to help where she can and a lot of times, you know, on nights, it's just the two of them and it takes a strong person to be able to work nights.

Although the chemistry supervisor discussed the example of the self-motivated, successful online graduate, she also had reservations regarding preparedness of online graduates in general. All of the supervisory staff believed that the graduates were somewhat prepared for the workplace, however, they all wished that they had more clinical rotation time, and said that since the online feeder school, Mountain Community College (MCC), converted their MLT program to an online program, the clinical rotation times had been shortened. All of the staff interviewed also stressed that hands-on training was crucial to the clinical laboratory science field, and again, were skeptical of how online education met that criterion. The chemistry supervisor at Western also made an assessment of online education preparedness versus traditional based on her own experiences with both types of students:

I have mixed emotions about it [online education]. ... I think it's hard for our field to be in an online program and get what you need out of it. Unless you're strong, you know you are strong and committed ... I think you can get the bookwork down but I think as far as – I just think it's just difficult to get it all in. But that's just my opinion and that's just how I feel about it. And the reason I feel that way is knowing where I came from and then the [online] students that I've actually worked with and that's just my feeling on it. I think a program like ours; I think you actually need to be probably on campus. I think some of the classes would be fine but as far as each individual class that pertains to a laboratory, I think it would work better on campus but that's just my opinion.

The laboratory manager, chemistry supervisor, and lead technologist all believed that online graduates were somewhat prepared, but needed more supervision or orientation than their traditional graduate counterparts. Surprisingly, however, the supervisor of hematology and coagulation interviewed at Western was only aware that she had been working with online students just prior to this study because the lab manager had informed her that this was the case. This supervisor, who had been at Western for a number of years, working in a variety of positions, was also not aware until the interview that the MCC program was online, and had been for over ten years. Furthermore, this supervisor had previously taught as an adjunct professor in the MCC program before it was converted to online. Based on her experience with all of the graduates, she said that she could tell no difference in the preparedness of the online graduates from traditional ones:

They seem to be doing very well. There [are] always good and bad students and we have one that she probably, I don't know, she would just be that way anyway. We have a little guy we have now, he's excellent. ... So, yeah, then in that case, I would say it's ... I can't tell a difference. I didn't even know until you told me [that the program was online]. Yeah I didn't know that. So, I guess that's your answer. I couldn't tell the difference in the ones we had five years ago and the one we have now or however long they've been doing it online.

Another indicator of preparedness for the CLS workplace is passage of the national registry examination. The laboratory manager had a policy that the national registry examination had to be taken and passed within three years of hire in the Western Rural laboratory, and if the exam was not passed, the employee would be let go from employment. The manager stated that the pass rate from the MCC online graduate hires was 100%: "Like I said, the most recent [MCC online] graduates, they're taking it right away and passing it right away so they're doing a very good job prepping them for that." This online pass rate was better than traditional graduates' pass rates on the registry exam at MCC.

Other than concerns regarding reduced clinical time and hands-on training, the manager at Western Rural brought to light some additional issues regarding online education, and one issue was isolated to the MCC program. The manager noted that many of the online students who went through the MCC program struggled with the blood bank course, and often failed it. As a result of failing the online blood bank course, many of the students would then choose to take the blood bank course through another local community college with a traditional MLT program, and then transfer their passing grade for that course back to the online MCC program. Additionally, the manager believed that technology was being under-utilized with the MCC online program, and that some enhancements could be made to that program for the benefit of the students:

I think that online education still isn't where it needs to be in relation to the technology available. ... I know the technology is out there that you could watch a recorded presentation by a professor and there are people who learn visually and if you had something like that, even if it wasn't live, you know, being streamed live, but you could watch the video and had opportunity to e-mail questions in, I think that would be better. From what I can tell just talking with students, the online is "Read this, answer these questions." I just think we're not utilizing the technology that's out there to the fullest yet. ... Not being able to use that video piece because someone showing you a diagram and discussing it out loud and you hearing it, that's one important way people learn. If it's just somebody reading it and not hearing it, I think that's a disadvantage.

### ***Hiring Online Graduates in CLS: Whoever is the "The Best Fit"***

Because of positive direct experiences with online graduates, the supervisory staff at Western Rural Hospital were more receptive to hiring online graduates than those in case one. All three supervisors and the manager participated in peer interviewing of potential employees, and all referred to this process when discussing decisions for hiring online graduates. The peer interview was the most important factor to all of the supervisory staff when it came to making hiring decisions. The manager explained the process of the peer interview, in which each

potential job candidate was asked a series of questions by a panel of selected and trained employees. How these candidates answered the questions would determine whether they would be hired; all of the supervisory staff indicated that they would not be biased against, or for, hiring an online graduate compared to a traditional graduate. The laboratory manager pulled together the process and the general consensus of the supervisory staff views:

What we do here is we have something called peer interviews so we're not only interviewing based on your degree and references you might have but we're also looking at you for best fit and somebody who is going to fit with the crew you already have so there are set questions the organization has prepared for that. ... Well I might ask them how much hands on they had had and how confident they felt. Are they ready to go to work unsupervised? Do they feel like they need supervision? And depending on what job opening I have, if it's somebody I need to put in a location that they might have to work alone or maybe with one other person, then maybe I would prefer somebody who felt they had more hands on and didn't need supervision. But you know that could be the person that did the online degree may feel they would need less supervision. So to me it wouldn't necessarily come down to how you learned. You got the degree, you graduated so you've proven to whichever school you came from that you're competent to pass and get a degree. So they have the degree. Neither one has any experience anywhere. It's going to come down to that peer interview and who we feel is the best fit.

All of the supervisory staff emphasized that they would not be biased against an online graduate for hire in their laboratory, but would approach the peer interview with an open mind and base their decisions on how questions were answered. The laboratory manager also made the point that although all of their current online graduates are from the MCC program, they may not always know, or recognize that a program is online or traditional just from reviewing an applicant resume. Therefore, the lab manager again stressed the heavy reliance on the peer interview outcomes.

Another point that was emphasized by all of the supervisory staff was the staffing shortage in the CLS field overall and also directly in their geographic region. The lab manager talked about how the traditional bachelor degree program at Mountain University (MU) had closed a few years prior, and that until its closure, had been a source of some of the employees

for Western. Now that the MU program had closed, the applicant pool was smaller and the closest educational program was the online program at MCC. Although the Western laboratory was well-staffed with relatively young laboratory professionals, the manager was concerned about the future and was open to graduates from both online and traditional programs to fill vacancies.

***Job Performance of Online CLS Graduates: More Hands-on Training would be Helpful***

The general consensus of the supervisory staff at Western Rural Hospital laboratory was that the online graduates performed at the same level as the traditional graduates employed there, and most said that they saw “no difference” in competency. Although there were no significant competency concerns, the supervisory staff did mention some issues they believed could be improved with online graduates.

The laboratory manager was primarily responsible for performance evaluations and competency assessment on employees, and when asked how online graduates compared to traditional graduates on these, she indicated that they performed essentially the same. She had seen a few differences in evaluations of online employees versus traditional, but attributed those not to the type of education received, but to lack of experience on the job. She said that most often, the same competency and learning of tasks on the job surfaced with both online and traditional graduates and those were ones that she would expect from an employee learning to work in a new laboratory.

All of the supervisors and the manager were traditionally educated, and most had graduated from the traditional bachelor degree program at Mountain University (MU), which had recently closed, and compared the clinical rotation time, or hands-on training, of the online program students to that of the program at MU. The MU program’s clinical rotation training was

longer, therefore, based on this factor, most of the supervisory staff believed these graduates were better prepared overall than online graduates. The chemistry supervisor compared specific job performance of online versus traditional graduates related to the amount of hands-on training:

Yes, they [online graduates] have the concept. It's just mainly applying that, I mean, going actually hands on to the instrument and things like that. I have seen a little bit of a change there. That was where we'd have to work more on that in order for them to be competent on that. Yes I will say that there is a difference there because the recent graduates we've had which we no longer have are MT program at [MU] so it's kind of hard to compare the most recent ... but able to actually come in and just be able to apply their skills and their education inside the laboratory, the online program could not compare with the on campus. I think they are doing a great job with the [online] program. I just think the clinical rotations need to be a little bit longer.

Conversely, the chemistry supervisor gave an example of more competent online graduates versus those from traditional programs:

We have a couple of girls who work for us that they were actually some of the first to graduate from the online program and they're super. I mean, in their knowledge, and they're still willing to learn and actually – I'm actually trying to get one to go back and get her four year and it will be online as well and I hope she does. But, I mean, they're great and I mean they – what they retain in school and apply to once they got out in the field, has made them excellent techs. Excellent techs. I guess basically back when I first, when they first started, I was just apprehensive because I just couldn't imagine getting what you needed in an online classroom or virtual classroom, whichever. I just I couldn't even image that. ... I had a real hard time with it. But we have two techs that are super strong. They are just as strong as any four year. I mean they apply themselves well.

Overall, the chemistry supervisor stated the beliefs of all of the supervisory staff at Western regarding online graduates' job performance. They performed well on the job, but some performance differences could be seen that they attributed to less hands-on training than traditional graduates. These differences did not create alarming concerns for the supervisory staff, and they generally viewed the graduates as equivalent to traditional graduates in job performance.

***Online Graduates' Perceptions of their Job Preparedness: It Depends on the Program—MLT versus MLS***

Two online graduates were interviewed at Western Rural Hospital laboratory. One was an MLT graduate of the MCC online program, and one was a graduate of an online Bachelor of Science degree MLS program offered at Eastern University (EU), which was the feeder school of the online MLS program in this study. The graduates had differing views of their preparedness for the workplace, related to the different levels of programs that each completed. The MLT graduate was a fresh graduate from high school when she decided to enter the online MLT program, whereas the online MLS graduate had been working in a lab as an MLT for a number of years before deciding to continue to pursue an advanced degree in the field. Because the vantage points were somewhat different regarding preparedness from their online degree for the workplace, each online graduate's views will be addressed separately in the following sections.

The online MLT graduate was critical of her online education and how it prepared her for the workplace. She entered the program just as it was going online in 2001 and talked about how she believed that the program was evolving as she was going through it, which made her educational experience more difficult. She also discussed issues that she had with faculty accessibility and that of the two faculty members, one was more accessible than the other when she had questions that she needed answered. The online graduate was a local resident and thus was able to participate in on-campus labs that were offered at the college, however, she still believed she would have been prepared more by a face-to-face classroom experience: "For me, it's the person-to-person contact. It's the learning. I guess it's the whole atmosphere and experience. You don't feel like you're by yourself and helpless." When asked if she was prepared for the workplace, she talked about how her clinical experiences prepared her the most:

I would probably say most of mine [preparedness] came from clinicals. It was the hands-on. That's when I really got comfortable with what I had chosen to do and then I could see some of the things the material was actually talking about. I think that's where I got kind of in a state where – the labs [I] took along with class but when I was in my clinicals it actually clicked for me. I was like, "Yeah, I like this." It's learning the theory and everything that goes behind it. ... I didn't [feel prepared]. I was just there. I knew I had to start my clinicals. I had made it through the course and whatever but I did not feel prepared at all. I guess having a good clinical site. That's why I've been here for so long. It's just the girls you worked with in clinical, you know, tried to help you and tried to, and "Well this is this and this is this." ... I didn't really feel prepared.

She went on to describe how she struggled in the online program to achieve success, and had to repeat the blood banking course at another local college, Central Community College (CCC), which had a traditional MLT program. She passed the blood banking course at CCC with an "A", and transferred her grade back to her online program at MCC. Although she struggled with the online program and did not feel prepared, she did pass her registry exam on the first attempt. "I passed first time. It was the repetitiveness. It had been drilled into my head for three years at that point." At the time of this study, this online graduate was working with training online graduates from MCC in the clinical setting, and said that she saw similar struggles with them. She believed that for future graduates to be successful in the online program, they would need to be dedicated to the learning the material and independently work hard to make it through.

