Radiologic Technology Students' Perceptions of an Effective Clinical Learning Environment

Submitted by

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GRAND CANYON UNIVERSITY

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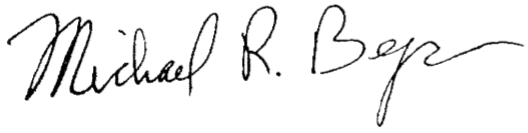

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The Radiologic Technology Students' Perceptions of the Clinical Learning Environment

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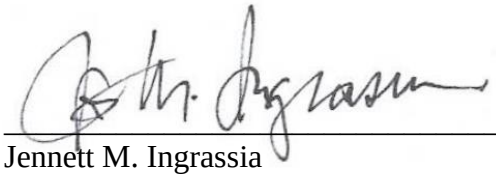

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Abstract

The purpose of this qualitative descriptive study was to examine how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on the ability of clinical instructors and practitioners to provide targeted practice and effective feedback. The theoretical foundations included Vygotsky's zone of proximal development and Sternberg's triarchic theory of intelligence. The sample was second-year students from four programs located in NJ and NY. A qualitative descriptive design was used. Data sources included a questionnaire and face-to-face interviews which were analyzed through thematic analysis using open coding. There were two research questions, one regarding the clinical instructor and the other, the practitioner and both which inquired: How do students perceive their ability to learn based on their perception of the ability of both individuals to provide targeted practice and effective feedback? Six themes emerged involving both clinical instructors and practitioners and their impact on assisted practice and feedback, interpersonal skills and the provision of additional opportunities for independent practice with no interference from practitioners yet followed by effective feedback. These themes specifically answer the research questions regarding both the clinical instructor and the practitioner. The most prevailing findings support a need for clinical instructors' willingness to work side by side with students to improve their performance, provide feedback, treat students respectfully and to understand the importance of independent practice.

Keywords: Clinical learning environment, clinical setting, clinical instructor, health care practitioner, clinical education, radiologic technology, radiographer, health care practitioner behavior and clinical instructor behavior.

Dedication

I would like to dedicate this endeavor, first, to three family members, my mother, Catherine and my maternal grandmother, Jennie, a strong willed and brave mother-daughter combination, and my cousin, Blanche, all who have since passed. My grandmother was an Italian immigrant who could not read or write. My mother barely completed ninth grade due to a necessity to financially assist her family. Because of that, an education was something she coveted. My cousin, Blanche, a nurse educator with not one, but two graduate degrees, loved life and fought her hardest to live it despite her health issues. I can only hope that I am half the educator and health professional that she was. All three women, in how they lived their lives, taught me to never give up and always believed in me. This one is for you, Mom, Nana and Blanche…the three smartest, strongest, and bravest women I know!

I would also like to dedicate this to two very dear friends and colleagues. Professor Parsha Y. Hobson, M.P.A, R.T.(R)(ARRT), you not only talk the talk but walk the walk, and through your actions have helped me to become the educator that I am today. I am a better person for having you in my life and for that I am truly grateful. Finally, to Professor Emeritus Eileen M. Maloney, M.Ed., R.T.(R)(M)(ARRT), FASRT who many years ago when I was at the very lowest point in my life, believed in me when I no longer believed in myself. You changed my life forever and I cannot thank you enough.

Acknowledgments

I have truly been blessed to have had the support of so many individuals from all parts of my life. There are so many people to thank, none more important than my late parents. Peter and Catherine Ingrassia did not have the ability to complete high school as they were both needed to help to financially support their respective families. As a result, the education of their children was a top priority to them. I miss you both and wish you were here to celebrate this accomplishment with me!

To my committee, chaired by Dr. Peggy Dupey. Dr. D., I honestly believe that you were an angel sent from heaven to get this poor sorry soul back on the right track. I was floundering when you found me, and you worked miracle after miracle so that I could achieve to what, at times, seemed the impossible. Thank you for never giving up on me, especially during those times when I gave up on myself. I will be forever grateful to you. To the remainder of my committee, Dr. Miranda Jennings and Dr. James Johnston. Dr. Jennings, thank you for going the extra mile for me so that I could achieve this goal. Your insight to this endeavor has allowed me to improve my skills as a researcher and is sincerely appreciated. Dr. Johnston, as my content expert, in some ways your input meant the most. I aimed to support the radiologic technology profession so that current and future students could be given the best education, in the best manner possible, by those who teach and more importantly, those who set the example. I can only hope that I have accomplished that objective.

Thank you to the participants for this study, to Judy Keyes, and to Jodi-Ann Douglas. Finally, thank you to all of my family, friends and co-workers, who have supported me and kept me in their prayers. You know who you are!

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Chapter 1: Introduction to the Study

Introduction

Radiologic Technology education can occur in hospital-based certificate programs, in two or four-year associate degree programs, or baccalaureate degree programs. The educational environment for radiologic technology students includes a *didactic* (classroom) and *clinical* (radiology department or medical imaging center) learning environment. It is in the *didactic* setting where the academic content of the curriculum (anatomy, positioning procedures, patient care, radiation protection, and equipment operation) is taught in the classroom. According to the American Society of Radiologic Technologists (ASRT) (2018), it is in the *clinical* learning environment of the curriculum where the didactic knowledge is brought into practice and is where students can perfect their skills through experience and eventual assessment. Therefore, the clinical learning environment is a primary component of the students' education because it advances and cultivates their skills to develop proficiency. The clinical instructor and the practitioner are the primary individuals who influence student learning in the clinical learning environment (ASRT & AEIRS, 1992).

This qualitative descriptive study explored how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on the ability of the clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The researcher hoped that the findings of this research provided value and enhanced the body of knowledge derived from prior studies concerning effective clinical learning (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). This exploration was geared toward

clinical instructors and practitioners to gain insight into students' perceptions of how to better facilitate student learning in the clinical environment. An increased understanding of students' perceptions of their ability to learn from clinical instructors and practitioners is vital to students' learning and even more importantly, to patients so that they may receive the best possible medical imaging and competent care (ASRT, 1992; ASRT, 2018; Shanahan, 2015). In short, enhancing the clinical education process so that clinical instructors and practitioners can understand how to better facilitate student learning may, in turn, enhance patients' healthcare. Thus, both students and patients might benefit from this research.

The administrators of radiologic technology programs rarely select the clinical learning environment with the teaching effectiveness of the clinical personnel in mind. Radiography educational programs secure clinical sites based more on necessity than the attributes of the educational opportunities received by the student (Giordano & Harris, 2012). Researchers identified the need to explore the nature of the radiologic technology students' clinical learning environment to obtain an enhanced understanding of how to improve the effectiveness of the educational experience (Thompson, Smythe, & Jones, 2016). Specifically, many researchers in radiologic technology suggested further research concerning the knowledge and skills of clinical instructors and their training to provide feedback (Francis et al., 2016; Nolan & Loubier, 2018).

Additionally, researchers recommended further exploration to identify and understand how the practitioner (staff radiologic technologist) is used as a resource by students and if sufficient practice is being allowed and daily feedback provided (Fowler & Wilford, 2016; Shanahan, 2015). This qualitative descriptive study aimed to help

address the gaps in existing research by exploring how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Specifically, this study explored the students' perception of their ability to learn from both the clinical instructor and the practitioner (staff radiologic technologist) through targeted practice and effective feedback.

Targeted practice can be defined as opportunities made available to students in the clinical learning environment to perform radiographic procedures learned in the classroom during their assigned clinical rotations. As explained in the *Clinical Education Competency Evaluation Model* document developed by the ASRT and the Association of Educators in Radiological Sciences (1992), this practice occurs under the supervision of a clinical instructor and /or practitioner. Effective feedback for radiologic technology students can be described as a manner in which formative assessments are made of students' performance, by the practitioner and clinical instructor, of radiologic procedures (ASRT & AEIRS, 1992). This assessment occurs through observation of the students' execution and performance of a specific radiographic procedure and followed by an evaluation of the resultant radiographic image.

Along with the purpose of this study, Chapter 1 will provide the background of a radiologic technology' educational program's dependency on the clinical learning environment's culture which includes the individuals who comprise the environment, primarily the practitioner and the clinical instructor. The problem statement and research questions, based on the gaps in the literature, will be discussed and the significance of the importance of learning in the clinical environment will be specified. Additionally, in

Chapter 1 the researcher will identify why the study was a qualitative descriptive study. Finally, assumptions, limitations, and delimitations surrounding this study will be identified as well as the intent of the remaining chapters.

Background of the Study

This qualitative descriptive study explored how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Radiologic technologists play a vital and essential role in healthcare in the United States. These individuals perform diagnostic medical imaging procedures (x-rays) such as orthopedic exams, for diagnosis by a radiologist, a medical doctor who specializes in the interpretation of medical images (ASRT, 2018). Radiographers are nationally certified by the American Registry of Radiologic Technologists (ARRT) through an examination. The examination comprises detailed Content Specifications, which are supported by a curriculum developed by the American Society of Radiologic Technologists (ARRT, 2018; ASRT, 2018). Once certified, a technologist may be employed in various capacities, mostly in a radiology department of a hospital or medical center, where clinical learning of students takes place.

Student learning in the clinical learning environment comes from several resources and individuals. These resources are based on the American Society of Radiologic Technologist's (ASRT) *Clinical Education Competency Evaluation Model* which was jointly developed with the Association of Educators in Imaging and Radiologic Science (AEIRS). The document was designed to provide structure and a plan

for clinical education and present an approach for student assessment (ASRT& AEIRS, 1992). Specifically, the ASRT model outlines how both clinical instructors and practitioners, also known as staff radiologic technologists, are responsible for teaching in the clinical learning environment. These individuals should reinforce the academic component of the curriculum (ASRT, 1992; JRCERT, 2018b). Specifically, the academic component includes, but is not limited to, radiographic positioning and procedures, radiation protection and safety, image production and evaluation, and patient care. Students practice this knowledge during clinical rotations on actual patients under the watchful guidance of the practitioner and, at times, with the clinical instructor. (ASRT & AEIRS, 1992). Typically, most student practice is performed, supervised, and assessed by the practitioner. Since radiologic technology clinical education is competency-based, when the students feel that they have had sufficient supervised practice, it is the clinical instructor's responsibility to not only assess but to formally evaluate the students' performance (Leggett, 2015).