The second online graduate interviewed had graduated initially from a traditional MLT program in the area and worked in the laboratory for a number of years before deciding to pursue an online advanced bachelor's degree in MLS. Because she already had experience working in the laboratory as an MLT, she believed that her online MLS degree did not provide additional preparation for the field because she was already prepared by her MLT degree and work experience. The lack of preparation from the degree was not based on whether it was online or traditional, but rather her job duties upon graduation did not change:

I felt that we are a small hospital so everybody did pretty much all jobs. The only difference is most of the supervisors were MTs; department heads were MTs except for a few areas. That has changed since then. If this was a larger hospital it would be more of a benefit than a small rural hospital because here everybody relies on everybody and it's not, "Well you're an MT and this is your responsibility. You're an MLT and this is your responsibility." It really didn't make that much of an impact here because of that. The supervisors who are MTs are still here. There is no turnover, no change over on that level. The opportunity here would be smaller than in a large hospital.

Although her job duties did not change as an MLS, she did take the MLS-level national certification examination and passed it on the first attempt after completing the online MLS program. She believed that her experience as an MLT previously in the lab helped her to pass the exam, and also the additional material learned in the online program in management and financial concepts helped her as well.

Although this online MLS graduate did not feel that her online degree prepared her for her current job in the laboratory, it did give her the opportunity to apply for other positions in the hospital that she would not have been eligible for without a bachelor's degree. The online graduate applied, and was selected for, the Infection Control Coordinator job for Western Rural Hospital. When asked if it mattered to the administration at the hospital that her bachelor's degree was online and not traditional in applying for advanced jobs, she said that it did not, and that, in fact, other individuals who held administrative positions in the hospital, including the nursing supervisor, held an online advanced degree in nursing.

Some of the concerns that this online MLS graduate had about her program were related to the infrastructure of the university. She encountered difficulties with registering for classes, applying for financial aid, and was required to drive four hours to campus to sign papers in person in order to enroll in the program. She felt that as an online program, some of these activities should have been structured more to fit distance learner needs, and not tailored only to the on-campus students. The online MLS graduate also began the program as it was a new

online program and talked about how the program evolved as she went through, and how from one semester to the next policies and procedures were changed, which made navigating through the program more difficult. Overall, she was pleased that she obtained the online degree because it gave her opportunities for advanced positions at Western Rural.

### **MLT Online Educator Perceptions of Job Preparedness and Performance**

The program director of the online MLT program at Mountain Community College (MCC) was interviewed to obtain her views on the workplace preparedness of her online graduates. Graduates from the MCC online program were employed in both cases one and two. The program director discussed different aspects of the program related to graduate preparedness, including personal factors and registry passage rates.

The program director believed that often times the ability to succeed in her online program was related to personal, individual factors and not to having to adapt to online content. She had taught in the MLT program before it was converted to an online program in 2001, enabling her to compare student successes in traditional versus online formats:

I actually really don't [believe that student issues come from online adaptability]. I really think the issues that students have come personally. That's our experience. I mean what their family, job, outside influence, support – that kind of thing. I don't know if one does better than the other grade wise or otherwise. I don't see that.

She went on to add that often times, students drop out of the online program due to personal issues, that also include financial aid, and that most years she has a fifty percent attrition rate for each starting class due to personal issues, which she said was no different than with her past traditional program attrition rate.

Regarding registry passage rates for online students, she said that passage rates have actually gone up in recent years, mainly due to improvements made in admission standards for the online program, specifically raising the entry GPA to 2.5 from 2.0:

For years, even seat-based, they were up and down. We could have 100%, 80%, 50%. On average I would say anywhere from 75-80%, but over the last few years since we raised our GPA and doing that, we have 100%. Three years ago we only had two people take the exam so one passed and one didn't. ... I think it is getting better and I think it can even be better if we really look at taking students who are academically prepared instead of the average 2.0.

The program director explained that those who fail the registry exam on the first attempt often have waited an extended time to take it after graduating from the online program, instead of taking it directly afterwards when the information learned is still fresh in mind. The program director advised students against waiting a prolonged time after graduation to take the exam; some students still wait to take the exam until after they get a job in the field because there is not licensure in the state to mandate taking the exam before employment.

When asked about online student preparation for the workplace, the program director responded that there was no difference in preparation between online graduates and the traditional ones that she used to teach. Since some of her online students did initial clinical training of basic skills in the hospital, and not during the more brief campus visits for local students, she believed that these hospital-trained online students were in some cases better prepared:

I don't really see a lot of differences because they are all exposed to the same content and the only difference between them is one is doing it in a student-based lab. The advantage ... [is] the online people have is because they are already in a hospital setting. So to me, you are getting to see the actual setting, all the equipment. I almost think seat-based is a little bit more limited unless you are just full out laboratory, which I don't know that I've visited any labs that are just totally fully operational like the real settings. I still think they both get their basic skills they need but I think there is something about being in the real world clinical setting that is advantageous.

The program director added that she was a proponent of hospital-based training programs, believing that programs sponsored by hospitals were the best, due to the direct exposure to full instrumentation and procedures in the laboratory, which university-based programs cannot always provide. Many hospital-based educational programs, however, have closed or become university-based due to staffing shortages in hospital laboratories which does not allow for adequate student teaching time, or time to perform education program administrative duties. The program director also believed that in some cases online graduates can actually perform better in the workplace than traditional graduates:

Sometimes I think online [education] make[s] a better tech because this person is more independent, more self-motivated. To me those are good qualities for a tech, somebody who can come in and take something and figure it out and do it. We want people like that who are very independent. If they are more needy and need to be shown everything, told everything, I don't know that they are as good a worker and part of our goals are to make good employees.

Further, the program director said it was important for students to be self-motivated and independent in order to be successful navigating through an online program.

Overall, the program director's views were similar to those of the supervisory staff in the hospitals who had experience with online graduates regarding preparedness. The program director appeared to be more optimistic in general than those working in the field about online graduates' preparedness, especially in stating that she believed that they can make more prepared laboratory professionals. An area of disagreement between the program director and the supervisory staff of the hospitals was regarding the importance of hospital-based programs. Although many of the supervisors graduated from hospital-based programs, many of these programs have now been discontinued in the field due to staffing shortages and laboratory staff not having enough extra time to train and educate students on the level that they once had.

## CHAPTER SIX: MLS-LEVEL CASE FINDINGS

In chapter five, findings from the two Medical Laboratory Technology (MLT)-level cases were presented. In this chapter, the Medical Laboratory Science (MLS)-level case findings will be discussed in the same format. For each MLS-level case, findings are grouped into sections related to research questions pertaining to laboratory administrators,' educators,' and online graduates' perceptions of online graduate job preparedness and performance. The sections for each case include laboratory administrators' perceptions of job preparedness and performance, hiring practices of online graduates, and online graduates' perceptions of their preparedness for the workplace. Finally, a discussion of the feeder institution MLS-level educators' perceptions of online graduates' workplace preparedness and performance for this study will be included.

### **Case Three: Eastern Rural Hospital**

#### ***Job Preparedness of Online CLS Graduates: Nothing Replaces “Doing it, and Doing it, and Doing it”***

Seven individuals were interviewed in this case—one laboratory manager, five supervisors, and one online student. Three interviewees were online graduates or students. The laboratory manager, who had a traditional MLT degree, had returned to school after working in the field for a number of years to obtain an online MLS bachelor's degree. Additionally, one of the supervisors had completed an online blood banking specialty program and was working on an online master's degree in blood banking at the time of this study. The final online graduate participant of this case was an MLT who was about to graduate with an online psychology bachelor's degree. Although her online degree was not in CLS, she had some helpful insight into how online education could work with CLS. Because all of the online degree participants in this study also worked in supervisory capacities, their views will be included in both the supervisor

perceptions of preparedness and performance, as well as the online graduates' perceptions of their preparedness for the workplace.

Of the supervisors interviewed in this case, three had no direct experience with online CLS graduates, but offered views nonetheless. Although these supervisors did not have experience with online graduates directly, their views were informative. These supervisors represent a real-lab scenario where they may not have had direct experience with online graduates, but may still have to make decisions regarding hiring such graduates. Moreover, their hiring decisions would be influenced by their views of online graduate preparedness, regardless of their experiences with such graduates. When speaking with some of the supervisors and the generalist tech that was also an online psychology student, I learned that they generally agreed that online education was not well suited to CLS, and that traditional education was preferable in CLS, especially for the MLT level. Although the main purpose of including this case was to gain insight into the views of online bachelor degree MLS education, the individuals in this case offered their views for both the MLT and MLS level. When speaking with the online psychology student, she said the following regarding MLT online education:

We do [have conversations about online CLS education], especially when we knew you were coming. We talked, actually have a lady now who is working with us who is going to be starting online. I was like, "You're going to have school online?" and I wanted to burst into tears. "Oh God bless you." That was actually the first time I heard you could get your MLT online. It was the first I'd ever heard of it. ... It was hard to have a poker face on that one because I just don't see how that would work. ... Most of us are older techs. ... Most of us, I think, had the same feeling of you've got to be in the ditch digging to learn how to dig the ditch and I think that's pretty much been the general opinion and just like everybody shaking their head, "I don't how you could ever pass it online." ... There is nothing that replaces doing it and doing it and doing it.

Sharing in the skepticism of the preparedness of online CLS graduates, the coagulation supervisor had experience with online MLT students who rotated through Eastern Rural for their

final clinical rotations. Based on her experiences with them, she believed that online students were not as well prepared as the traditional students she had worked with in clinical laboratory settings. The supervisor stated that: “[The online students were] not very well prepared. It was Okay. They did not stay here very long so I never did see what happened. It was iffy.” She discussed the importance of hands-on training to be prepared for the workplace, which she believed the online students lacked.

Although most of the supervisors shared the same views favoring traditional education over online at the MLT level, they all seemed to be in support of MLTs furthering their education online to the MLS level. Most believed that much of the basic preparedness came from experience in the workplace as an MLT, and for the most part, the job duties of the MLS would not be very different. The online MLS degree was viewed favorably overall as a viable alternative to obtaining this degree. The coagulation supervisor’s comments represent the general consensus of the supervisory staff at Eastern Rural regarding online MLS education:

They were already MLTs and eventually wanted - actually I know three or four who did that. They wanted to get their MT [MLS]. They went to [Eastern University]. They did the online. But they already had several years of clinical experience. They thought it was a breeze after that. They already had a good base, a good foundation.

The laboratory manager at Eastern Rural Hospital, who was also an online graduate of an MLS bachelors program, shared some of the views of the supervisors regarding online CLS education, and also added some unique views. He believed that overall program quality was more important than whether a program was online or traditional. During his interview, he referred to his own traditional MLT program as a gold standard for what he believed CLS education should be, but noted that since the program director of that program had retired, the program quality had gone downhill. The manager had experience working with one other online MLS graduate, who also obtained her associate’s degree through traditional means and then

pursued the online bachelor's degree. He spoke favorably of this graduate's preparedness for the workplace, mostly because he believed that her experience working in the laboratory for a number of years before obtaining her advanced MLS degree was what prepared her, and the degree was more of an enrichment.

The blood bank supervisor, who had an online blood bank specialty certification, and was working on an online master's degree in blood bank at the time of this study, had more favorable views of online graduates and programs. He had worked directly with online Eastern University (EU) MLS graduates in previous hospitals. Based on his experiences with his own online programs, and with online MLS graduates, he believed that they were very prepared for the workplace:

I think it's [the MLS online program] a much more intensive process and they expect a lot more of their students. I think their philosophy was, at least with the matriculation process that you've been through a traditional classroom [MLT] experience so their expectations are higher. It takes a lot of discipline to do it online because it's very easy with traditional student. They have to go to class. You're not as supervised as you would be if you were in traditional school setting. You really have to discipline yourself to study and go through the course more. It's easy to be distracted when you do this stuff at home, go to the library. There are a lot of choices to be made. I think their thinking is if you've gone to that point, you are going to be a more disciplined student. [Based on what I have seen of the rigor of online programs and their high expectations] I know a few people who have gone through that [online] matriculation process from MLT to MT and seem to be very well prepared.