In radiologic technology education, the clinical learning environment is a radiology department in a hospital, medical center, or a medical imaging facility. Although this environment includes individuals such as administrators, supervisors, radiologists, clerical staff, and aids, the clinical instructor and the practitioner are the primary individuals who influence student learning (Fowler & Wilford, 2016; Francis et al., 2016; Shanahan, 2015). How conducive (student-friendly) the environment is to students and their ability to learn impacts the students' success (Cohen, Dempsey, & Keith, 2017; Hussain et al., 2016; Mason, 2006). Challen, Laanelaid, and Kukkes (2017) support the importance of a conducive learning environment and found that such

characteristics as good technical skills, proper ethical conduct, communication skills, teaching ability, and teamwork all provided an atmosphere for a student-friendly learning environment. An additional factor of the impact of the clinical learning environment includes practitioners and their commitment to the students' success (Thompson, 2015). According to Perram et al. (2016), students perceived the demeanor of the practitioner to be a convincing factor for an effective and productive clinical venture.

It was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Several prior studies indicated a gap in the research concerning the clinical learning environment, specifically, the students' ability to learn from both clinical instructors and practitioners (Fowler & Wilford 2016; Francis et al.'s 2016; Nolan & Loubier, 2018; Shanahan, 2015).

The impact of the clinical instructor is another area that lacks sufficient research. Francis et al.'s (2016) investigation recognized that clinical instructors could benefit from training and determined that additional research was needed concerning the knowledge and skills of the clinical instructor. This additional training, in turn, may facilitate student learning. Nolan and Loubier (2018) investigated students' perceptions of feedback in the clinical learning environment and recommended further research regarding how students received feedback from clinical instructors. While their research concluded that students were more receptive to feedback if a trust were demonstrated between the two individuals, further research in this area was suggested to note the effect that feedback had on students' ability to learn.

Just as the clinical instructor plays an important part in student learning, so does the practitioner. Shanahan's (2015) study identified the practitioner as the chief asset for student knowledge. This research determined a need for further exploration of how students use the practitioner as a resource. Fowler and Wilford (2016) noted a gap in the research concerning the ability of the practitioner to provide targeted practice and effective feedback to students. In Fowler and Wilford's study, students emphasized the importance of feedback and also underscored the need for direction on how to improve in weaker areas (Fowler & Wilford, 2016). Since, typically, practitioners do not receive formal education and training on how to provide feedback, Fowler, and Wilford (2016) identified a need for exploration in this area. All of these noted areas lacking in the research needed to be addressed as patients in need of radiographic procedures must receive the greatest possible medical image performed by a competent and caring radiographer to receive the best possible chance of a proper diagnosis.

Problem Statement

It was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of the clinical instructor and practitioner (staff radiologic technologists) to provide targeted practice and effective feedback. The students were the unit of analysis as they were the individuals who would benefit from this study. The phenomenon of this study was how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of the clinical instructor and practitioner (staff radiologic technologists) to provide targeted practice and effective feedback.

Researchers cited the importance of future studies regarding the identification methods which promote student learning in the clinical environment. Suggested areas of research include the influence of the practitioner and clinical instructor in the educational process (Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). Identifying the most effective ways that students learn will increase the likelihood that patients receive the best quality medical imaging procedure to provide the physician with the ability to make the best possible diagnosis. Also, competent radiologic technologists can prevent unnecessary radiation exposure and are more able to provide quality patient care (ASRT, 1992; ASRT, 2018). Enhancing the clinical education process enhances patients' healthcare.

The clinical learning environment has numerous components, including teaching by clinical instructors and practitioners. As a result, researchers indicate more information is needed to identify which components of the clinical learning environment are perceived by students as most conducive to learning (Clawson & Curtis, 2018; Cohen, Dempsey & Keith, 2017; Fowler & Wilson, 2016; Francis et al., 2016; Holmstrom & Ahonen, 2016; Sandridge, 2018; Shanahan, 2015). Researchers emphasize the importance of students' ability to learn in the clinical learning environment when practitioners and even clinical instructors receive limited training on how to educate students. Although these researchers have explored clinical learning environments in countries other than the United States, it should be noted that the American Registry of Radiologic Technologists recognizes degrees from institutions in Australia, the United Kingdom (and Canada) as meeting the ARRT's academic degree requirement (which includes both didactic and clinical coursework). Essentially, this means the curriculum of

these educational institutions is the same as the United States thus relative to this current study.

Factors that may influence students' perceptions of the most effective environment include the clinical instructors' interpersonal skills and teaching proficiency, the practitioners' ability to provide feedback, and how they are used as a source of knowledge during students' day to day clinical activities (England et al., 2017; Fowler & Wilford, 2016; Francis et al., 2016; Holmstrom & Ahonen, 2016; Sandridge, 2018 & Shanahan, 2015). The general population for this study is all radiologic technology students in the United States enrolled in radiologic technology programs accredited by the Joint Review Committee on Education in Radiologic Technology. The target population included all second-year radiologic technology students from New Jersey and New York, and the sample included second-year students selected from four educational institutions, three in New Jersey and one in New York totaling a sample size of 33 for the questionnaire and from that sample, 12 interview participants.

Gaps in the research were identified relating to the both the clinical instructor and the practitioner. In terms of clinical instructors, Francis et al. (2016), explored clinical instructors' perception of their attributes and recommended additional research to "assess the characteristics, knowledge, and skills of practice educators (clinical instructors) with regarding attainment of student skills" (p. 294). Nolan and Loubier's (2018) study set out to identify students' open-mindedness to clinical instructor feedback in the clinical learning environment. They recommend, "researchers should continue to investigate variables related to students' receptivity in a clinical setting" and suggest additional

research on training sessions concerning overall effectiveness and perception of student receptivity over the course of the program…" (p.254).

Aside from explorations relating to clinical instructors, researchers also show the need for research concerning the practitioner. The practitioner is a staff radiologic technologist, with whom students spend most of their time. Shanahan (2015) explored the students' perception of the practitioner as the primary resource for learning in the clinical learning environment. The findings determined that the students relied extensively on the practitioner. Shanahan (2015) recommended future research to perform an investigation "conducted in the clinical setting in which student learning behaviors could be observed" to gain a better understanding of how practitioners are used as a resource (p. 369). Finally, Fowler and Wilson identified a gap in their study which investigated the impact of feedback on students' learning. They suggested additional explorations concerning the impact "feedback had on student radiographers' learning" (e23).

Professional development opportunities exist for clinical instructors but are not always available to practitioners. According to the ASRT Faculty Needs Assessment survey (2015), typically, practitioners receive limited training concerning how to provide targeted practice and effective feedback. Fowler and Wilford (2016) found that students value the feedback given by the practitioner but that practitioners, for a variety of reasons, cannot always provide an evaluation and informal assessment of students' performance. The authors suggested further research "to examine the impact feedback had on student radiographers' learning" (p. e23) in the educational and feedback process. To summarize, because of the identification of these gaps, the hope was for a clinical instructor to be effective and therefore, to be a segue for practitioners to take notice of

their importance. Hopefully, in turn, the practitioner will accept their role in the educational process along with the clinical instructor to produce a better radiographer.

Purpose of the Study

The purpose of this qualitative descriptive study was to examine how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. This study's phenomenon was how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The clinical environment is where students apply the academic content taught in the classroom to actual patients while being supervised by the practitioner and the clinical instructor (ASRT, 1992; England, 2017; Thompson et al., 2015). The findings concerning the students' perceptions of their ability to learn based on the ability of the clinical instructor and practitioner's ability to provide targeted practice and effective feedback may provide insight into the training and professional development of clinical instructors and practitioners thus may help to enhance student learning.

The target population for this study was second-year radiologic technology students in educational programs in New Jersey and New York. These students had minimally three to four semesters of clinical education experience. The students were randomly chosen from four programs, three in New Jersey and one in New York. The

total approximate number of students for the questionnaire was 100 and 12 for the semi-structured interview, evenly split between New Jersey and New York.

Research Questions

The research questions were based on the phenomenon of this study which is how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The following research questions focused on student perceptions and guided this study.

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback.

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback.

The research questions focus on the students' perceptions of their ability to learn based on their perception of the clinical instructor and practitioner's ability to provide targeted practice and effective feedback. The researcher integrated both the theory of the zone of proximal development and the triarchic theory of intelligence as the theoretical foundations for this study, into the research questions. The zone of proximal development, developed by Lev Vygotsky, involves the contrast between what a learner can accomplish with and without assistance (Vygotsky, 1994). Vygotsky identified two concepts, one as *scientific* and the other, *spontaneous,* which further illustrate and relate

to clinical learning. According to Vygotsky, the scientific concept describes what a child learns in a classroom venue, which in radiologic technology education is referred to as didactic instruction of the academic concepts learned in the classroom. This knowledge provides the framework needed for the spontaneous concept, which can be equated to the clinical component of a radiologic technology student's educational process (Vygotsky,1994). Vygotsky's identification of both the scientific and spontaneous concepts are the foundation of students' clinical learning in radiologic technology (ASRT & AEIRS, 1992).

The scientific concept is also very appropriate for clinical education as a precursor. When using what was learned in the classroom in the clinical learning environment, the student first observes, then practices radiographic exams with the clinical instructor or practitioner, and eventually, the learner's practice becomes less and less dependent on the clinical instructor and the practitioner. Vygotsky (1994) states that following the student's personal experience with the scientific concept, the theory taught in the classroom, the spontaneous concept will develop. An understanding of the scientific concept, in this case, the cognitive material is one of the necessary components for the success of the clinical education experience. The research questions for this study concern the students' perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners to provide targeted practice and effective feedback. Vygotsky's theory describes the contrast between what a learner can accomplish with and without assistance, thus the importance of the individuals, the clinical instructors and practitioners, who have the responsibility of providing this assistance through practice opportunities and feedback.

The second theory is Sternberg's triarchic theory of intelligence. As discussed by Sheckley, Allen, and Keeton (1993) this theory can be used to describe the adult learning phenomenon. According to Sternberg et al. (2000), the triarchic theory of intelligence involves analytical, creative, and practical thinking. These types of thinking can be applied to the clinical education of radiologic technology adult students all to establish proficiency and competence, the essence of clinical education.

The clinical instructor and the practitioner are the primary individuals in the clinical learning environment whose ability to provide targeted practice and effective feedback play a crucial role in the clinical education of the radiologic technology student. The student's perception of their ability to learn from these individuals may be directly proportional to the contrast of students performing initially with assistance, and then, to finally being able to perform medical imaging procedures without assistance.

Advancing Scientific Knowledge and Significance of the Study

The purpose of this study was to increase understanding of students' perceptions of their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. An effective clinical experience is vital to the success of the radiologic technology student as it is responsible for the foundation that students will build upon once they become a member of the radiography profession (Perram et al., 2016). The researcher hoped that the findings of this study enhanced the body of knowledge derived from prior studies concerning effective clinical learning to benefit students by better facilitating student learning. That this investigation was geared towards clinical instructors and practitioners may also provide insight into where to focus future training

and professional development. The research was striving to help meet the gaps identified in the literature concerning clinical instructors' knowledge and skills and their training together with an understanding of how the practitioner is used as a resource by students in providing practice opportunities to students as well as dispensing feedback (Francis et al., 2016; Fowler & Wilford, 2016; Nolan & Loubier, 2018; Shanahan, 2015). It was hoped that the knowledge gained from this research will contribute to an increasingly successful clinical educational experience for radiologic technology students.

As mentioned previously several gaps in the literature have been discovered relating to both the clinical instructors and practitioners. Francis et al. (2016), explored clinical instructors' perception of their attributes and recommended additional research concerning the knowledge and skills of clinical instructors. According to Nolan and Loubier (2018), further research is needed concerning the training of clinical instructors, relating to their ability to provide feedback.

In addition to explorations relating to clinical instructors, there was also a gap in research concerning the practitioner who is the staff radiologic technologist, with whom students spend most of their time. Shanahan (2015) explored the students' perception of the practitioner as the primary resource for learning in the clinical learning environment. The findings demonstrated that the students relied extensively on the practitioner. Further research was recommended to duplicate the study to further distinguish how practitioners are used as a resource. Moreover, Fowler and Wilford (2016) found that students value the feedback given by the practitioner but that practitioners, for a variety of reasons, cannot always provide an evaluation and informal assessment of students' performance.

Although professional development opportunities may exist for clinical instructors, the same may not be true for the practitioner (Fowler & Wilford, 2016).

Typically, practitioners receive little or no training in how to provide targeted practice and effective feedback (ASRT, 2015). Fowler and Wilson, suggest additional exploration of the impact of feedback on students' learning. The researcher proposes an examination of students' perceptions regarding their ability to learn in the clinical environment based on the ability of the clinical instructors and practitioners to provide targeted practice and effective feedback. Increasing understanding of students' perceptions of their ability to learn from clinical instructors and practitioners is vital. Insight from students may help generate insight for clinical instructors and practitioners into how to provide targeted practice and effective feedback more effectively (England et al., 2017; Fowler & Wilford, 2016; Francis et al., 2016; Shanahan, 2015).

Specific radiologic technology clinical learning objectives stem from the curriculum designed by the ASRT, the professional society, and are based on the Content Specifications document mandated by the American Registry of Radiologic Technologists (ARRT, 2017) the credentialing organization. The ASRT's learning objectives, which primarily relate to the ARRT's clinical competency system requirements are enforced by the JRCERT, the accrediting agency (ARRT, 2017; ASRT, 2012; JRCERT, 2018b). The researcher hopes the results of this study will increase understanding of the factors best enhance the clinical education process.

Enhancement of the clinical education process is a priority identified in the ASRT Practice Standards (2016), a document that presents criteria for acceptable and legitimate practice. As students become practitioners, they will be administering ionizing

(potentially damaging) radiation to patients while performing radiographic examinations and procedures. In doing so, they must be educated to prevent a patient from receiving more radiation than necessary or even a missed or a false positive diagnosis (ASRT, 2017). More information is needed to identify the student's perspective of what is most beneficial within the clinical learning environment (England et al., 2017; Holmstrom & Ahonen, 2016; Rose & McIntosh, 2016). Increased knowledge of the students' perspective of their ability to learn may help produce the most highly skilled radiologic technologists through well prepared clinical instructors and practitioners.

As stated previously, this study is based on the theory of the zone of proximal development developed by Lev Vygotsky. This theoretical foundation describes the difference of what can be accomplished by a student with, versus without, assistance (Vygotsky, 1992). This premise can be directly related to the clinical competency system for radiologic technology clinical education requirements (ASRT & AEIRS, 1992). The competency system outlines the clinical educational sequence. Academic content taught in the classroom is transferred to the clinical learning environment. This occurs through observation and practice with a clinical instructor and practitioner, and eventual performance of radiographic procedures with minimal or no assistance. It is the final step where a student performs with no assistance and mastery is achieved, which demonstrates the theory of Vygotsky's zone of proximal development.

Rationale for Methodology

The researcher chose a qualitative method for this study. This method allowed for a detailed examination of a phenomenon as it existed (Yin, 2018). The method is qualitative because it was a study of what was known related to personal experience in

terms of professional and clinical knowledge obtained (Stake, 2010). It is important to understand students' personal experience in the clinical learning environment and a qualitative study provided students' perspective of their ability to learn based on their perception of the ability of the clinical instructor and practitioner's ability to provide targeted practice and effective feedback. A questionnaire was combined with semi-structured interviews to be a better data collection process than numerical data in quantitative research.

This study focused on a comprehensive exploration of the perceptions of a small sample. Patton (2015) explains that a qualitative method will produce an abundance of comprehensive findings of a much smaller number of individuals as is the situation for this study. The researcher determined that this method is most appropriate for the study because the qualitative research method using face-to-face interviews allowed for a greater understanding of students' overall perceptions of their ability to learn from clinical instructors and practitioners. Additional reasons for selecting a qualitative approach related to the research questions (Richards & Morse, 2013). In the case of the research questions in this study, it was important to gain an understanding of the role of both the clinical instructor and practitioner in terms of their contribution to students learning through their ability to provide targeted practice and effective feedback. Qualitative research can provide an in-depth awareness in each of these areas.

Nature of the Research Design for the Study

The researcher chose a qualitative descriptive study for this research. According to Sandelowski (2000) and Holly (2019), a descriptive design involves an extensive review of a phenomenon as it naturally exists. It is a description of events in the words of

the participant of their understanding and experience of a certain event (Seixas, 2017). Furthermore, a descriptive design provides an occasion to compile rich characterizations of a phenomenon where only minimal information is available (Bradshaw, Atkinsin & Doody, 2017).

In the context of this research, a qualitative descriptive study can be used to describe the phenomenon of the radiologic technology student's perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Specifically, a descriptive study allowed the researcher to explore the issues defined in the problem statement, which addressed how it was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based their perception of the ability of the clinical instructor and practitioner to provide targeted practice and effective feedback.

Additionally, the researcher chose a qualitative descriptive study design because the investigation involves the ordinary surroundings of radiologic technology clinical education to be examined in its natural state (Sandelowski, 2000). This study focused on the students' perspective of social interactions between the student and the clinical instructor and practitioner and how these interactions added to, detracted from, or had no effect on student learning. It was an appropriate research design because there was a need to understand the perceptions of radiologic technology students of their ability to learn based on the ability of the clinical instructors and practitioners to provide targeted practice and effective feedback.

A descriptive study is one of four common types of qualitative research. The others are phenomenology, ethnography, and grounded theory. A descriptive design was chosen over phenomenological, ethnography, and grounded theory methods. The use of this design provides a circumstance to obtain perceptions from students that are prolific and flush. In phenomenology designs, the researcher focuses on obtaining data for the basic necessary elements of an individual's experiences (Patton, 2015). However, the researcher sought to understand the actual experiences, themselves, of radiologic technology students with the result not necessarily to identify the lived experience but rather to describe it (Gaudet & Robert, 2018; Holly, 2019). Ethnography is related more to an examination of the culture of individuals (Bradshaw, 2017; Gaudet & Robert, 2018; Patton, 2015). This study explored students' perception of their ability to learn based on the ability of the clinical instructor and practitioner's ability to provide targeted practice and effective feedback, which was an investigation of an individual's perception, rather than a culture. Finally, a grounded theory method was also not appropriate for this study because it relies on the discovery of theory and the theories for this study have already been identified as Vygotsky's theory of the zone of proximal development and Sternberg's triarchic theory of intelligence (Sternberg, 1988; Vygotsky, 1978).

The general population for this study was all radiologic technology students which according to the JRCERT, totals approximately 12,879 students (JRCERT, 2018a). The target population was second-year radiologic technology students because they have already experienced minimally 2 to 3 semesters of clinical education and likely had a better insight into the educational experience than students who are earlier in the

curriculum. Approximately 6,439 students begin their second year of radiologic technology education each year, 2,434 in New Jersey and New York (JRCERT, 2018a).

The number of participants may decrease due to attrition during the academic year. The data collection procedure included questionnaires and face-to-face semi-structured interviews. The sample that was incorporated for this study was students from four randomly selected radiologic technology programs in the states of New Jersey and New York. This included a maximum of 101 second-year students to obtain the required minimum of 100 participants for the questionnaire and 12 for the semi-structured interviews.

The questionnaire was in two parts. Part one was used initially to obtain demographic information through closed-ended questions and the second part was composed of three general and basic open-ended questions to elicit responses of how students best learn. The data collection procedure for the questionnaire was performed electronically through SurveyMonkey®, an online survey software platform. (SurveyMonkey®, 2019a). The researcher sent a copy of the questionnaire to the respective educational institutions personally requesting the participation of second-year students for the study. Students, through the program director from the students' educational institution, were provided with a link to SurveyMonkey® through their college email account to complete the questionnaire. A cover letter was attached to include a statement of anonymity issued by the researcher and a formal consent form that was electronically approved by the participant. Also linked to the cover letter was a detailed explanation of the study, its purpose and how the information obtained will be used. In addition to the cover letter, the questionnaire included the following sections: (1)

Cover Letter, (2) Consent Form (3) Part one to collect demographic data through closed-ended questions (4) Part two with three general open-ended questions to elicit responses of how students best learn.

The semi-structured interviews were used to obtain information concerning students' experience with the clinical instructor and the practitioner specifically related to their perception of being educated and the provision of feedback. The documents mentioned above provided instructional guidelines for the curriculum and were partly the basis for the questions used in the semi-structured interviews. In terms of participant selection for the semi-structured interviews, in the questionnaire, participants were asked if they would be willing to participate in a face-to-face interview and if so, provide their contact information, in the form of an email address. Twelve students agreed to participate, however, two did not respond to the researcher's initial request to set up the process. Due to the snowball method, an additional two students were willing to participate. As with the questionnaire, the researcher sent a copy of the initial interview questions to be asked to the appropriate educational institutions. Following informed consent given to participants just before, the semi-structured interviews were held in a comfortable setting, such as a conference room, at the participants' educational institutions. The researcher interviewed the participants in a face-to-face semi-structured format where the participants' responses were recorded.