Overall, the laboratory staff at Eastern Rural hospital believed that online MLT education was not well-suited for the field, and those who had direct experience with online graduates did not believe they were as well prepared for the workplace as their traditional counterparts. The MLS online graduates, however, believed they were as prepared for the workplace as traditionally prepared MLS graduates, largely due to their prior work experience as an MLT. All of the supervisors also said that they would support and encourage an MLT to pursue an online

MLS degree, and that the hospital viewed that online degree no differently than traditional as far as supporting the student financially.

### ***Hiring Online CLS Graduates: Skepticism about their Clinical Skills***

Given their views about the inadequacy of job preparedness of online graduates, it is not surprising that at Eastern Rural Hospital the supervisory staff were skeptical about hiring online graduates. They had only one online graduate working there, on a part-time basis, giving them very little experience with online graduates. Most of the staff admitted that they would have bias against an online graduate, especially if they were faced with the choice of hiring either an online or traditional graduate for a position. The hematology supervisor, who had years of experience working in the lab, but none with online graduates, was skeptical, yet open to hiring online graduates:

That would be tough [choosing between an online and traditional graduate for hire]. I would be more inclined, I think, with the person who had the clinical experience versus the online. Simply for the reasons that were just stated. You wouldn't want to just disregard the other person without at least giving them a chance. Maybe you could actually take them into the lab and see what they could do. Give them some examples and see what they could do as far as pipetting or diffs or something like that.

The other supervisory staff, including the manager, agreed that they would ask knowledge base questions during the interview to see how much they knew, and would also set up mini practical experiences in the laboratory to have the online candidate demonstrate what they could do. The manager said that he always asked specific CLS knowledge-based questions for interview candidates, regardless of whether they are online or traditional, but would add additional practical procedures for the online graduates to demonstrate.

The generalist, who was also the psychology online graduate, commented on how staffing shortages in the field would play a role in how well-received online graduates would be in the workplace:

That would probably depend on how many more of us get out of the field. I think there is coming a day when they're going to *have* to take you – whatever they can get – because I just don't see people going into it [the CLS profession]. Like I said, a lot of programs are shutting down. I think there will come a time when they will have no option but to hire people who have gone to school online but I don't know that it will ever be looked at as the same in the profession. ... In my opinion, that would take not only attending labs on campus but a good strong clinical background. Clinical rotations are key. It always helps when you can say, "I went through there." It also helps if you've done clinicals at a certain place. I got offered a job at every single clinical site I went to.

The generalist went on to talk about the importance of knowing the reputation of the program from which the potential employee graduated, which aligned with the laboratory manager's views regarding the importance of program quality, whether online or otherwise.

Again, the blood bank supervisor did not share the same views of online graduates as the other supervisory staff, and actually said he would favor the online graduate over the traditional graduate if he had to make the choice, especially for the online MLS graduate:

Well, you know, I would honestly lean toward the online student because I know what's involved and how difficult it is. Immediately that tells me that they're dedicated. That doesn't mean the traditional student isn't going to be dedicated. But I know from [my] online experience that the online person has to be motivated, dedicated, a good organizer, can schedule time well. Those are qualities, of course, you look for in a new employee. They are self-starting, they're self-motivated. You have to be when you do online courses. So if they were equal in every respect but that, I would probably lean toward the online. But I feel I'm being biased by doing that because I have that extra little bit of insight on what it's like to go through that.

Generally, the supervisory staff at Eastern Rural were skeptical of hiring online CLS graduates, especially MLT, and would evaluate them closely during an interview process for an open position. Their level of skepticism appeared to be influenced by the amount of direct experience they had with online graduates, or whether they had online experiences themselves,

with the exception of the online psychology student, who still had a high level of skepticism about online in CLS despite her own experiences with online learning. The online psychology student had experiences in her own biology laboratory course that reaffirmed her belief that traditional methods were best for teaching hands-on laboratory skills.

***Job Performance of Online CLS Graduates: MLS Graduates Already Prepared***

Information gained about the actual job performance for online graduates for this case was somewhat limited due to many of the supervisors not having direct experience working with online graduates. Only three, out of seven, individuals interviewed at Eastern Rural hospital had direct experience with online graduates. Of the three who did have experience working with online graduates, the coagulation supervisor said that she did not work with them long enough to be able to make the determination on long-term job performance. The laboratory manager believed that the one online MLS graduate with whom he worked performed equally on the job as traditional graduates, but attributed that to her prior experiences on the job before going on to obtain her online MLS degree. This online graduate, as well as the laboratory manager, who obtained his MLS degree online, both passed their national registry exam on the first attempt after completing their degrees. The blood banking supervisor believed that online MLS graduates were just as competent as their traditionally educated co-workers and had this to say regarding competency assessment:

I didn't notice any difference. You have to remember they are doing six-month competency or one-year competency. They get a lot of training on how to do that on the job as opposed to remembering how they did it in school. I honestly don't have anything to provide as far as what their competency was like immediately upon hiring ... you have the background, here's how we do it. Show me how you do it. We grade you. As far as the background, they seem to have just as much background at performing that competency as any other student. I've not noticed any difference.

Again, the perceptions of equal competency of online graduates compared to traditional graduates by both the laboratory manager and the blood bank supervisor were derived primarily from their belief that graduates were already prepared to do the basic laboratory duties from their prior training as an MLT, and that the online MLS degree did not give them an extra skill set per se, but enhanced their overall knowledge base.

### ***Online Graduates' Perceptions of Their Job Preparedness: Already Had Basic Skills***

There were three online graduates working at Eastern Rural hospital during the time of this study, however, one was an online graduate in another field—psychology. Skeptical of online CLS graduates' preparedness for the workplace, she discussed her own experience in a science class online where she had to virtually perform pipetting, which is a basic CLS skill:

I was very interested in that [how the online lab would work]. I just couldn't imagine. It was like you click this to pipette this. You click this to pipette that. If you had an understanding of the way things are, the methods. I don't see how anybody could pass it. It was difficult. I think I wound up with a B or A- but it was difficult. My actual hands on background enabled me to do better in that class but it was difficult and I would really feel bad for anyone who didn't have that basic knowledge because there were a lot of things that you just had to have done them. It increased your knowledge. I'm sure it would increase someone's knowledge who didn't have any lab experience but if you didn't know what a pipetter was and lots of people just don't. ... In my personal opinion, to be an effective employee and to take good care of our patients, I think you should at least get your two year degree [MLT] on campus. After you have your two year degree and you've worked in the field, I think it's ok to finish your MT [MLS] online. I think you can do that but I really honestly do not see how you can go online with no lab experience. You can't come out work ready. There's no way. Clicking on the pipetter is not the same thing as doing it with your thumb, and blowing it out, and to deliver.

The laboratory manager had a slightly different vantage point than the online psychology student, and was more positive of his online preparation. He obtained his MLS degree online, however believed that his traditional MLT program, completed a number of years earlier, prepared him for the day-to-day laboratory work tasks, and the online MLS degree prepared him for more of his administrative tasks as a manager:

The bachelor's [online MLS] degree, I did take some management courses in there as far as budgeting and scheduling and things of that nature that I'd never been involved with. Got into regulatory, mainly [Clinical Laboratory Improvement Act] CLIA, and looking at the Federal Registry somewhere. I really didn't have exposure to as an MLT. I think it did help there. I know as far as looking at research and we had courses in research and statistics and looking at which statistic was appropriate for whatever type of research you were doing. Not that I know that now but I think it was helpful. I looked at ethics, bioethics. I know you had to know that you had to submit to a board if you were going to do research, any type of research and the board has oversight of either approving or denying. I guess it does help you look outside of just you're doing this test into what else is involved in the lab.

The laboratory manager also passed his national MLS registry exam on the first attempt after completing the online MLS program, however he believed that his preparation for this examination came both from his rigorous MLT program and the online MLS program. He also added that his online MLS degree was well-received in the workplace, and that it was considered equal to a traditional degree when he applied for his current manager's position, and further stated, "It never became an issue ... in fact, our chief nursing officer, I think she got her master's online and she was the one making the decision who to hire for the lab so that may have played a role [in her hiring decision] also."

The blood banking supervisor had a traditional bachelor's degree in MLS from a university out of the area, however had an online blood banking specialty certification, and was pursuing an online master's degree in blood banking at the time of this study. Throughout the interview he was very positive and supportive of online education in CLS, speaking frequently of his own experiences:

I thoroughly enjoy it [the online masters in blood banking]. I find I think online experience is much more rigorous. The curriculum tends to be a little bit more difficult because you are a lot more time and you don't have as much opportunity to be on campus. I think they expect a lot more of you. I noticed that when I was an undergrad, it's hard to explain, it's just more difficult even though my exams some are open book and some aren't. I think they expect a lot more of you as a student than they did in traditional classroom setting. That may not be everywhere. ...The workload is very intense and I think that's just par for the course for online.

Both the laboratory manager and the blood banking supervisor talked about aspects of the program they thought could have been improved and aspects they believed were keys for success. The laboratory manager commented on the online course content and how the hematology course content would have been better suited for research purposes, but that other areas were relevant for the MLS level. The blood banking supervisor talked about his online research projects and how he enjoyed the online course discussion boards. The laboratory manager and the blood banking supervisor agreed that to be successful in an online program, a student must be dedicated and self-motivated. The blood banking supervisor commented about the need for motivation for success:

You have to be committed right from the beginning. You have to be able to realize it is going to not be so easy ... you can't just let things go because I think they give you a lot more to do within a semester as far as each week; you have a lot more course work. They expect you to have it done by the end of the week. You have to post a lot of discussions. You have to be dedicated and committed to doing that. Responding and sending emails to colleagues and students. You can't let those things go. I think that student who goes through the program has to be able to see the whole thing and they have to understand up front that because it's online doesn't mean it's easy. I think that is a misconception that's out there. I've talked to several people who knew I was doing [an] online course ... and I think their first perception was it was a piece of cake. It's not. It's much more difficult to do it because you don't have all the research available as a regular student would—library, instructor.

Both of the CLS online graduates in this case believed their online degrees prepared them for the workplace, however they both also had traditional CLS degrees that provided them with the basic skills necessary for the laboratory. They believed their online degrees and certifications prepared them for the administrative positions they held in the laboratory and that their online degrees were viewed as equal to traditional degrees.

## **Case Four: Eastern Urban Hospital**

### ***Job Preparedness of Online CLS Graduates: Already Prepared***

Eastern Urban hospital, with three participants, was the smallest case. One participant was an online graduate of the bachelor degree in MLS at Eastern University (EU), and the other two were supervisory personnel in the laboratory. Although there were only three participants in this case, they were experienced individuals who had worked with a number of online graduates. One of the supervisory personnel was the assistant laboratory manager involved in hiring and evaluating all employees, and one was the training coordinator responsible for training all new employees upon hire. The assistant laboratory manager had obtained his master's degree online in business, therefore he had some insight into how online programs would prepare students for the CLS workplace. Between the two supervisors, there were some commonalities in views of preparedness of online graduates, both for the MLT and the MLS levels.

Both the manager and the training coordinator had obtained traditional MLS degrees and been working in the field for a number of years. Both believed that online MLS degree graduates were just as prepared for the workplace as traditional, mostly because they were already MLTs working in the laboratory for a time who had basic clinical skills before returning to obtain an online MLS degree. When asked about the job preparedness of online MLS graduates, the training coordinator noted that most employees who choose to go this route have already been working as MLTs for a number of years, so they already had the job experience and were just "advancing to a higher level of professionalism" with the online MLS degree.