Definition of Terms

The following terms were used operationally in this study to aid in the understanding of the students' perception of their ability to learn based on the ability of

the clinical instructors and practitioners' ability to provide targeted practice and effective feedback:

American Society of Radiologic Technologists. The premier professional organization for people working in medical imaging and radiation therapy. The mission and vision is to advance the quality and safety of patient care through education, advocacy, research and innovation (ASRT, 2017)

American Registry of Radiologic Technologists. The largest credentialing organization for medical imaging, interventional procedures, and radiation therapy. They adopt and uphold standards for educational preparation for entry into the profession, as well as professional behavior (ARRT, 2017).

Clinical education competency evaluation model. A jointly developed document with the Association of Educators in Imaging and Radiologic Science (AEIRS). This document was designed to provide structure and a plan for clinical education as well as present an approach for student assessment (ASRT & AEIRS, 1992). Specifically, the ASRT model outlines how both clinical instructors and practitioners, also known as staff radiologic technologists, are responsible for teaching in the clinical learning environment. These individuals should reinforce the academic component of the curriculum (ASRT, 1992: JRCERT, 2018a).

Clinical instructor. An individual either employed by the educational institution or the clinical learning center who is directly responsible for the students' clinical learning experience and the evaluation of students' clinical competence. He or she is primarily responsible for ensuring that students have a positive clinical component by

providing them with learning opportunities in addition to clinical instruction and supervision (JRCERT, 2018b).

Clinical learning environment. A location, usually the radiology department of a hospital or medical center, where students have an opportunity to complete the clinical education component of the program. This occurs as the result of a formalized relationship between the educational institution and the clinical facility which helps to assure the quality of clinical education by delineating appropriate responsibilities of the program and the clinical learning environment (JRCERT, 2018b).

Didactic. Classroom style of education, primarily where the academic content is taught (JRCERT, 2018b).

Effective feedback. A manner in which formative assessments are made of radiologic technology students' performance, by the practitioner and clinical instructor, of radiologic procedures (ASRT & AEIRS, 1992).

Joint Review Committee on Education in Radiologic Technology. Promotes excellence in education and elevates the quality and safety of patient care through the accreditation of educational programs in radiography, radiation therapy, magnetic resonance, and medical dosimetry.

Practitioner/Staff Technologist. A radiologic technologist who has received a certificate after successfully passing an ARRT examination and meeting all other educational and ethics requirements for eligibility. After initial certification by the ARRT, the certification is registered and renewed on an annual basis (ARRT, 2014). It is this individual who works side by side with the student in the clinical learning

environment. Unlike the clinical instructor, the practitioner/staff technologist does not perform formative evaluations of the student.

Targeted practice. Practice opportunities for radiologic procedures made available to students in the clinical learning environment to perform those procedures learned in the classroom and lab during their assigned clinical rotations. This practice occurs under the supervision of a clinical instructor and /or practitioner for later assessment as part of the clinical requirements deemed by the ARRT (ARRT, 2018; ASRT & AEIRS,1992). This practice is deemed targeted as there are very specific exams that must be assessed.

Theory-practice gap. Theory-practice gap to the disparity of information disseminated in the classroom versus what is occurring in the clinical learning environment (Baird, 2008).

Assumptions, Limitations, Delimitations

When conducting a research study, there may be inadequacies that may hinder or restrict the investigator. It is important to recognize these flaws, which are identified as assumptions, limitations, and delimitations. The following were the assumptions, limitations, and delimitations anticipated by the researcher for this study.

Assumptions. According to Bloomberg and Volpe (2016), assumptions are based on initially established concepts that, in the end, will either be true or may turn out to be unfounded or baseless. Bloomberg and Volpe also explain that assumptions demonstrate what the researcher believes to be sincere at the start of the research. The following is a list of the assumptions for this study.

1. All students from all programs will have been educated using the same curriculum and the same clinical requirements as deemed by the American Registry of

Radiologic Technologists. If this were not the case, then there would be a lack of consistency in material covered, thus the clinical education requirements.

2. All programs follow the *Standards for an Accredited Educational Program in Radiography* as delineated by the accrediting agency, the Joint Review Committee on Education in Radiologic Technology. The JRCERT accreditation process ensures that all programs meet the same standards meaning that both clinical instructors and practitioners are held to a standard to ensure that all students are educated using the same curriculum and highest standards.

3. All who participated in the Questionnaire and Interview were honest in their answers as they were assured confidentiality. If confidentiality was not ensured, students may not provide honest, in depth descriptions of their clinical experience.

Limitations. Bloomberg and Volpe (2016) state that limitations are outside circumstances that could have a resultant effect on results by altering the aim of the study. The following is a list of the limitations of this study:

1. This study was limited by the number of incomplete questionnaires returned to the researcher thus demonstrating a reduced number of the sample size.

2. Originally, interview participants were to be recruited and selected based on their respective responses to the questionnaire. However, due to the low number of those who indicated an interest, all students who volunteered for the interview were selected. At the outset, the researcher hoped to select interview participants from those individuals who provided more in depth descriptions to answers in the open ended questions in the questionnaire. The hope was that these individuals would do the same during the interview process.

3. This study was limited by the uneven number of the sample size distributed in each state, as there were double the number of participants from New Jersey. Had there been a more equal number of participants the researcher may have been able to note a difference between descriptions of participants as New Jersey has a more stringent clinical requirements than New York.

4. Demographic questions were minimal. The only demographic information permitted by the GCU IRB was students' year in the program and the state in which the program was located. As information concerning participants' age, gender, ethnicity was unknown.

Delimitations. According to Bloomberg and Volpe (2016), a delimitation is a method for the researcher to identify how the aim of the study was contained and why

alternative approaches to the study were not used. The following is a list of the delimitations for this study.

1. This study was delimited to a sample of only second year radiologic technology students. This is because, for the most part, these students had at least three to four semesters of clinical education, which was sufficient time for information to be obtained. Since second-year students took part in the clinical education component for a longer duration than a first-year student, they had more experience. This additional time in a clinical rotation was advantageous for this qualitative descriptive study.
2. This study was delimited to the only students from a radiography program accredited by the JRCERT who were interviewed. Some radiography programs fall under the umbrella of institutional accreditation. The difference is that programmatic accreditation ensures the student a proper clinical experience. Institutional accreditation, while accepted by the ARRT does not closely evaluate the clinical component. As a result, the clinical component requirements may not be as stringently adhered to nor verified in a program using only programmatic accreditation as opposed to following the JRCERT Standards of Accreditation.
3. This study was delimited to students in New Jersey and New York.

Summary and Organization of the Remainder of the Study

The clinical component of radiologic technology education is vital to students' success because it is where academic content taught in the classroom can be put into practice. The experience in this component of education can be significantly impacted by the practitioner and the clinical instructor. This qualitative descriptive study aimed to explore how second-year radiologic technology students perceived their ability to learn based on the ability of clinical instructors and practitioners to provide targeted practice and effective feedback.

In Chapter 1, the researcher introduced the topic of the study, the background of the study, and the problem statement based on gaps identified by current researchers. Also, the researcher presented the purpose of the study. The purpose of this study was to examine how second-year radiologic technology students in New Jersey and New York

perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The researcher outlined the research questions for the study as well as information regarding the methodology and design selected. In addition, a description of both data collection sources a questionnaire followed by a semi-structured interview was provided. The definition of terms associated with the phenomenon and research setting was also included in Chapter 1, along with the assumptions, limitations, and delimitations for this study.

In Chapter 2, following the identification of the gap and the theoretical foundations, a description of the clinical education process in radiologic technology was provided, along with a description of the national, and state requirements for eventual certification. The literature review revealed several themes concerning clinical education in other allied health professions that can be applied to radiologic technology, and a minimal number of radiologic technology studies, as well. The most prevalent research themes concerned perceptions of both clinical instructors and students of what is effective and ineffective in the clinical learning environment, the impact of the practitioner, and the professional development needs of clinical instructors and practitioners concerning their supervision and teaching skills. Additional themes included research on the effectiveness of the clinical learning environment, itself, in terms of behaviors and attributes of those involved in student learning. Other areas of prior research that will be included related to the relationship of academic content to practice and the program director's role as a gatekeeper.

Chapter 3 presents a description of the research methodology, design, and sample. Chapter 4 discusses the data analysis and reveals the results of the research while Chapter 5 provides an interpretation of the results and discusses implications for future research and how the results of this study can improve the clinical education component of radiologic technology programs. The timeline for this study projected completion within 12 months of the approval of the proposal, approved by AQR by July 2019. Included in the timeline is institutional approval from the four radiologic technology programs from which the researcher recruited the sample. The researcher also included the distribution of the questionnaire and time allotted for semi-structured interviews as well as the transcription of the questionnaires and interviews.

Chapter 2: Literature Review

Introduction to the Chapter and Background to the Problem

The focus of this qualitative descriptive study was to explore how second-year radiologic technology students perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Clinical instructors' and practitioners' contributions to students' learning are a vital prerequisite for students to respond to the execution of day-to-day clinical activities (Subramaniam, Sambasivan & Silongm 2018). As a result, this literature review provides a comprehensive overview of prior research concerning the culture of the clinical learning environment and the influence of the clinical instructor and practitioner. As there is a paucity of research in this area in radiologic technology education, most of the research discussed will be related to other allied health and medical education programs to include but not limited to nursing, physical therapy, athletic training, and medicine.

In Chapter 2, the researcher will discuss the background of the problem and the rationale for the researcher selecting Vygotsky's theory of the zone of proximal development as the theoretical foundation for this study. The literature review portion of the chapter will cover themes relating to the culture of the clinical learning environment, including the elements of faculty members' acceptance of students and willingness to supervise and teach them. The researcher will also discuss the influence of the clinical instructor focusing on such topics as attributes, technical knowledge and competency, and the practitioners and their willingness to share knowledge, educate and supervise students and provide feedback.

The contents of the Theoretical Foundations and the Review of Literature were obtained through various sources including SAGE, Eric (Ebsco), ProQuest Education Journals, ProQuest Central, ProQuest Nursing and Allied Health Source, Google Scholar, CINHAL Complete, OVID, PubMed and Academic Search Complete. Key search terms used to gather research included the clinical learning environment, clinical setting, clinical instructor, health care practitioner, clinical education, radiologic technology, radiographer, health care practitioner behavior, and clinical instructor behavior. A comprehensive search of the allied health sciences database for the clinical learning environment yielded substantial research but mostly in the nursing, physical therapy, and athletic training professions.

The researcher found only four studies indicating minimal research in radiologic technology concerning the clinical learning environment (Bloomfield & Subramaniam, 2008; Giordano and Harris, 2012, Mason, 2006; Rose & McIntosh, 2015). Only the studies by Giordano and Harris (2012) and Mason (2006) were performed in the United States. The researcher reviewed several investigations in radiologic technology concerning perceptions, specifically, of the clinical instructor or the practitioner (Cunningham, Wright & Baird, 2015; Fowler, & Wilford, 2016; Giordano, 2008; Giordano & Harris, 2013; Ingrassia, 2011; Perram et al., 2016; Thompson et al., 2016). Since there were only a few studies in radiologic technology, much of the literature review for the present study was derived from other allied health venues but can be directly applied accordingly.

As stated in Chapter 1, there are no guidelines in place to access the value of the clinical site so the clinical site selection process may not always be in the best interest of

the student. From a historical perspective, radiography educational programs appropriate to these clinical sites based more on necessity than the attributes of the educational opportunities received by the student (Giordano & Harris, 2012). All the above factors may impact the student's acquisition of knowledge through application, reflection, and feedback so that academic content taught in the classroom can be brought into practice in the clinical learning environment.

These requirements are verified as being met by the radiologic technology program director (Reid, 2001). This verification process is performed through the program director's signature on the student's Registry certification application following a statement verifying the completion of various clinical competencies (Reid, 2001). In essence, the program director must rely on the assessment and evaluation from the clinical instructor who, in turn, depends on the influence of the practitioner for students to meet their clinical learning outcomes.

It was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Referring to the above problem statement, there were several gaps defined in the current literature relating to both the clinical instructors and practitioners. Francis et al. (2016), explored clinical instructors' perception of their attributes and recommended additional research concerning the knowledge and skills of clinical instructors. According to Nolan and Loubier (2018), further research is needed concerning the training of clinical instructors, relating to their ability to provide feedback.

Apart from explorations relating to clinical instructors, there is also a gap in research concerning the practitioner, who is the staff radiologic technologist, with whom students spend most of their time. Shanahan (2015) explored the students' perception of the practitioner as the primary resource for learning in the clinical learning environment. The findings showed that the students relied extensively on the practitioner. Further research was recommended to duplicate the study to further distinguish how practitioners are used as a resource.

Moreover, Fowler and Wilford (2016) found that students value the feedback given by the practitioner but that practitioners, for a variety of reasons, cannot always provide an evaluation and informal assessment of students' performance. Furthermore, although professional development opportunities may exist for clinical instructors, the same may not be true for the practitioner (Fowler & Wilford, 2016). Typically, practitioners receive little or no training in how to provide targeted practice and effective feedback (ASRT, 2015). Fowler and Wilson, suggest additional exploration of the students' perception of the effect of the feedback.

Identification of the Gap

A welcoming clinical learning environment where both clinical instructors and practitioners take part and possess awareness of their importance to students' clinical progress, may be impactful to student learning. Several studies have addressed the need for more research concerning the impact of the clinical instructor and practitioner in the clinical setting, specfically related to students' targeted practice and providing effective feedback of that practice. These studies address this gap in radiologic technology education concerning the overall impact of the clinical instructor and the practitioner on

student learning (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). Specifically, the researchers are advocating for a better understanding of the role and responsibility of the clinical instructor and practitioner in the clinical education process (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). The researchers noted gaps regarding both groups of individuals. As a result, further research regarding clinical instructors includes students' perceptions of their knowledge and skills and training to be better prepared to provide feedback to students (Francis et al., 2016; Nolan & Loubier, 2018). Additional research was also suggested concerning the practitioner and relate to seeking to understand and identify students' perceptions of how the practitioner (staff radiologic technologist) is used as a resource by students as well as further exploration to note if practitioners are allowing students sufficient practice and can properly provide feedback (Fowler & Wilford, 2016; Shanahan, 2015).

The interpersonal skills of those individuals in the clinical learning environment may influence the clinical education of students. Both Ingrassia (2011) and Mason's (2006) research demonstrated that interpersonal skills of clinical instructors are relevant and meaningful to radiologic technology students' clinical education. Students in Mason's exploration of clinical stressors revealed that the majority of respondents found intimidation of practitioners and clinical instructors to be a cause of stress and that other items such as an understanding when mistakes were made and not being belittled to be attributes that relieved stress. Ingrassia's exploration of behavioral characteristics of clinical instructors that were perceived to be most important to students in the clinical environment were those instructors who were approachable (non-intimating), practiced

mutual respect, and provided support and encouragement. Francis et al. (2016) concluded that those involved in the clinical education of students must possess very specific prowess and demeanor.

The authors describe a "practice educator" as one trusted with enabling students' learning and state that further inquiry into the actual expertise and proficiency of this individual would be valuable. Francis et al. (2016) also stated that there should be an "analysis amongst those that have attended practice educator workshops and those who have not (p. 294)." Nolan and Loubier (2018), who studied feedback provided by the clinical instructor, stated: "…researchers should continue to investigate variables related to students' receptivity (of feedback) in a clinical setting" (p. 254). The primary individuals that influence the clinical education of radiologic technology students are the clinical instructor and the practitioner; therefore, their teaching methods may influence student learning

Since the student spends the most time with the practitioners in the clinical learning environment, the ability of the practitioners to provide targeted practice and effective feedback is essential. Shanahan (2015), whose investigation revealed that the practitioner was the primary resource for students, suggests further research in studying learning behaviors in the clinical learning environment. Shanahan points out that it would be beneficial for "…studies conducted in a clinical setting in which student learning behaviors observed would provide valuable insight into the actual use of knowledge tools" (p. 369). As is evidenced by the above studies, there is a need for further investigation to examine how radiologic technology students perceived their ability to learn based on the ability of the clinical instructor and practitioner (staff radiologic

technologist) to provide targeted practice and effective feedback. Fowler and Wilford, (2016), who studied the value of feedback given to radiologic technology students by the practitioner found that students greatly valued it, yet feedback was not always available due to time constraints. Because, when given, the feedback was highly effective, Fowler and Wilford recommend further research to explore the "the impact feedback had on student radiographers' learning" (p. e23)." This research seeks to understand the students' perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback.

This information obtained from this study may be vital. A portion of students' eligibility to sit for the ARRT national certification examination hinges upon the program director's verification of successful completion of numerous clinical competencies. These competencies are assessed in the clinical learning environment by the clinical instructor who, in turn, depends on the practitioner. This dependency involves the demonstration of academic content that is taught in the classroom being present in the clinical learning environment so that the student has the knowledge and practice to meet these learning objectives.

Theoretical Foundation

This qualitative descriptive study which explored second-year radiologic technology students' perceptions of the clinical learning environment is based on two theoretical foundations. The first is Lev Vygotsky's (1978, 1994) theory of the zone of proximal development. Vygotsky's (1978, 1994) theory centers around what he referred to as the zone of proximal development which can best be explained as the contrast

between what a learner can accomplish with help and what they can accomplish without help. The overall support of students in the clinical learning environment may foster positive learning outcomes (Ingrassia, 2011; Mason, 2006). Vygotsky focused on the relationship between learning and development and used the zone of proximal development as an approach to augment the quality of learning in school (Vygotsky, 1978, 1974).

To further illustrate this, Vygotsky (1978, 1974) introduced two concepts, identifying one as scientific and the other as spontaneous. According to Vygotsky, the scientific concept describes what a child learns in a classroom venue, which in radiologic technology education is referred to as didactic learning. It provides the framework needed for the second of the two concepts, identified as spontaneous, which can be equated to the clinical component of a radiologic technology student's educational process (Vygotsky, 1978, 1994). The concept of transferring classroom knowledge into practice is included in both research questions. Both research questions concern the student’s perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. These are the primary individuals in the clinical learning environment whose teaching methods play a crucial role in the clinical education of the radiologic technology student and can guide the student from the academic content into practice.

Vygotsky (1978, 1994) stated that the spontaneous concept will generally develop, following the student's personal experience with the scientific concept. In terms of this study, eventually, the spontaneous concept serves to further deepen an understanding of the scientific concept and it is in the zone of proximal development

where the two concepts, once far apart, come together (Vygotsky, 1978, 1994). This means that radiologic technology students use the information taught in the classroom, Vygotsky's scientific concept, into the clinical learning environment as targeted practice, thus the spontaneous concept. The zone of proximal development is where, through the clinical learning process, the spontaneous concept arises to the level of the scientific concept, meaning where academic content taught in the classroom turns into practice in the clinical learning environment. As a result, the more targeted practice opportunities given and the more that effective feedback is administered, the more students will develop their clinical skills.

Vygotsky's (1978, 1994) zone of proximal development has been referenced in more contemporary research concerning the clinical learning environment. Skoien, Vagstol, and Raaheim (2009), as well as Vagstol and Skoien (2011), discuss the zone of proximal development as what should be recognized by all those who take part in a student's clinical education. In the case of this research, this is why it is important for both clinical instructors and practitioners to realize the importance of their role in the students' clinical education. Peer and McClendon (2002) address Vygotsky's work, particularly his view on scaffolding and how it applies to clinical education. In radiologic technology clinical education, scaffolding plays a major part in students' progression. Targeted practice should begin with less difficult procedures and then as mastery is achieved to a more challenging procedure. For example, a simpler routine chest radiograph procedure on a patient who can physically and mentally function would need to be mastered prior to a student performing a chest procedure on a patient in a stretcher, who is unable to communicate. Peer and McClendon stated that its importance is in the

student's ability to strongly engage in the learning process for advancement to materialize and it may be up to the clinical instructor and practitioner to encourage and support student engagement.