The laboratory assistant manager agreed that all the online MLS graduates working were initially MLTs in the laboratory with a strong base of clinical skills. The laboratory director had

more concerns, however, with the general nature of online MLS programs today, compared to those of the past that he perceived as higher quality, online or otherwise:

I think if you're a good tech, like if they were MLT, and they went that route [online], it's not bad, it's just, I don't know if they have the same background as the traditional because even now with the traditional, the curriculums have changed so much where they don't teach as in depth as they did previously. ... I'm sure a lot of that has changed but if you ask anybody in a lot of different fields who [has] been doing it for a long time and it's not just MTs or MLTs, they don't seem to have the grasp of concepts [like] they used to. I think that's traditional *and* online. I think you lose some of that even more so online. But does that mean they can't be good? Of course not. They can be just as good as or better than a traditional. If you ask me my opinion, I think the traditional student would be better typically than the online because you are interacting with the instructors better. I know you have chats and stuff like that online but I don't think it's the same. That's just my opinion.

The training coordinator shared the views of the assistant laboratory manager regarding how training in years past was better, and that the knowledge base of students today was not as strong. When asked about the differences in preparedness of online MLS graduates and traditional ones from her own experiences, she discussed how training has changed:

You talk about MT programs today, no I don't [see a difference between online and traditional]. If you want to go back to the years when we were in there, you know, when we were terrorized and beaten, those were all acceptable methods to teach us—you really – it was more stringent, I think. There probably is a difference. I'm an old person and I want to say they don't make them like they used to. But nowadays, what I see bothers me in the MT programs out there now. There are very few that are set in a hospital. ... This kid goes out and they're farmed out to some tiny little hospital out in the mountains to go get their clinicals and they may just get sit down to read procedural manuals most of the time. So people come out of MT [MLS] programs with a real lack of clinical experience nowadays.

The laboratory manager also believed that the students today were the 'dumbest generation.'" He went on to add that most students now do not have an adequate knowledge base, because technology has made it too easy to find information, taking the place of having to "know" information:

Don't take my word for it. Look at the studies. The studies will tell you. Most people don't know how to critical think anymore. Critical thinking abilities are not what they used to be because they don't have to. There it is [the information readily available on the internet]. Where before, you had to think ... I think it will get progressively worse. ... Why learn it when you can just Google it? I can Google it and pass my test.

Although the supervisors had both worked with online MLS graduates and found them to be as prepared for the workplace as traditional MLS graduates in general, they both had reservations about online MLT education. Neither of the supervisors had worked with an online MLT graduate, but believed that it was important to have basic knowledge of the field through traditional means.

### ***Hiring Online CLS Graduates: Program Reputation is Key***

At Eastern Urban, concerns about hiring online MLS graduates were not as pressing as with online MLT graduates, mostly because the online graduates were already working in the laboratory as MLTs from traditional programs. One of the biggest factors for the assistant laboratory manager was that individuals passed their registry examination upon hire, but he indicated that this had not been a problem with any of his current employees, online or otherwise.

The training coordinator was an advocate of hiring MLTs versus MTs initially, because she believed that the MLT was more driven to go to work in the field and be more dedicated than an MT with just a bachelor's degree; she believed that the MTs were not as grounded and used the laboratory job as a stepping stone into other areas making them harder to keep on staff. On the other hand, the training coordinator had favorable views of working MLTs continuing their education to the online MT degree:

So we've already made them into a clinical employee. We're just fancying up the package now. I'm really a big fan of that. Only the folks who are really driven will pursue that level. That is making us a new crop of bachelor-degree folks who can progress onto higher levels. You know, supervisors and things like that. I really like it

because they've got some experience when they do those [online] courses and I think back to when I was just a little baby in school, I was just memorizing stuff trying to live and graduate. Now they can be in the lab working and associated with what they're doing in the program and it makes both sides that much better. I think it's much better ... think you're more mature if you've been out working and you actually absorb more of it.

When asked about hiring online graduates for the laboratory, the training coordinator indicated for MLS graduates, online or traditional, it would not make a difference, and that she would look at the overall reputation of the school and the CLS program from which the student had graduated, if it was not a current employee of the hospital. For online MLT versus traditional MLT graduates, she added that the most important reputation issue was where the students did their clinical rotations, and if they were at larger hospitals versus smaller, rural hospitals where the students would not have as much exposure to different types of laboratory tasks.

***Job Performance of Online CLS Graduates: No Appreciable Difference***

Regarding job performance of online MLS graduates, since all were already working as MLTs in roughly the same job capacity after graduating with the online MLS degree, their performances were viewed as the same as traditional MLS graduates by both the assistant laboratory manager and the training coordinator. Although the graduates were doing essentially the same job in the laboratory upon graduation from the online MLS program, the training coordinator believed that the additional education was more of a personal advancement mechanism, and changed them from a “worker bee to a scientist”. The assistant laboratory manager added that employees who chose to pursue additional education to the MLS level, online or traditional, received positive marks on their performance evaluations for taking the initiative to advance their education. He commented specifically about competency evaluations for online MLS graduates at Eastern Urban:

They [online MLS graduates] did fine before ... I don't see any appreciable difference in terms of better. We have one who is okay in one area. He went to school and still has one area that he's not the strongest in. Still not strong ... I don't want to say yea or nay but I didn't see anything massively different [after online education], appreciably different [because they are doing the same job as before].

Although he believed that there was no difference in job performance of online MLS graduates compared with traditional, the assistant laboratory manager had some concerns regarding online education and how the assignments measured the true knowledge base of students. Additionally, he had some concerns with cheating and said that it would not be difficult to do in an online classroom based on his own experiences:

Technology is good for a lot of things, but not for people I know in terms of really understanding information. Because you had to read it [and understand and paraphrase the information yourself] versus ... cut and paste this, change a few words, so I'm not plagiarizing. How do you know [that I plagiarized]? They had that plagiarizing software, but if you change a few words here and there, they won't pick it up.

Although the assistant laboratory manager raised this cheating concern in the online classroom, his views did not appear strong enough to deter from hiring such graduates if they had passed the national registry examination, as mentioned earlier.

### ***Online Graduates' Perceptions of their Job Preparedness: Doing the Same Job***

The online MLS graduate who had obtained a traditional MLT degree prior to starting his online MLS degree had been working as an MLT in the laboratory for about five years. He worked full-time the whole time he was working on the online MLS degree. As for workplace preparation, the online graduate said he was essentially doing the same job as he had prior to obtaining the degree, and that his main objective for obtaining the degree was to have the ability to progress into more management roles in the laboratory with a bachelor's degree:

That's kind of a tricky question because I feel as if I was prepared before I went into the program given the fact I was already employed in the lab and so I think if you want to compare that with someone who is in the traditional route, well you have to look at the fact that the people in the traditional route [haven't] been working in the lab yet. If the

person has been in the MLT program and then starts online while working in the lab, you're pretty much doing the job that the traditional-route students are looking to do once they graduate. The only advantage is four-year plus two-year degree you should start out with a better pay and you ultimately should have more options if you chose to take that route. As far as preparation, I don't think four-year degree prepares you any better than a two-year degree because you have people in the lab with two and four-year degrees and pretty much have the same jobs. I don't think it prepares you a lot more.

As for the national registry examination, the online graduate had not yet taken it, but felt that he would be successful and pass the exam:

I don't think the school is solely responsible for your preparation. I think it's more or less on the individual to make sure they're prepared because I don't think anyone else knows your strengths and weaknesses better than you do. I think it's ultimately up the individual to make sure they're prepared. That's why I don't feel I'm going to have a problem with the exam. I'm pretty well prepared for it. That's what I tell everybody. If you don't make it, I don't think you should blame the school. Blame yourself because you know what you need to know. You know it before the exam to get yourself prepared. I think the school does its part in providing you with base of information. They don't sit there and drill it into your head, which I don't think they should. It was your decision to go to school so it should also be your decision to take in and absorb as much information as you can there.

The online graduate had advice for future online graduates for success, saying that it was important to be self-motivated and self-disciplined to navigate through the program. He recommended not getting behind on assignments and staying organized. He believed that the most valuable assignments in his online program were the case studies, where he would have to work through a set of laboratory values and determine a patient's disease condition. The online graduate said that he did not have as many hands-on activities as he would have in a traditional program, but was required to perform a hands-on project in his own laboratory workplace, make a video of it, and submit it for an assignment.

He explained that some of his traditional colleagues were skeptical of his online degree, believing that it was "easier" than traditional degrees. He took those opportunities to "educate" them on how involved the online process was and the amount of work that was required to

complete the program successfully. He believed that in order to turn around some of the skepticism of online degrees, it would be important for more individuals to successfully complete them and then perform well in the workplace:

Yes. I think that would be more of a testament in itself by them being able to demonstrate the skills needed to show competency in job areas as well as being a traditional student. It will change things a little bit. That's one thing I think would kind of change it if they can demonstrate competency and show they can do the job just as well as anybody else ... Well, maybe [perceptions have begun to change about online education]. I haven't heard anything negative about it since [I graduated with my online degree]. So maybe. Maybe their minds have changed or they just haven't said anything.

Another concern that colleagues expressed to him regarding online degrees was their perception of higher levels of cheating than in traditional classrooms. The online graduate did not believe that there was a high degree of cheating and plagiarism in his particular program and said that all of his exams were proctored to ensure that students could not just look up answers as they took the exam. There appeared to be a difference in perspective about the level of cheating in the online classroom between the online graduate and the assistant laboratory manager, who believed that it was easier to cheat online.

Overall, the online graduate believed he was prepared for the workplace after finishing his online degree, not because of the degree, but because of his previous work experience in the laboratory. His degree was becoming recognized more as an equivalent degree to traditional MLS degrees based on his work performance in the laboratory, and ability to advance into the same positions as others with traditional degrees.

### **MLS Online Educator Perceptions of Job Preparedness and Performance**

The program director of the online MLS program at Eastern University (EU) was interviewed regarding her views of preparedness that online MLS provides graduates for the workplace. The EU online program was identified as the feeder school for this study, had

graduates working in case four at the time of the study, and had an affiliation with case three, but had no current graduates working there. The program director discussed various factors that influenced success in the online program, and preparedness for the workplace.

The online MLS program at EU accepted students from all over the country who were graduates of associate degree MLT programs. Students accepted into the online MLS program also had to be working in the field; this requirement for work experience was related to some of the clinical tasks students were required to complete in their workplace. Because of this prior work experience, and the nature of the online program, the program director stated that online graduates performed better on the national registry examination than her traditional program graduates:

Yes [online graduates do better on the registry exam]. I think, too, a lot of our traditional learners, and this is different than your MLT population, is the age. We have a lot of younger students. They've been here two years, but two years out of high school. They're still young. They want the whole, and rightfully so, university experience. The online learners are more focused. They are older. They already have started their careers. I think that helps too. They can be more focused. They aren't as distracted by the things – the football team, the basketball team.

The program director added that she had a higher expectation of her online students than she had for her traditional students because the online students already had work experience in the field. She further added that she was considering raising the entrance GPA from 2.5 to 3.0 for the online program to increase the quality of students even more. She said that online students' pass-rate average was around 92%, which was above the national average, and this was not the case for the traditional graduates. Traditional graduate pass rates at EU were more sporadic, sometimes below the national average of around 85%, and other times above.

The views of the program director and the supervisory staff of participants in all hospital cases were similar regarding preparedness of online MLS graduates for the workplace. They

agreed that these graduates were already prepared for the workplace due to their prior job experience as an MLT, and that the MLS degree was an advanced degree that added an opportunity to progress to other management-level positions.