An additional theoretical foundation for this study can be found in Sternberg's triarchic theory of intelligence. This theory, as stated by Sheckley, Allen, and Keeton (1993) is one that can be used to describe the adult learning phenomenon. According to Sternberg et al. (2000), the triarchic theory of intelligence involves analytical, creative, and practical thinking, all of which can be applied to the clinical education of radiologic technology students. In essence, this theory is about establishing proficiency and competence in the adult learner, which is the type of learner in radiologic technology education.

Initially, in the radiologic technology curriculum, these three aspects of intelligence noted above can initially be assessed as theory in the classroom, just before practice in the clinical learning environment. Then, in the clinical setting, practical thinking can be applied to the performance and practice of procedures, creative thinking to the more difficult patient and analytical thinking to the evaluation of the radiographic images, themselves. Furthermore, Sheckley et al. (1993) state that the use of a "recursive process" allows the adult learner to relate cause and effect. In the case of radiologic technology clinical education, the "cause" would be the performance of a radiographic procedure and the "effect" would be the resultant radiographic image. For the adult learner, the recursive process would be the feedback discussion which would involve the practitioner as the teacher for a back-and-forth discussion of the results to aid in learning (Sheckley et al., 1993). These concepts are important to this study as the "cause" would

refer to the students' perception of the ability of both clinical instructors and practitioners to provide targeted practice. The "effect" that would be related to students' perception of the feedback received from these individuals based on the students' performance and the resultant radiographic image.

As stated in Chapter 1, radiologic technology students are taught to put the academic content taught in the classroom into practice in the clinical learning environment. Vygotsky's (1978, 1994) theoretical frameworks easily tie into the acquisition of knowledge and skills that hopefully occurs in the clinical learning environment for the radiologic technology student. The zone of proximal development occurs in the clinical learning environment. The learning process in this setting is performed in a sequential manner where the student, after initially learning procedures in the classroom, first observes, then assists, and then practices with assistance (ASRT & AEIRS, 1992). The last step of this educational process should lead to the student independently performing the radiographic procedure, hence Vygotsky's zone of proximal development.

The above description appropriately identifies what should happen in terms of Vygotsky's theoretical framework involving the zone of proximal development. This concept of the zone of proximal development is particularly useful in terms of education in the clinical learning environment where this theory can be demonstrated as one of the theoretical frameworks of this research. Vygotsky (1978) detailed his thoughts concerning the acquisition of knowledge and the progress of children. His theory stated that adults, as individuals who are more knowing and proficient, play a major part in cultivating the learning and development of children by assisting them with more

challenging circumstances. Vygotsky also asserted that to obtain an accurate evaluation of a child's intellectual progress, the ability of the student must be measured when operating both with and without assistance. This concept aptly applies to learning in the clinical environment. In this venue, the student can experience performing radiographic procedures after observation by first working with the practitioner then gradually needing less and less assistance and guidance. Eventually, the student should be able to perform the procedure with no guidance or assistance from the practitioner (ASRT & AEIRS,1992)

Several studies have investigated the perception of the radiography student of some specific aspects of the clinical component (Fowler & Wilford, 2016; Ingrassia, 2011; Perram et al., 2016; Rose & McIntosh, 2015; Shanahan, 2015). The practitioners' perception of clinical education has been investigated by Francis et al. (2016), Rose and McIntosh (2015), and Thompson et al. (2015). Bloomfield and Subramaniam (2008), Giordano and Harris (2012), Mason (2006), and Rose and McIntosh's studies have addressed the clinical learning environment as a whole and but only two of these four studies were performed in the United States. There is very little research in radiologic technology education concerning students' perception of their ability to learn based on clinical instructors' and practitioners' ability to provide targeted practice and effective feedback and, several investigators have suggested further research in this area (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). As a result, this study serves to advance this body of knowledge to examine how the clinical instructor and the practitioner influence student outcomes.

Understanding the student's perspective regarding which aspects of the clinical component led to a successful and educational clinical experience or what deters that success is vital. This information will hopefully lead to an awareness of practices that should be retained and promoted as well as those that should be eliminated or changed. Student success in the clinical component of their education is vital to engendering a confident, competent, and compassionate radiographer. It was hoped that, through questionnaires and interviews, students' perspectives of the clinical instructor and practitioner will be revealed. It was hoped that light would be shed upon favorable practices and attitudes of individuals in the clinical learning environment as well as which practices and attitudes that deter clinical learning. This knowledge could only serve to improve clinical learning, thus performance to produce a qualified and caring radiologic technologist.

Review of the Literature

It was essential for the researcher to have conducted a complete examination of the literature to explore how radiologic technology students perceive the culture of the clinical learning environment. This survey of the literature was formulated into several main sections to include the culture of the clinical learning environment, individuals who comprise the clinical learning environment, the influence of the clinical instructor and practitioner, conclude by an overview of clinical education and the clinical learning environment in radiologic technology.

Based on recent research, the clinical learning environment may not guarantee that learning is taking place. Francis et al. (2016) investigated the practitioners' perceptions of attributes possessed by a practitioner that could be considered to be the

consummate educator in the clinical learning environment. England et al. (2017) examined clinical education designs in Europe. Both Francis et al.'s and England et al.'s investigation revealed that for student learning outcomes to be met, there is a reliance on several other circumstances and elements. The most important of these elements is the supervision of practitioners and clinical instructors in the clinical practice of students. Both researchers acknowledge that a set of specific skills and attributes are necessary to successfully educate students in the clinical learning environment. England urges further research in the area of training for these individuals to include specific topics needed and Francis suggests research to note if there is a difference in the attainment of student outcomes for those with versus those without education training. In radiologic technology education, the goal of the educational component in the clinical learning environment is to provide the student a variety of experiences where learning occurs in the context of real-life surroundings with other individuals (ASRT & AEIRS, 1992). The hope is that a successful clinical experience for the student will ensure that, upon successful completion of their education and the ARRT certification exam, they continue to maintain high standards of excellence in the profession.

A review of the literature concerning the clinical learning environment involves general attributes, which make up the environment's culture, which in most cases is the radiology department of a hospital or an imaging center. There are cultural differences from one clinical learning environment to another, possibly making one radiology department more student-friendly, than another. Also discussed will be the importance of those individuals who comprise it, most especially the radiologic technology practitioner and the clinical instructor. The clinical learning environment is an integral part of the

student's education as it is where information assimilated in the classroom can be transferred into an environment where the student can practice and refine their skills and to develop professional values (Ghrayeb, 2017; Skaalvic, Norman, & Hendriksen, 2011). This literature review will provide a general overview of a clinical learning environment as well as the impact of those who are embodied in the setting and their contributions to teaching strategies for the health care student.

The culture of the clinical learning environment. The clinical learning environment provides a framework for students. It is a venue for them to progress to proficiency in the application of what is learned in the classroom in terms of knowledge, skills, values, and demeanor (Burgess, Oates, Goulston, & Mellis, 2014; Doyal et al., 2017; Pitkanen, 2018). Doyal et al.'s (2017) study, which investigated nursing students' perspective of the clinical learning environment, found that it was most important to students that clinical staff be pleased to help students. However, this learning environment can be classified as indeterminate as learning opportunities are sometimes inconsistent (Bharj & Embo, 2018). According to Preethy, Erna, and Mariama (2014), each environment has a particular individuality. Like some humans, some surroundings can be more affable than others and a clinical learning environment may be no different. The quantitative study by Preethy et al. concerning perceptions of students, doctors, and nurse educators in the clinical learning environment, was designed to be a comparison of each group of individuals' perceptions with the hope of modifying or improving certain aspects of the environment as needed. Using a structured questionnaire, the Clinical Learning Environment Inventory (CLEI), their research revealed that the majority of all groups had a similar perception of the ideal clinical learning environment.

However, the study by Subramaniam et al. (2018) concerning the effect of leadership styles of those who supervise medical residents revealed something different from the Preethy et al. (2014) investigation. While all parties were in agreement in Prethy et al.'s study, that was not the case in Subramaniam et al.'s study where supervisors were both—either encouraging or abusive. Using a questionnaire, researchers could conclude that the clinical learning environment affected the development of the medical residents' competency. Those who had opportunities to develop and learn were more successful than those residents who were not permitted enough participative learning opportunities (Subramaniam et al., 2018).

The dynamics of the interaction of the student and the staff of the clinical environment are essential to the students' clinical learning. In Hongkan, Arora, Muenpa, and Chamnan's (2018) study, of medical school students' perception of the clinical learning environment and atmosphere, it was noted that while there was satisfaction with the instructor, the clinical learning environment and atmosphere were compelling areas for further development. In Chen (2016) et al.'s study, also of medical school students, findings indicated a need to direct the educational institution's awareness more toward the clinical learning environment and its reliance on student learning experiences. Preethy et al.'s (2014) study concurred that a favorable, humanizing experience with a positive relationship between the clinical instructor and practitioner was an important aspect of students' learning. Delaney et al. (2015) state that students need a comfortable learning environment.

According to Gunay and Kilinc (2018), a quality clinical learning environment is the result of the collaboration between the educational institution, practitioner, and

administration. Rindflesch, Hoversten, Patterson, Thomas, and Dunfee (2013) studied physical therapy students' characterization of elements that help to carry out a prosperous clinical experience. The results, obtained through interviews of this study using probing questions, indicated that a positive work surrounding to include practitioners that are not only welcoming but, willing to act as educators toward students and contribute to a rich clinical experience was important to clinical learning. Other factors that add to this are the availability of learning opportunities and a staff that is willing to collaborate with students concerning the care of patients (Rindflesch et al., 2011). Preathy et al., Chan, and Delaney et al., all agree with Rindflesch et al. that a staff of practitioners willing to work with students to achieve their learning outcomes is the most preferred. All of these studies demonstrate the importance of a welcoming clinical learning environment.

Some students preferred an individualized supervisory relationship in the clinical learning environment. This was found to be the case in Antohe, Riklikiene, Tichelaar, and Saarikoski's (2016) study of student nurses in the Czech Republic, Hungary, Lithuania, and Romania. Gurkova et al.’s (2016) descriptive cross-sectional study of nursing students in Slovakia, supported Antohe's et al.'s investigation further stating that those students with individualized, one on one, supervision were more satisfied with their clinical experience. Finally, Pitkanen et al. (2018), who examined the clinical learning environment and supervision of nurses found that students preferred one on one time with a practitioner. Based on the above studies, students perceived a more positive learning experience when paired with a clinical instructor on an individual.