## **CHAPTER SEVEN: CROSS-CASE THEMES AND CONCLUSIONS**

The purpose of this study was to explore the perceptions that Clinical Laboratory Science (CLS) administrators and educators had of online graduates' workplace preparedness and job performance, as well as the online graduates' own perceptions of their job preparedness. In chapters five and six, research findings from four cases were provided. Findings were based on interviews with participants in each of the four hospital cases, and were organized in accordance with research questions pertaining to online graduates' job preparedness and performance. Laboratory administrators, including managers, supervisors, and lead technologists involved in hiring and evaluation procedures of new graduates, were interviewed. Additionally, online graduates of Medical Laboratory Technician (MLT) associate's degree programs and Medical Laboratory Science (MLS) bachelor degree programs were interviewed. Finally, educators from both online MLT and MLS programs were interviewed, and their views of preparedness and performance of online graduates were discussed. In this chapter, the results of a cross-case analysis are presented, addressing the following research questions:

1. How do laboratory administrators and educators perceive the workplace preparedness of new online CLS graduates?
2. How do laboratory administrators and educators perceive job performance of new online CLS graduates?
3. How do new online graduates perceive their level of preparedness for the workplace?

Four themes emerged from the findings. The first theme was related to participants' prior experiences with online education. The amount, and the quality, of the experience participants had with online graduates was related to their perceptions – the more experience, and the better the quality of the experience, the more positive the perception of online graduates. The second

theme regarded the nature of online programs and concerns about the lack of hands-on activities or clinicals online graduates had during their degree programs. The importance of online program quality and reputation was the third theme. Finally, the influence of job market conditions on the hiring of CLS graduates, online or otherwise, was the fourth theme. There was triangulation in findings between participant responses in this study from which the themes emerged. Triangulation of the three groups of participants across the four cases, as well as across MLT and MLS programs provided confidence in the validity of findings. Of the four themes, some crossed over MLT and MLS- level education, and others pertained just to MLT or MLS-level education – and explanations of these occurrences are included in each section. In addition to describing themes across the four cases, themes will be discussed in relation to extant literature on online education. Additionally, limitations of this study, as well as future directions for research, and implications for the CLS field will be discussed.

### **Theme One: Online CLS Education—Seeing is Believing**

The amount, and quality, of direct experience that participants had with online education seemed to influence their perceptions of workplace preparedness and performance of online graduates. Those participants who were able to “see” online graduates as being as prepared as traditional in their own workplaces were more likely to believe in them, and have a more positive view of their workplace preparedness. Those who had more experience in general, and who had positive experiences with online education, were more favorable, and those who had less, or no, experience with online education were more skeptical. This theme spanned across all four of the hospital cases, and each of the groups represented in this study will be discussed in relation to this issue – laboratory administrators, online educators, and online graduates.

Laboratory administrators who had little, if any, direct experience working with online graduates were more skeptical of their preparedness for the workplace. In fact, in case two, many of the laboratory staff who had not had direct experiences working with online MLT graduates met together before our interview and collectively decided that they were not in favor of online MLT education, favoring traditional education in the field, and appeared to be taking a “stand” against online. The more laboratory administrators worked with online graduates directly in the workplace, the more receptive and positive they were about the graduates’ preparedness for the workplace. The less experience or exposure that laboratory staff had working with online CLS graduates, the more skeptical they were of their preparedness for the workplace. Their skepticism was based on speculation about how learning clinical laboratory skills online compared to traditional means, like the way that they had been educated. This phenomenon was especially true in relation to MLT online graduates, who were fresh to the field, with no clinical experience in the laboratory.

Administrators who had minimal or no experience working directly with online MLT graduates on the job, or during their final clinical rotation period prior to graduation, were very skeptical of their preparedness for the workplace. Often the administrators said that the online graduates would have to “prove” themselves in the workplace in order to be considered equally prepared to their traditionally educated counterparts. Some laboratory administrators with no experience working with online MLT graduates said that the pressure would be on the first online graduate hired to set the standard for future hiring, based on their work capabilities upon hire. If the online graduate performed well on the job, they would be deemed acceptable, and future online graduates would be well-received. Some of the laboratory administrators stated they would give the online graduates a “test” or “practical” during their interviewing process,

having them perform some basic laboratory skills tasks that they could evaluate. Other lab managers said they would ask online graduates verbal questions about general laboratory science content in order to gain a sense of their knowledge base.

The laboratory administrators who had direct experience with online MLT graduates viewed their job preparedness more positively, and were more open to hiring them. Those who had experience were focused less on whether a graduate was educated in an online or traditional program, and more on whether the graduate was the “best fit” for the job. In these cases, peer interviewing was utilized to assess job candidates’ skills and knowledge, and determine if they were right for the jobs available. Laboratory administrators who had prior experience with online graduates were more comfortable with hiring them, based on their experiences, and had more of an idea of how to handle situations in working with online graduates.

Laboratory administrators in all four cases were more receptive to online MLS graduates than they were to online MLT graduates. Most online MLS graduates already have an associate degree in MLT, and have worked in the field for a period of time. Often times these online MLS graduates were working in the laboratory as MLTs while pursuing their online degrees. Because most MLS online graduates had prior job experience and already had basic laboratory skills and knowledge at the MLT level, laboratory administrators believed they were prepared for the workplace. In fact, laboratory administrators in all four cases said they would encourage an MLT who was working in their lab to go on to pursue an online MLS degree if there was an individual interested in doing so.

Regarding job performance, across all cases, the laboratory administrators did not believe there was an appreciable difference between online and traditional graduates. Laboratory managers reported that online graduates performed at the same level on assessments of

performance in the laboratory such as individual lab skills competencies and performance evaluations. Although there were some concerns over limited clinical rotation time for MLT online graduates, this limited rotation time was not thought to affect job performance measures. All of the hospital case lab managers said that once all new graduate hires, including online and traditional, are hired into the laboratory, they undergo an orientation period where individual training on the job takes place. With online MLS graduates, laboratory managers saw no difference in job performance because in all instances in this study, these graduates were already MLTs working in the laboratory pursuing the MLS degree at the same time. In these instances, the online MLS graduate was doing the same job they did as an MLT, and basic laboratory skills had been established prior to obtaining the online MLS degree.

Across all cases, both MLT and MLS online graduates believed that their degree was equivalent to a traditional degree of the same type. Although some Medical Laboratory Technicians (MLT)s struggled in their programs and believed that more clinical time would have been helpful, they reported that once they earned their online degrees, they believed they were as qualified to enter the workforce as someone with a traditional MLT degree. Further, the online MLT graduates believed that they were just as well-received as someone with a traditional MLT degree in the workplace. This was somewhat contradictory to how some of the administrators viewed online MLT degrees, as lesser degrees than those awarded in traditional programs.

MLS online graduates also believed that their online degrees were equivalent to traditional MLS degrees, and that they had the same advancement opportunities in the CLS and health care fields as their traditionally educated co-workers. Moreover, online MLS graduates who sought positions in health care areas that required an MLS degree were hired for such positions, often times over traditional graduates. Most of the online graduates interviewed across

the cases were very proud of their degrees, and often noted the level of dedication, self-discipline, and commitment they had to have in order to succeed in their online programs.

Educators at both the MLT and MLS level also indicated that their perceptions of online education were evolving as they gained more experience working with it. Both educators had previously taught in traditional programs before transitioning their programs to online formats, and admitted that before the transition, they were more skeptical of quality issues of online education. Once the educators began their online programs, their views became more positive as they realized that online education was a viable option, and in some cases could be better than traditional preparation. The educators concurred with the online students' views that student self-motivation and discipline were necessary in order to succeed in an online program, and that in some cases, these qualities made an online graduate a better MLT or MLS in the workplace than a traditional graduate.

The idea that the amount of experience that administrators, educators, and online graduates had with online education is directly related to their views is not surprising in light of prior research on perceptions of online education in business. The views of participants in the current study were not unlike those of senior learning executives in business, one of whom was initially skeptical of online education until he pursued and obtained an online master's degree in business himself (Trierweiler & Riviera, 2005). The once skeptical business executive became more open to and positive about online learning after his own positive experiences with it. Further, the collective "stand" that some of the administrators took against online learning in the current study, especially at the MLT-level, and in favor of traditional learning instead, has been found in previous research. For example, this "stand" is aligned with comments made by Professor Margaret Brooks (2009) regarding opposition to online higher education based on her

own experiences with colleagues and the general public. Brooks (2009) noted that many believed face-to-face instruction was superior to online instruction, and went on to add that although the general public was slowly becoming more receptive to online education over time, there was still some growing to do in this area, and that educational programs had to continue to “prove” that online standards were the same high standards as those in traditional programs.

The current study’s findings that educators’ views of online education become more positive with increased experience teaching online was also reflected in previous research. In Johnson’s (2008) qualitative study of nursing faculty making a transition from a traditional to an online format, similar shifts to more positive perceptions of online education were seen with increasing online experience. In the Johnson study, the more that nursing faculty taught in online programs, the more open they became to the idea of effective online teaching strategies. Before beginning to teach online, nursing faculty in the Johnson study expressed reservation about and reluctance to teach, online. Their views changed, however, as they saw that online methods they utilized worked for effective student learning.

In the current study, online graduates’ views about the keys for success in online education were consistent with views of online faculty in previous research. In the current study, online CLS graduates reported sentiments that were comparable to those in two previous studies of online higher education. Views of master’s degree faculty in Brown’s (1998) case study and views of online faculty discussed in the Desai et al. (2008) literature review on online higher education, regarding dedication and self-discipline as essential personal student attributes for success in an online program, were consistent with views of online graduates in the current study. Further, views of business employees (Merriman, 2006) were reflected in the current study’s online graduates’ beliefs that online education provides opportunities for increased job

advancement and enrichment that may not have been possible otherwise, due to work and family commitments. These views were especially true of online MLS graduates in the current study. All of the online MLS graduates across all four cases obtained their degrees for convenience purposes. They were already working in the CLS field full-time as MLTs, and had aspirations of job advancement.

The current study adds to the limited previous research on actual job preparedness of online graduates, both from the vantage point of online graduates and administrators. Previous literature was limited to addressing online nursing graduates' views of their experiences in the classroom (Kenny, 2002), but did not address how online graduates performed in the workplace after graduation. The Coose (2010) online nursing study, which revealed comparable pass rates of online versus traditional students on certification exams, suggested more studies needed to be done to evaluate how well these online graduates performed in the workplace. Although the current study examined the workplace preparedness of CLS online graduates, rather than nursing online graduates, it adds knowledge that may be applied to many skills-based healthcare fields.

The current study findings are consistent with current literature in the field regarding skepticism about online education and how these perceptions may change to more positive ones over time and with experience. Additionally, previous literature regarding online graduates' attributes for success were also mirrored in the current study. What was not reflected in literature, however, was how practitioners in health care fields, including CLS, perceive preparedness of online graduates. In prior research, only perceptions of business executives about online education were addressed, and in health care, only perceptions of nursing faculty, not practitioners. The current study adds information regarding how specific factors, such as direct experiences with online education, influence perceptions of laboratory professionals who

actually work closely with them in the field, and that seeing the successes of online graduates is believing in their preparedness for the workplace. In this way, the current study extends what we know about online graduates' job preparedness and fills in gaps in the literature for CLS and other related health care fields

**Theme Two: Hands-on Skills—“I *Did* This, Rather than, I *Saw* This”**

Across all cases, laboratory administrators and online CLS graduates shared concerns about the opportunities for hands-on experiences present in online educational programs, particularly at the MLT level. Since the MLT-level graduates were new to the CLS field, the laboratory administrators believed it was essential that their hands-on, or clinical, skills were strong coming out of their educational programs. Although laboratory managers with direct experience with online graduates were more comfortable in hiring them, and believed that they were prepared for the workplace, those managers also believed that the online MLT graduates could have benefited from more clinical rotation time in their educational programs. CLS educators in this study, however, did not share the same views as administrators and online CLS graduates, believing that there were adequate hands-on experiences provided in their online programs.