Clinical education can be a mixed experience for students. Salamonson et al. (2015) investigated nursing students' most satisfying and most challenging aspects of

their clinical placement. Using instruments that combined both qualitative and quantitative data, as well as the use of semi-structured focus group interviews, it was revealed that there was satisfaction by students with the manner that staff nurses generally cared for patients. However, there were negative aspects noted that involved staff nurses' disinterest to take part in educating students. Like, Rindflesch et al. (2013), this investigation also verified the importance of learning opportunities but more importantly, opportunities accessible through the willingness of staff nurses to teach them.

Not only do clinical learning environments differ from one locale to another, but some may vary within the institution making clinical education even more challenging for students. Hegenbarth, Rawe, Murray, Arnaert, and Chanbers-Evans (2015) studied the clinical learning environment in nursing, in particular, four nursing units in one Canadian hospital. In this qualitative study, the researchers found that not all four units, although in the same hospital, had the same climate. Also discussed was the importance of the social and organizational aspects of the clinical learning environment and its impact on students. There was a diversity of the individuals that made up the culture of the clinical learning environment that was investigated and their impact on the students was notable. This was demonstrated when the study revealed two specific themes, which the investigators labeled *influencing factors* and *willingness*. Some influencing factors included the fact that having students present, in the unit, was a method of recruitment. In addition, according to Hegenbarth et al. valuing the students' contribution as a member of the nursing unit was also positive. Furthermore, Recker-Hughes, Padial, Becker, and Becker's (2016) literature review also discussed influencing factors for having students in

the clinical learning environment. Their review of prior research indicated a motivating factor for having students as the students' presence contributed to staff professional development. However, O'Brian et al. (2017), examined employers' perceptions of students in the clinical learning environment. They indicated that it was important that the students' educational process be a joint effort between the educational institution and the employer.

The importance of the investment of students by the health care institution should be noted. O'Brian et al. (2017) investigated the perception of employers relating to the presence of students in the clinical learning environment. The purpose of their research was to gain better recognition of the vitality, advantages, and deterrents, and other issues related to student participation. Their findings revealed both favorable and unfavorable aspects. The importance of being in a welcoming environment was also a finding in Rindflesch et al.'s study (2011). The authors noted that being welcome was even more beneficial for students when the willingness of those in the unit included creating situations where the student felt like they were part of the team and protected (Hegenbarth et al., 2015). The researchers concluded that all of these characteristics improved the students' learning.

More often than not, a student's preferred perception of a clinical learning environment is different from the reality of their actual learning environment. Papathanasiou, Tsaras, and Sarafis (2014) explored the perception of the clinical learning environment of nursing students in Greece. Through the use of a quantitative instrument in their descriptive study, they compared students' perceptions of their preferred setting to their viewpoint of the actual environment in which they were participating. The

researchers evaluated several characteristics. Those noted as preferred, but not necessarily experienced in the actual environment, were satisfaction, individualization, and innovation. According to Papathanasiou et al., innovation referred to teaching and learning methods related to the acquisition of skills that were made more intriguing. Individualization was related to the opportunity the students had to make their own decisions, in addition to how they were regarded by those in the clinical learning environment (Papathanasiou et al., 2014). Finally, satisfaction defined the students' overall comfort level with the clinical experience. The researcher concluded that students did not receive opportunities to become self-motivated (a lack of the need for autonomy) or to demonstrate their earnestness as there were insufficient situations presented for student participation (Papathanasiou et al., 2014).

Students' perceptions of the clinical learning environment involve a positive interaction with individuals in the environment. Both Pitkanen et al. (2018) and Papathanasiou et al. (2014) state that those individuals within the setting need to demonstrate a genuine concern for the student for optimal learning to take place. Through a questionnaire, Doyal et al.'s (2017) qualitative study, like Papathanasiou et al., investigated perceptions of the clinical learning environment of the student. The factors revealed were perceived to either augment or repress the clinical learning environment. The results indicated as did those of Pitkanen et al., Preathy et al., and Salamonson et al. (2015) that a supportive setting facilitated a positive experience as well as the availability of diverse learning opportunities. Some perceived negative aspects from the perspective of both the clinical instructors and the practitioners of the environment included disinterest by the students as well as a lack of ambition and impetus.

Some clinical learning environments may not be student friendly. Jackson et al. (2011) investigated strategies used by students to adapt to negative demeanors in the clinical learning environment. They used an online course survey to investigate students the most challenging and satisfying aspect of the clinical learning environment. Their findings revealed that it was not uncommon for students to experience abuse and duress from staff nurses, ward supervisors, and medical or administrative staff. In this study, students were asked to identify their most negative aspects, as well as the most gratifying aspects of their clinical rotation (Jackson et al., 2011) They stated that feelings of being ignored, excluded and unwelcome limited their learning opportunities. Conversely, Doyle (2017) et al.'s research found that a clinical learning environment that was welcoming promoted learning.

Finally, students must contend with stress in the clinical learning environment. According to Ahmadi, Shahriari, Kevyanara, and Kohan (2018), the human element of the clinical learning environment may be the origin of stress for students. In this qualitative study of midwifery students, using semi-structured interviews, it was determined that multiple factors can be the cause to include the association with clinical staff and fear of poor performance. Osman and Gim's (2018) study somewhat concurred with Ahmadi et al.'s research. Through the use of a questionnaire, they found that in addition to the stress of the fear of poor performance, such circumstances as sub-optimal grades and a failure to meet the clinical instructor's expectations were also a case for emotional pressure for nursing students. Saheer et al. (2018) investigation indicated that students perceived stress in the clinical learning environment, like Osman and Gim and Ahmadi et al., over the fear of poor performance and also for learning clinical

procedures. In addition, findings in this study of dental students also revealed stress caused by poor surroundings created by the clinical staff and supervisors.

Individuals involved in the students' clinical education. Many individuals are part of the clinical domain. The clinical learning environment is comprised of practitioners, a clinical instructor, supervisors, staff and patients, and doctors (Preethy, Erna, & Mariama, 2014; Skaalvic et al., 2011). Overall, students should have role models in that setting that support the learning objectives, in addition to individuals that will provide encouragement and timely feedback (Phuma-Ngaiyaye, Thokozani Bvumbwe, & Mep Coretta Chipeta, 2017; Nolan & Loubier, 2018). According to Schumacher, the relationship between the clinical educator or the practitioner with the student should be complimentary.

The student's contentedness is an important factor in clinical education. The quantitative research by Skaalvik et al. (2011) supported the findings of Preethy et al. (2014) and Delaney et al. (2015) concerning their assessment of the importance of the student's comfort level in the clinical earning environment. For example, the comfort level was increased in an environment where the practitioners knew the name of the student and were approachable, as the staff-student relationship was important for the student's success. Ingrassia's (2011) study of the ranking of the importance of clinical education factors of both students and clinical instructors also identified the approachability of the clinical instructor as an important component to the student. In Skaalvic's et al.'s study, feeling welcomed is also a factor in students' perception of the clinical learning environment (Skaalvic et al., 2011). This also supports one of the conclusions in Rindflesch et al.'s (2011) research on environmental characteristics that

create a positive or negative clinical experience. The researchers found that the student's experience is favorable or deficient depending on the staff's provision of support and encouragement.

The leader of the clinical learning environment is not directly involved in the day-to-day teaching of the student because of administrative duties. However, because those who act in this capacity are usually responsible for allocating responsibilities to practitioners, their actions may indirectly affect the student's experience. As a result, the supervisor of the clinical learning environment, although not always as visible in the department as the practitioner and clinical instructor plays a part in the student's experience (Bisholt, Ohlsson, Engstrom, Johansson, & Gustafsson, 2014; Skaalvic et al., 2011). In Slaalvic et al.'s (2011) investigation, students were aware of how clinical education supervisors viewed the staff. Students preferred an atmosphere where the department leader regarded the students as part of the team, appreciated their efforts, and gave useful feedback (Bisholt et al., 2014; Skaavik et al., 2011). Furthermore, according to Bisholt et al.'s (2014) study, which used the same quantitative instrument as Skaalvik et al. (2011), a good relationship between the educational institution and supervisors in the clinical learning environment is meaningful.

Overall, the culture of the clinical learning experience is a vital component of the student's success. There are many individuals involved and each plays a definitive role, specifically the clinical instructor and the practitioner. The supervisor who oversees the day-to-day operation of the clinical learning environment sets the tone and the staff follows (Bisholt et al., 2014; Skaalvic et al., 2011). It is important that the educational institution and the clinical learning environment, work together to make the student's

experience a success (O'Brian et al., 2017). To the student, a relaxed atmosphere of feeling welcome, comfortable and being involved is preferred as well as possessing a favorable interpersonal relationship with the individuals present in the clinical learning environment which is essential (Bisholt et al., 2014; Bloomfield & Sbramaniam, 2008; Preethy, Erna & Mariama, 2014; Skaalvik et al., 2011). Having a variety of clinical opportunities available is a vital component and being able to take advantage of these opportunities independently, and when possible, is an important component of learning to the student, in addition to the quality of care given to patients by the environment's staff (Bisholt et al., 2014; Bloomfield & Sbramaniam, 2008; Skaalvik et al., 2011).

Influence of the clinical instructor. The clinical instructor is the primary link to a successful clinical experience. An individual designated as such, in allied health education, is primarily responsible for the transition process of formal learning of the academic content to clinical practice by sustaining practical knowledge through reflection and critical thinking (Ozga et al., 2016). This occurs by overseeing the guidance of students through real-life situations in the clinical learning environment through mentoring, ensuring that competency requirements are met, and encouraging the use of critical thinking skills (Glynn, McVey, Wendt, & Russell, 2017).

Role and responsibility. Clinical instructors have a distinct role and responsibility to the student. These individuals create a caring environment (Burgess, Oates, Goulston & Mellis, 2014; Clawson & Curtis, 2018). Clinical instructors are role models and mentors and, as such, have a duty to the profession in which they practice (Plack, 2008). According to EL Banon and Elsharkawy (2017), the clinical instructor's responsibility is to support students through their purposeful presence, deliver feedback,

give confidence, and try to keep order in the clinical process. As a result, their role is critical to student learning outcomes which makes an ineffective clinical instructor a detriment to the students' clinical education.