With the CLS field being applied and skill-based, this issue of hands-on training experience in online programs is important. Laboratory staff, as well as online MLT graduates, believed more clinical rotation time was needed in online CLS programs. This finding was similar to findings of the initial pilot work involving the local laboratory manager, who was concerned with online CLS graduates being trainable or adaptable to the work environment, and was also concerned about their hands-on skills. Although they successfully graduated from online programs, and passed their national certification exams in most instances, the majority of

the online MLT graduates believed their job preparation could have been even stronger with more clinical rotation time.

For the MLS level, however, the level of hands-on activities in online programs was not a concern across the cases. Again, because the MLS online graduate most likely was already a working MLT in the laboratory, most administrators believed they already had the basic, and most crucial, laboratory skills, and that the MLS degree was an enhancement degree, building on their current knowledge and skills base. This finding was also consistent with the earlier pilot work, where the laboratory manager was more concerned with MLT-level hands-on skills, and not so concerned with MLS-level skills. Likewise, online MLS graduates in all cases believed that their MLS degrees did not prepare them any more for their jobs, if they were still working in the laboratory. Many online MLS graduates were still working in the same jobs they had before obtaining an MLS degree. All of the MLS online graduates did believe, however, that their online MLS degrees prepared them for opportunities of job advancement into management areas of the CLS and healthcare related fields.

Educators across the cases had a different view from other participants in the current study about the lack of hands-on experiences provided in their online programs, believing that they were providing adequate preparation. Actually, the educator at the MLT level believed that her graduates were prepared very well clinically and that because they needed to be more independent in their online coursework and program, this made them more prepared, and more of a self-starter clinically in the workplace than those from traditional programs. There seemed to be somewhat of a disconnect between the MLT educator and the hospital cases on this point. The hospital-based participants believed online CLS graduates were prepared enough for the workplace, but would prefer they had more clinical rotation time in their programs. Conversely,

the MLT educator believed that her online graduates had adequate clinical preparation. In fact, the educator was also in favor of her students doing all of their clinical rotations at hospitals, and not coming to campus any for clinical instruction. This was not an option that the hospital-based participants were in favor of due to low staffing levels, and staff not having adequate time to instruct students in the hospital laboratory setting.

This study's findings that practitioners in the CLS field are concerned with hands-on training in online education are consistent with concerns of nursing faculty noted in previous research. Studies of nursing faculty by Smith et al. (2009) and Christianson et al. (2002) showed that faculty were concerned about the structure of their online programs, and how best to assess clinical skills of students in the online classroom. Each study suggested different online course methods that best addressed clinical skills of nursing students in the online classroom, such as group projects, case studies, group discussions, and even virtual laboratories. Furthermore, a study examining the online nursing program at Drexel University revealed similar preferences for interactive learning experiences such as discussions, wikis, and blogs to assess nursing students' ability to react appropriately in real-life patient case scenarios (Cornelius & Glasgow, 2007). Another study of nursing faculty by Blake (2009) revealed concerns about how well-suited online learning was for practice-based learning in nursing. Although CLS online graduates in the current study indicated that case studies were one of the most effective online assignments to pull information together and understand concepts, they still believed that they would have gained more, and been better prepared for the workplace, from having additional hands-on clinical experiences in their programs.

Previous studies addressed the concerns nursing faculty had about evaluating clinical skills of students in the online classroom, however, there have not been any studies regarding

assessing their clinical job preparedness or performance after graduation from an online program. From prior research, we know that certain online course assignments were more effective than others in assessing clinical skills at the classroom level, however, once students left the classroom and entered the real world, there was no evidence to show how they took these classroom skills and applied them effectively in the workplace. The current study adds key information regarding practice-based evidence of hands-on skills in the workplace after graduation from an online program. From this study we learned that including more hands-on skills in entry-level online programs, such as the MLT, was more important to practitioners than hands-on skills in online advanced degree programs, such as MLS, in order to have “ideal” workplace preparedness.

### **Theme Three: Program Reputation and Quality—It Should be a Good School**

Across all cases, the reputation of an online educational program was very important to participants in this study. All three types of participants—laboratory administrators, educators, and online graduates—were concerned about program quality. Three aspects of quality they stressed were (1) program or institution name recognition and well-established integrity, (2) program national registry passage rates, and (3) general academic integrity of the program, including instances of cheating. The factors that each group considered important regarding program reputation were the same in some instances, and different in others.

One issue that concerned laboratory administrators was the reputation of the institution from which prospective employees were graduating, be it online or traditional. It was important to laboratory administrators that the institution be well-known for producing highly qualified, competent graduates. Just as participants were drawn to educational programs with positive reputations, they were repelled by those with unfavorable reputations. In case one, there was a

consensus about a perceived “bad” program, based on prior experiences that participants had with the program’s students who had performed clinical rotations that were unfavorable. Because of past unfavorable experiences with this program’s students, participants at the hospital would no longer accept the program’s students for rotation. Also related to clinical rotations of students, participants believed another aspect of a good-quality program was the location where students were sent to do their clinical rotations or internship; schools with good reputations were those who sent their students to hospitals that also had well-known, good reputations.

Another indicator of a good-quality program for the laboratory administrators was high national registry passage rates after graduation. For the online programs, all of the participants, including administrators, educators, and online graduates, indicated that pass rates were very good compared to traditional programs, and in the case of the online MLS program in this study, they were better than rates in traditional programs. The educators for both the MLT and MLS programs in this study said that GPA standards had been increased in their programs in order to recruit better quality students, who would be more likely to succeed from the beginning. As a result of this GPA increase, as well as the structure of the curriculum of the online programs, graduate registry pass rates were above national averages in both the MLT and MLS programs. Additionally, the MLS online program graduates registry pass rates were 100 percent in recent years, and higher than traditional MLS graduates from the same institution. The program director had a higher expectation for the online MLS graduates because of their previous work experience that the traditional MLS students did not have. All but one of the online graduates in the study passed on the first attempt taking the exam.

In addition to positive community program reputation and high registry pass rates, participants in the study believed that high standards of academic integrity were important for

program quality. They were especially concerned about the possibility of increased cheating in the online classroom. Across the cases, the educators were aware that some believe that cheating is more prevalent in an online classroom. Both had taken measures, throughout the development of their programs over the years, to lessen the likelihood of cheating. The educators had put into place proctored examinations to ensure that students did not have the opportunity to look up exam answers while taking them online. Likewise, none of the online graduates interviewed in this study indicated that cheating was an issue in their programs. In fact, the MLS online graduate stressed that he believed his program was intense, and that cheating was not possible due to checks put into place by the program.

Most of the previous research related to the quality of online programs and courses was from the perspective of higher education faculty, and specifically addressed quality course design, rather than overall program or institution reputation. Based on interviews conducted with administrators in the Office of Continuing Education at University of Illinois at Urbana-Champaign, Gaide (2004) discussed factors such as good student and technical support in the online classroom, whereas Maddox (2004) discussed faculty training issues that were essential to the development of a quality online course. A study by McGorry (2003) highlighted the importance of components built in to the online courses, such as responsiveness, flexibility, interactive learning strategies, and efficient use of technology. Although online CLS graduates and educators in the current study also believed these factors were important in quality online programs, the stronger theme was that the program, and institution, should have a good reputation among institutions offering CLS programs. There was a similar finding in Trierweiler and Rivera's (2005) study of senior learning executives in business, where the executives believed that the most important aspects of acceptance of online programs were their integrity,

accreditation status, and expense. Similarly, in the current study, knowledge that the online program had high standards and graduated reputable, qualified graduates was important to laboratory administrators, but not as important to them as their own personal experiences with online graduates in the workplace.

Another program quality factor important to this study's participants was national certification exam pass rates, and it was reported that online student pass rates were at least equivalent, if not higher in some instances, than those of traditional graduates. This finding is aligned with several previous studies comparing pass rates of online graduates to traditional graduates. In the Coose (2010) study of online versus traditional nursing graduates, online pass rates were no different than traditional graduates. In the Hansen-Suchy (2011) study of online MLT pass rates versus traditional graduate pass rates, there was no appreciable difference in pass rates between the two groups once the online program became more established. Additionally, the Russell et al. (2007) study of national pass rates at the MLS-level of online graduates versus traditional graduates revealed pass rates were slightly higher for online graduates than traditional. Further, the Hansen-Suchy (2011) study indicated that student demographics, such as being an older student with more laboratory experience, appeared to be a factor in the registry pass rate success of online graduates. This was also confirmed by the MLS educator in the current study. Moreover, the Campbell (2003) study of seven online CLS programs across the country showed that online students performed better on certification exams than traditional students, for similar reasons of being older and more mature, and having more laboratory experience in several instances. Information learned in the current study was consistent with findings of previous studies that online graduates perform just as well, or better, on national certification exams than their traditional graduate counterparts.

Regarding academic integrity of online programs, there were some findings in the literature of concerns about more cheating in the online classroom. Based on empirical findings, Brooks (2009) reported that fellow faculty believed there was a higher incidence of cheating in the online classroom than with the traditional classroom. Further, in CLS literature, Conaway-Klaassen and Keil (2010) discussed a case of student cheating in the CLS online classroom, and how policies were changed at the institution to prevent further cheating incidents. In the current study, educators and online graduates did not identify cheating as a problem, and in some instances, emphasized procedures that had been put into place in their online programs to prevent such occurrences. Both educators were aware of instances of cheating in the online classroom from previous research and conferences attended on this topic, and took extra measures in their programs to eliminate such occurrences.

Information obtained in this study is consistent with previous literature regarding concerns about online program quality, the importance of high pass rates, and concerns about academic integrity of online programs. This study adds more specific information regarding continued practitioner skepticism about the quality of online programs, despite the higher pass rates observed and the processes put into place to prevent cheating in the online programs. A specific variable that created skepticism about the quality of online programs was the general community reputation of the program. What we learned from this study was that factors such as one bad online class experience, or one bad experience with an online student, or the knowledge of sending online students to an undesirable hospital for clinical experiences, could damage an online program's reputation. In this way, the current study adds information regarding the importance of community perceptions about the quality of individual online programs, as well as institutions.

#### **Theme Four: Job Market Conditions—“We Will Take Who We Can Get”**

Although participants in this study expressed concerns about program reputation and quality that influenced their views on hiring, the laboratory administrators across all four cases were also affected by CLS job market conditions, and the general availability of new MLT and MLS graduates when faced with hiring decisions. Administrators across all cases talked about staffing shortages in the CLS field that were due to a number of factors. One factor mentioned was an increase in the number of educational program closures, some of which had served as a large source of graduate employees for the hospital laboratories over a number of years. Due to these program closures, there was a more limited applicant pool for job openings in the hospitals; therefore, being selective in hiring only graduates of “top” schools was not always possible. One participant summed up the sentiment of many of the participants in the study stating that sometimes they just had to “take who they could get.” Other reasons for shortages were retiring workforce, and fewer individuals going into the CLS field due to lower wages, compared to other health care fields such as nursing, where education requirements were equivalent. When asked how online CLS education was a factor, or not, in the staffing shortages, many across cases said that online education could help in offering educational opportunities to some who may not have had access otherwise. Others believed they would not be able to be as “picky” as in the past with choosing traditional graduates instead of online, because there may not be as many traditional graduates to choose from in the future. Likewise, there was a sense that administrators may be “forced” to consider online graduates for hire because of limited applicant pools.

Prior research has linked the emergence of online higher education, including that in CLS, with job shortages and the ability to offer greater access to college degrees. Maddox

(2004) cited reasons for growth in online higher education programs including increasing access to disabled students, as well as students in rural areas. Further, Brooks (2009) identified reasons such as family and job commitments that prevented potential students from pursuing traditional education. Similar reasons for the development of more online programs were listed in nursing, such as increasing access to nursing education and providing flexibility to working students and those with family commitments (Atack & Rankin, 2002).

In CLS, Simonian (2007) suggested that in order to fill workforce shortages caused by retirements, CLS educators began offering online programs to provide more access to education in the field. Although we know from prior research that shortages are a reason for development of online education in the field, the current study shows that laboratory administrators are still skeptical of hiring such graduates, but admitted that because of shortages, in some cases they may not have a choice but to hire them. With dwindling applicant pools for CLS jobs, administrators in this study were obliged to consider hiring online graduates as a last resort, where their initial preferences in many situations were traditional graduates.

### **Limitations of the Study**

Due to the nature of qualitative research, findings cannot be generalized, however an argument can be made that other laboratory administrators, educators, and online graduates have similar perceptions to those identified in this study because of the uniformity of clinical laboratories and CLS education programs across the country. There are numerous online programs, both at the MLT and MLS level, which may have only slight differences in structure for courses, methods utilized in the online classroom, and procedures for handling clinical rotation experiences. Some programs considered to be “online” may have more actual online components than others. Although the structure of the online CLS programs in this study may

vary to some degree from other CLS online programs, they are similar in important ways. Programs at MLT and MLS levels are subject to the same accreditation standards set forth by the National Accreditation Agency for Clinical Laboratory Science (NAACLS), which standardizes laboratory educational programs across the country. Specific factors such as set curriculum content areas, amount and type of clinical rotation experiences, and faculty expertise in the CLS field are standardized across all accredited CLS programs, online or traditional.

Another limitation in this study was the dependence on laboratory managers at out-of-state locations for selecting participants and scheduling interviews in their respective laboratories. Because I was not familiar with the hospitals, nor did I know participants personally, I relied on laboratory managers to identify participants based on criteria for the study that I had set forth, and trusted them to select suitable candidates. In most cases, the participants selected by managers were forthcoming and added relevant information to the study. In one case, however, there were two interviewees selected by the manager who did not meet criteria of being in a supervisory capacity or being an online CLS graduate. I did not discover until after the individuals began their interviews that they did not meet interview participant criteria for this study. As a courtesy, I conducted a brief interview with each, but the data were not utilized in this study.

Scheduling of interviews was also dictated, to a large extent, by the laboratory managers of each hospital case. The scheduling was dependent on participant availability during the work day in the laboratory. The work schedules, in each laboratory case, were very busy, and interviews were scheduled at times that were convenient for the participants, which sometimes meant conducting a series of back-to-back interviews, which was less than ideal and comfortable

for me. Due to the rigorous interview schedules, I had to make more of an effort, in some cases, to remain focused and ask relevant interview questions of participants.

### **Implications for Future Research**

As evidenced by findings, educators' perceptions of online programs changed over time; as educators became more comfortable with their online programs, they began to change course and program content and to improve overall quality. Educators and online graduates in this study revealed that the online programs evolved over the years in response to what seemed to work the best for student outcomes. A future study of the evolution of online education in CLS, from where it began, to where it is in ten or more years, and what specific course procedures and policies have changed would be valuable to CLS educators. It is important for program directors who are contemplating starting an online program, or those seeking more information for online course design, to have knowledge of what experienced online faculty have determined to be the most effective course strategies in CLS.

Concerns over limited hands-on activities was noted as a theme in this study, however, findings were limited to two online CLS programs regarding how hands-on activities in the online classroom were addressed. An expanded study to examine how several other online CLS programs, especially at the MLT-level, deal with hands-on learning and clinical rotations would be beneficial to program directors, and would provide laboratory administrators with more information regarding the background of their online graduate employees. Specific elements, such as length of time of clinical rotations, locations in which clinical tasks are performed, and how clinical skills of students are evaluated would be important to determine.

Another theme in this study was the importance of having a good quality CLS program from which future employees graduated. Although some factors were identified, such as the

general reputation of the program in the community, the location where clinical rotations were performed, and registry passage rates of the programs, further study of more specific factors important to laboratory administrators in judging a quality program would be helpful. This information would be beneficial for program directors to aid in future program development. Further, specific information regarding what laboratory managers and supervisors believe constitutes a “good” community reputation of a program would also be helpful to CLS education program directors.

### **Implications for the Clinical Laboratory Science Field**

The findings of the current study have implications for laboratory administrators and CLS education program directors. For laboratory administrators, there is existing literature on online pass rates versus traditional graduate pass rates showing that online graduates perform just as well, or better, on national certification exams. This study confirmed that finding and provided additional information about actual job performance and preparedness of the online graduate, which for the most part, was positive. The results of this study can raise awareness of online graduates’ job preparedness and performance, and offer laboratory managers and supervisors valuable information to make more informed decisions when considering hiring online graduates for the workplace.

Another implication for practice in this study is recognizing the differing perceptions between laboratory administrators and educators in regards to some aspects of the job performance and preparedness of online graduates. Although, overall, the laboratory administrators who had experience working with online graduates believed they were “prepared enough,” educators of online graduates were much more positive of the same graduates’ preparedness. Educators at both the MLT and MLS levels believed their online graduates were

as prepared, or more prepared, than traditional graduates for the workplace. They based these views on the online students' higher level of independence and self-motivation needed to succeed in online coursework, as well as their high test pass rates. Although laboratory administrators recognized that it took more self-motivation to successfully complete an online degree, and that passage rates were high, they did not agree with educators that their preparedness was the same or better than traditional graduates. In fact, laboratory administrators were more focused on the amount of clinical rotation or hands-on activities students had as a measure of preparedness. There appeared to be a disconnect between laboratory administrators' and online graduates' perceptions, and educators' perceptions of job preparedness in these areas, and perhaps better, more open communication between the two groups to discuss these different perceptions would be indicated. It is not surprising that the perceptions are somewhat different in this area, as it is common place for educators to believe that they are preparing their students adequately for the workplace, and are following accreditation standards for clinical rotations. Nonetheless, although standards are technically being met for clinical rotations for online students, there appears to be a gap in the level of preparedness that laboratory administrators and online graduates believe is important for optimal workplace readiness. As part of accreditation standards for CLS programs, annual clinical advisory meetings are required between program directors of CLS programs, faculty, and clinical affiliate personnel, which often include laboratory managers and supervisors. At these meetings, discussions take place regarding a variety of CLS program issues, including areas for improvement. More awareness of differing perceptions of online education between educators and practitioners should be noted, and more discussions are needed about ways to improve processes, and increase confidence in perceptions of laboratory administrators about online graduates.

## **Conclusions and Significance**

The findings of this study add to the limited research in online education in CLS. Laboratory administrators, educators, and online graduates believed that MLT online graduates are somewhat prepared for the workplace, whereas they believe that MLS online graduates who have prior clinical experience are already prepared before obtaining their online degrees. The perceived limited amount of hands-on training at the MLT-level online education was a concern for most administrators and online graduates, however, if administrators were facing a staffing shortage, they would be more inclined to consider these online graduates for employment. A quality program was important to laboratory administrators, educators, and online graduates, where national registry pass rates were high, and good reputation for degree granting institutions and graduates were established. Laboratory administrators indicated that online graduates at the MLT-level were “prepared enough” for the workplace, and that after a standard orientation time that is required for all new employees, both online and traditional graduates, the online graduates were able to perform at the same level as traditional graduates.

This study provides important information in an area where there was little, to no, research on workplace preparedness and performance of online CLS graduates. Notwithstanding limitations, the qualitative case study design of this study allowed for specific, key issues to be identified and to determine how practitioners, educators, and online graduates perceive online CLS graduate workplace preparedness and performance. There was a great deal of triangulation in findings across participant responses and across cases, from which key themes emerged, which provides confidence in the validity of the research findings. The data from this study will provide laboratory professionals with knowledge to make more informed, evidence-based decisions about educating and hiring online CLS graduates.

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## **APPENDICES**

Appendix A: IRB Documentation

Appendix B: Sample Access Letter

Appendix C: Interview Guides

**APPENDIX A: IRB DOCUMENTATION**

**IRB APPROVAL LETTER  
IRB INFORMED CONSENT FORM**



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**Office of Research Integrity**

Institutional Review Board

401 11th St., Suite 1300  
Huntington, WV 25701

FWA 00002704  
IRB1 #00002205  
IRB2 #00003206

December 16, 2013

Jennifer Perry  
Clinical Laboratory Services

RE: IRBNet ID# 395052-2

**At:** Marshall University Institutional Review Board #2 (Social/Behavioral)

Dear Ms. Perry:

**Protocol Title:** [395052-2] Online Graduates in Clinical Laboratory Sciences: Are They Prepared for the Workplace?

**Expiration Date:** January 14, 2015  
**Site Location:** MU  
**Submission Type:** Continuing Review/Progress Report  
**Review Type:** Expedited Review

APPROVED

The above study and informed consent were approved for an additional 12 months by the Marshall University Institutional Review Board #2 (Social/Behavioral) Chair. The approval will expire January 14, 2015. Since this approval is within 30 days of the expiration date, the fixed anniversary date of 01/14 was maintained. Continuing review materials should be submitted no later than 30 days prior to the expiration date.

If you have any questions, please contact the Marshall University Institutional Review Board #2 (Social/ Behavioral) Coordinator Bruce Day, ThD, CIP at 304-696-4303 or day50@marshall.edu. Please include your study title and reference number in all correspondence with this office.

Approved on:	1/14/13
Expires on:	1/14/14
Study number:	395052

## **Informed Consent to Participate in a Research Study**



### **Online Graduates in Clinical Laboratory Sciences: Are They Prepared for the Workplace?**

Jennifer D. Perry, MS, BSMT (ASCP), Principal Investigator

#### **Introduction**

You are invited to be in a research study. Research studies are designed to gain scientific knowledge that may help other people in the future. You may or may not receive any benefit from being part of the study. Your participation is voluntary. Please take your time to make your decision, and ask your research investigator or research staff to explain any words or information that you do not understand.

#### **Why Is This Study Being Done?**

The purpose of this study is to explore the job preparedness of clinical laboratory professionals with online degrees in both the Associate in Applied Science in Medical Laboratory Technology (MLT) and the Bachelor of Science in Medical Technology or Medical Laboratory Science (MT or MLS). The study will examine the perspectives of laboratory educators, managers, supervisors, bench level laboratory professionals, and graduates of laboratory online programs regarding the level of preparedness online education provides new graduates for the laboratory workforce. Using information gained from this study, laboratory administrators can make better decisions regarding hiring practices of graduates of online programs versus traditional graduates, and CLS educators of online programs and accrediting agencies will have additional information regarding how well their online graduates are performing, aiding in effective program design and development.

#### **How Many People Will Take Part In The Study?**

About 40 people will take part in this study. A total of 48 subjects are the most that would be able to enter the study.

#### **What Is Involved In This Research Study?**

If you choose to participate in this study, you will participate in a face to face interview with me that will last approximately one hour. During this interview, I will ask you questions

pertaining to your perspectives of the preparedness of online CLS graduates. It may be necessary to interview you a second time, to further clarify responses. There may also be a possibility of focus group interviewing, where individuals with similar backgrounds and experiences with the research topic

Subject's Initials

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will interview as a small group instead of individually. Participation in the focus group is entirely voluntary.

### *How Long Will You Be In The Study?*

You will be in the study for about one week.

You can decide to stop participating at any time. If you decide to stop participating in the study we encourage you to talk to the study investigator or study staff as soon as possible.

The study investigator may stop you from taking part in this study at any time if he/she believes it is in your best interest; if you do not follow the study rules; or if the study is stopped.

### *What Are The Risks Of The Study?*

There are no known risks to those who take part in this study.

### *Are There Benefits To Taking Part In The Study?*

If you agree to take part in this study, there may or may not be direct benefit to you. We hope the information learned from this study will benefit other people in the future. The benefits of participating in this study may be: knowledge gained that could aid laboratory administrators in hiring practices of online CLS graduates, and aid CLS educators in effective online program design.

### *What About Confidentiality?*

We will do our best to make sure that your personal information is kept confidential. However, we cannot guarantee absolute confidentiality. Federal law says we must keep your study records private. Nevertheless, under unforeseen and rare circumstances, we may be required by law to allow certain agencies to view your records. Those agencies would include the Marshall University IRB, Office of Research Integrity (ORI) and the federal Office of Human Research Protection (OHRP).

This is to make sure that we are protecting your rights and your safety. If we publish the information we learn from this study, you will not be identified by name or in any other way.

*What Are The Costs Of Taking Part In This Study?*

There are no costs to you for taking part in this study. All the study costs, including any study tests, supplies and procedures related directly to the study, will be paid for by the study.

*Will You Be Paid For Participating?*

You will receive no payment or other compensation for taking part in this study.

*What Are Your Rights As A Research Study Participant?*

Taking part in this study is voluntary. You may choose not to take part or you may leave the study at any time. Refusing to participate or leaving the study will not result in any penalty or loss of

Subject's Initials  
Page

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benefits to which you are entitled. If you decide to stop participating in the study we encourage you to talk to the investigators or study staff first.

*Whom Do You Call If You Have Questions Or Problems?*

For questions about the study or in the event of a research-related injury, contact the study investigator, Jennifer Perry at 304-696-3188 (office) or 304-550-3452 (cell). You should also call the investigator if you have a concern or complaint about the research.

For questions about your rights as a research participant, contact the Marshall University IRB#2 Chairman Dr. Stephen Cooper or ORI at (304) 696-4303. You may also call this number if:

- You have concerns or complaints about the research.
- The research staff cannot be reached.
- You want to talk to someone other than the

research staff. You will be given a signed and dated copy

of this consent form.

***SIGNATURES***

You agree to take part in this study and confirm that you are 18 years of age or older. You have had a chance to ask questions about being in this study and have had those questions

answered. By signing this consent form you are not giving up any legal rights to which you are entitled.

\_\_\_\_\_  
Subject Name (Printed)

\_\_\_\_\_  
Subject Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Person Obtaining Consent (Printed)

\_\_\_\_\_  
Person Obtaining Consent Signature

\_\_\_\_\_  
Date

Subject's Initials

**APPENDIX B: SAMPLE ACCESS LETTER**  
**SAMPLE LETTER TO GAIN ACCESS TO HOSPITAL LABORATORIES AND**  
**EDUCATION INSTITUTIONS**

## **Sample Letter to Gain Access to Hospital Laboratories and Educational Institutions**

Dear Laboratory Manager/CLS Educational Administrator:

My name is Jennifer Perry, and I am the program director for the MLT and MLS programs at Marshall University in Huntington, WV. Our MLT and MLS programs are linked in a career ladder format, where the MLT program is an on campus program, and the MLS program is an additional two years, which has recently been converted to an online program. I am also a doctoral student in the Education Leadership program at Marshall University, and my prospectus has recently been approved by my dissertation committee. I have been given permission to begin data collection on my study titled *“Online Graduates in Clinical Laboratory Science: Are They Prepared for the Workplace?”*

As I am sure you know, there has been an increase in online programs at both the MLT and MLS levels across the country in recent years. There is some research out there that compares ASCP test score results of both types of programs, and results have been favorable towards online programs, but there is nothing related to how lab managers and supervisors perceive the preparedness of such graduates compared to on-campus graduates. Since there is not much published information in our field regarding online education for CLS programs, I believe that this research would add to the body of knowledge, be helpful to accrediting agencies of education programs, and to laboratory managers in their hiring practices.

My dissertation will be a qualitative, multi-site case study involving three to four hospital laboratories’ managers,’ supervisors,’ and recent online graduates’ perceptions of preparedness of online graduates for the workplace. I have done some researching of online programs of both MLT and MLS levels, and after initial discussions with the program directors at those institutions, found that your hospital employs online CLS graduates. I would very much like to have your hospital participate in my study. I realize that the research process can be time consuming and that you are very busy, therefore, I will make every effort to blend in to your laboratory as much as possible as to not disrupt workflow.

Since this is a qualitative study, I plan to collect data by conducting interviews and reviewing various documents. For the interviews, I would like to speak individually with laboratory managers, section supervisors and recent online CLS graduates. I will also be reviewing national registry examination results data for these graduates, which I will obtain from the education program directors. In addition to interviews and registry data, I would also like to review records of recent graduates, such as competency and performance evaluation data to triangulate findings from my study.

I anticipate spending two to three days at each hospital for the data collection. Please be assured that informed consent will be obtained from all willing participants in this study, and that confidentiality of all aspects of the study will be addressed. Real names will not be used from documents reviewed, and hospitals participating in the study will be identified with pseudonyms.

I would like to phone you to discuss the possibility of having your laboratory participate in the study. If you would provide a few convenient dates and times that I could call, as well as the best phone number to reach you, I would appreciate it.

Thanks so much for your time and attention to this matter; I look forward to hearing from you.

Jennifer D. Perry, MS, BSMT (ASCP)  
Marshall University Doctoral Student  
Phone: 304-696-3188;

Email: [jennifer.perry@marshall.edu](mailto:jennifer.perry@marshall.edu)

**APPENDIX C: INTERVIEW GUIDES**

**INTERVIEW GUIDE FOR LAB MANAGERS, SUPERVISORS, AND  
EDUCATORS**

**INTERVIEW GUIDE FOR RECENT ONLINE GRADUATES/FOCUS GROUP**

## Online Education: Interview Question Guide (Lab Managers, Supervisors, and Educators)

Jennifer D. Perry

Good afternoon (morning). First, I wanted to say thank you very much for taking the time to sit and talk with me today, I know that you are very busy and that supervising a laboratory can be very time intensive. I would like to talk with you today and get your thoughts on online education in our CLS field; I am doing some research in this area and I am interested in knowing more about how laboratory managers, like yourself, feel about education in our field, and the emergence of online education. I want to tell you that everything that we discuss today will be kept confidential, and if this work becomes published, all identifying information will be removed. Because I would like to transcribe our interview today to have an accurate record of what we have talked about, would it be ok to record our conversation? Thanks again for your time, we will go ahead and begin if that is ok with you.

1. I have spoken with the education program director at \_\_\_\_\_ (area educational programs targeted), and he/she told me that you do have some graduates from her (MLT or MT/MLS) program working in your laboratory. Are you able to recall which of your employees were educated from \_\_\_\_\_ (particular institution)?
2. I know that \_\_\_\_\_ education program offers an online track to complete the (MLT or MT/MLS) degree. Can you tell me about your thoughts on that online program? How do you feel that the education received through online delivery compares to other new graduates who received education through traditional means? (somehow work into this conversation to ask about their own educational background and get a sense of important education values they have)
3. Can you tell me a little about your employees, who have worked less than a year, who were trained through the online program at \_\_\_\_\_? You can talk about qualities they have that you feel are related to their education and training. How well prepared do you think they are? Can you give me some examples?

4. How do you feel that online education has prepared your new employees for entry level MLT competence in your lab? What are the strengths and weaknesses of their education? Could you give examples or stories? How do they compare to traditionally trained new employees?
5. How do you feel that online education has prepared your new employees for entry level MT/MLS level competence in your lab? What are the strengths and weaknesses of their education? Could you give examples or stories? How do they compare to traditionally trained new employees?
6. Describe qualities that an entry level Medical Laboratory Technician (MLT) should have that you would consider make them prepared or competent to begin working in your lab.
7. Describe qualities that an entry level Medical Technologist or Medical Laboratory Scientist should have that you would consider make them prepared or competent to begin working in your lab.
8. What do you feel are some of the most important aspects of a MLT educational program to prepare students to be competent in the laboratory workforce? (Probing questions from these responses to dig deeper)
9. What do you feel are some of the most important aspects of a MT/MLS educational program to prepare students to be competent in the laboratory workforce? (Probing questions from these responses to dig deeper)
10. If you had to make a decision about hiring an individual for an open MLT/MT/MLS position in your laboratory, and two candidates applied, both successful graduates of accredited programs, one from an online program and one from a traditional program, who would you choose and what factors would influence your decision making? (Probe deeper on these questions to really get in depth information)
11. Do you have any advice for people who are planning on going into the laboratory profession in the future? Do you have any concerns?
12. Do you have any advice for online laboratory education programs?

**13.** Is there anything else that we did not talk about that you would like to discuss?

**Online Education: Interview Question Guide (Recent Online  
Graduates/New Employees/Focus Group)**

**Jennifer D. Perry**

Good afternoon (morning). First, I wanted to say thank you very much for taking the time to sit and talk with me today, I know that you are very busy and that things can get very hectic in the laboratory. I would like to talk with you (all of you) today and get your thoughts on online education in our CLS field and your specific experiences with your online education. I am doing some research in this area and I am interested in knowing more about how recent online graduates who are working in the laboratory, like yourself, feel about your educational experiences and especially about how that has prepared you for your position in the laboratory. I want to tell you that everything that we discuss today will be kept confidential, and if this work becomes published, all identifying information will be removed. Because I would like to transcribe our interview today to have an accurate record of what we have talked about, would it be ok to record our conversation? Thanks again for your time, we will go ahead and begin if that is ok with you.

1. From what institution did you (each of you) receive your online degree?  
(Depending on how many recent graduates I speak with, I may be able to group some responses according to the specific online program they completed)
2. How long ago did you complete your online degree?
3. Why did you choose to get your degree online? Explain how you made this decision.
4. Were you working when you were doing your online coursework? Explain how this situation was.
5. In what ways do you feel that your online education prepared you well for the workplace? Explain.
6. In what ways do you feel that your online education did not prepare you well for the workplace? Explain.

7. Tell me some of the activities or assignments that you can recall from your online program that were of most value to you? The least?
8. Do you (any of you) have any advice for people that are planning on going into the laboratory profession in the future? Do you have any concerns?
9. Do you (any of you) have any advice for online laboratory education programs?
10. Is there anything else that we did not talk about that you (any of you) would like to discuss?

**CURRICULUM VITAE**  
**JENNIFER D. PERRY, Ed.D. CANDIDATE**

**EDUCATION**

Marshall University  
**Doctor of Education in Education Leadership, 2014**  
Marshall University  
**Master of Science in Health Care Administration, 1999**  
Marshall University  
**Bachelor of Science in Medical Technology, 1994**  
**Honors: Magna cum Laude**  
Marshall University  
**Associate in Applied Science, 1992**  
**With Honors**

**CERTIFICATION**

American Society of Clinical Pathologists (ASCP) Certification for:  
    Medical Laboratory Technology (MLT)  
    Medical Technology (MT)

**PROFESSIONAL EXPERIENCE**

1993-2000     MLT and MT, Plateau Medical Center Laboratory, Oak Hill, WV  
2000-2005     Chemistry Supervisor, Thomas Memorial Hospital Laboratory,  
                    South Charleston, WV  
2005-2007     Assistant Professor, Clinical Laboratory Sciences, Marshall University,  
                    Huntington, WV  
2007-present   Chairperson and Program Director, Associate Professor, Clinical  
                    Laboratory Sciences, Marshall University, Huntington, WV

**HONORS AND RECOGNITION**

2006   Huntington Clinical Foundation Grant Award, Marshall University  
2011   Full Seven Year CLS Programs Accreditation awarded, Marshall University  
2011   Tenure awarded, Marshall University  
2012   Promotion to Associate Professor, Marshall University