Barriers to the clinical instructor. Several barriers may be encountered by clinical instructors that may prevent them from performing their duties to the best of their ability. Plack (2008) investigated physical therapy students' perception of barriers and support of the clinical instructor in terms of the engagement of students. One of the barriers that surfaced from the qualitative research interviews were negative experiences with previous clinical instructors. Ramel and Martin's (2017) research elaborates Plack's and Greenfield et al.'s (2012) findings by stating that a primary factor relating to the students' poise and contentment with the clinical learning experience may very much depend on both the student and the clinical instructor being in concert with each other. They found that a good relationship between the two increased the student's technical competency.

The clinical instructor must be viewed as a team member in the clinical learning environment. Therefore, clinical instructors need to have a good rapport with the practitioners, supervisors, and the staff who comprise the clinical learning environment. If the clinical instructor does not have a good rapport with those individuals in the clinical learning environment, it may negatively affect the student-clinical instructor relationship (Shahsavari, Parsa, Yekta, Houser, & Ghiyasvandian, 2013). In Aljadi et al.'s (2017) study of physical therapy clinical instructors, support from supervisors, and fellow clinicians was identified as a challenge. In Pitkanen et al.'s (2018) study of nursing students in the clinical learning environment and supervision, students perceived the

instructor to be an outcast in the clinical learning environment. It was thought that they could not fully give of their expertise.

Shahsavari et al. (2013) investigated factors that encourage or deter student-clinical instructor interactions. Through observation and semi-structured interviews, the researchers found that when students observed the relationship of the clinical instructor with the staff, they could judge the instructor's strengths and weaknesses. This could be a positive or negative perception, yet one that would affect the students' connection with the clinical instructor. Many times, the clinical instructor does not capture the respect of the practitioners in the environment or, in some cases the instructor is powerless during day-to-day activities. While clinical instructors must aggressively set up a friendly, supportive and effective climate for students, students need to realize the limited control the instructor has over the clinical learning environment (Shahsavari et al., 2013). Shahasavari et al. also stated that another barrier is that the practitioner must acknowledge that teaching cannot be hurried and therefore may somewhat interfere with the day-to-day activities within the clinical learning environment. In Zipp and Kolber's (2014) literature review, time constraints were also found to be a barrier for clinical instructors.

Clinical instructors and their colleagues in the clinical learning environment also need to have a rapport and an understanding of their roles so that student learning outcomes can be met. Similar to Matsumura, Callister, Palmer, Cox, and Larsen, (2004) and Shahsavari et al. (2013), Reising, James, and Morse's (2018) study, addressed the importance of a cooperative relationship between clinical instructors and colleagues in the learning environment. Their investigation of students' perceptions of clinical

instructors' characteristics noted that students viewed the clinical instructor's inability to work with practitioners negatively. They were also concerned that clinical instructors were not flexible nor up to date with current practice.

Clinical instructor as an evaluator. Being an evaluator can also be a barrier for clinical instructors. Ernstzen and Bitzer's (2012) qualitative study of the roles and attributes of a successful clinical instructor describe another barrier to clinical instructors being able to perform their duties successfully. They investigated perceptions of both clinical instructors and students of the clinical learning environment and discovered that although the role of the clinical instructor was that of a facilitator, the fact that they were also the evaluator, was a barrier. Student's perceived that this role influenced the atmosphere of learning. They felt that by knowing the clinical instructor was grading them, openness and trust between the two may be impeded. Student's felt that to avoid this barrier, clinical instructors should be mindful of this issue by forming an unrestricted surrounding where students can be free to learn from their mistakes (Ernstzen & Bitzer, 2012). Needham, McMurray, and Shaban (2016) used focus groups and interviews of nursing clinical instructors to report that clinical instructors found assessment to be a challenge. However, through networking with other clinical instructors they could attain increased awareness of the process.

Clinical instructor preparation. Several studies investigated the effect of clinical instructor preparation. There is a need for additional instructional guidance for clinical instructors in terms of clinical facilitation (Needham et al., 2016). Aljadi, Alotaibi, Alrowayeh, and Alshatti's (2017) investigation of benefits and challenges to clinical instruction found that clinical instructors in physical therapy desired professional

development sessions involving an update of academic content. This conclusion coincides with the investigation by Chang, Lin, Chen, Kang, and Chang (2015) which involved nurse preceptors' perceptions of which preparation course was the most and least beneficial. The participants of this study, through a quantitative survey and focus group, stated that training courses on communication skills were the most advantageous.

A similar situation was found in Al-Arif's (2018) study of pharmacy students. Using a survey concerning student satisfaction with preceptors, Al-Arifi's investigation revealed the need for the professional development of communication skills. Chen et al.'s (2016) study of medical students' perception of clinical learning revealed that preceptors needed to be better prepared to design the undertaking of clinical education. Bjurman (2018) study of clinical educators of medical school students concurs. His findings made known clinical educators need proper training to relate classroom instruction to the clinical learning environment. El-Banan and Elsharkawy (2017) who investigated both nursing students and clinical instructors' perceptions of clinical instructor characteristics found that an unsuitable amount of preparation is viewed as a crucial issue in clinical education. They suggested workshops and seminars as an orientation for new clinical instructors.

Clinical instructor characteristics and behaviors. A clinical instructor's characteristics result in behaviors that can severely impact the student's perception of the clinical learning experience. For clarification, a characteristic refers to a feature or quality in an individual such as attributes or traits, and behaviors refer to how an individual conducts oneself resulting in a person's demeanor or attitude. There has been much research investigating how these behaviors can affect the student's learning and comfort

level in the clinical environment. In general, clinical educators empower the students' clinical experience through their execution of interpersonal skills and effective leadership and supervision (Ramel & Martin, 2018). Careful implementation of these behaviors can lead to a successful clinical educational experience for the student. According to Clawson and Curtis (2018), clinical instructors are obligated to develop an environment of compassion where students can interact with clinical instructors in a positive caring manner.

Interpersonal skills. Overall, a clinical instructor's interpersonal skills are deemed important to the creation of a positive clinical atmosphere. In El Banon and Elsharkawy's (2017) study, both clinical instructors and students ranked interpersonal skills as the second most important characteristic, just behind teaching ability. Ramel and Martin (2017), in their investigation to evaluate the clinical experience of nursing students, concluded that the actions of the clinical instructor relate in a positive nature to the student's reaction to effective learning in the clinical environment. Specifically, related factors of interpersonal skills that contribute to the effectiveness of the clinical instructor are such attributes as approachability, the creation of a positive atmosphere, clinical instructor's respect, and their ability to demonstrate caring and kindness (Clawson & Curtis, 2018).

A clinical instructor's approachability is crucial. In Ingrassia's (2011) study ranking of most important characteristics of a clinical instructor, approachability was found to be the highest-ranked characteristics as perceived by both students and clinical instructors. Like Ingrassia's investigation, in Ernstzen and Bitzer's (2012) study, approachability, seen through verbal and non-verbal communication, was also the main

factor in terms of clinical instructor attributes. Plack's investigation demonstrated through semi-structured interviews that a clinical instructor's approachability facilitated learning.

The demeanor of the clinical instructor can affect the students' comfort level. According to Reising et al. (2018) who investigated nursing students' perception of the clinical learning environment and Clawson and Curtis (2018) who researched students' perception of caring, it is important to the students' learning that they experience a high comfort level in the clinical learning environment beginning with their perception of the caring behavior of the clinical instructor. Reising et al.'s findings demonstrated that students desired more respect, support, and recognition in the clinical learning environment and Skaalvik et al. (2011) research results revealed that students wanted to feel cared for by the clinical instructor. Ernstzen and Bitzer's (2012) investigation concurred with Reising et al. and Skaalvic et al. by revealing that both clinical instructors and students perceived the establishment of a favorable atmosphere as one of the greatest attributes of the clinical instructor.

A supportive clinical instructor enhances student learning. Clawson and Curtis (2018) performed an investigation that detailed clinical instructor characteristics that were caring and uncaring. They investigated these behaviors from the perspective of the student. Their analysis of research revealed findings revealed that a caring clinical instructor was one who provided individual time, assisted students with procedures, furnished them with educational opportunities, and was able to act as a link between the student and practitioner. According to Plack (2008), when clinical instructors can demonstrate support, it can serve as a verification of a student's progress. When the clinical instructor successfully challenges a student, the students' progress becomes

recognized, thus assured and acknowledged. An uncaring clinical instructor hinders student learning (Plack, 2008)

As stated previously, the clinical instructor's rapport with staff is also a factor in the clinical learning environment. In Heidari and Norouzadeh's (2015) study of nursing students in Iran, a negative aspect of their clinical experience was the clinical instructor's inability to reduce stress in the clinical learning environment, such as the theory-practice gap, which will be addressed later, in more detail. Moonaghi, Mirhaghi, Oladi, and Zeydi (2015) also found that an element of support was needed. Thus, a clinical instructor with a favorable rapport with the staff of the clinical learning environment is essential. This practice is also advocated by Reising et al. (2018) and Shahsavari et al. (2013), both of whom discuss the impact of the clinical instructor having a good rapport with practitioners, supervisors, and general staff of the clinical learning environment. Similar to Ingrassia (2011), Ozga et al.'s (2016) study on clinical instructor behaviors used a qualitative questionnaire to rank the most important interpersonal skills. Findings indicated that the clinical instructor's ability to create a comfortable clinical learning environment was ranked most important.

The importance of the students' perception of the clinical instructor who also acts as a mentor and role model is a great factor to the students' clinical success. Students' expectations of mentoring were also investigated by Foster, Ooms, and Marks-Moran (2015). They primarily looked at a mentor in the clinical learning environment to act as a role model by being a true professional. Through a focus group and online questionnaires, students stated that although most individuals, who were in the capacity of a mentor, embraced the challenge, some did not which negatively affected the learning

experience. The results of the study revealed that the most proficient nurses made better mentors (Foster et al., 2015). El Banon and Elsharkawy agree with Foster et al. (2015) and add that by being an effective role model, they inspire students to study more diligently. Their research revealed that clinical instructors who perceive themselves as role models are empowered to possess positive characteristics for students to emulate.

Clinical instructor's technical knowledge and competence and teaching skills. To be effective, a clinical instructor must possess a high degree of technical knowledge and competence as both a clinician and an educator. Shahsavari et al. (2013) investigated clinical barriers that could affect student learning through the nurse clinical instructor-student relationship. The investigators, through semi-structured interviews and observation, discovered that the skill level of the clinical instructor related to behaviors. One of the behaviors ranked by students as most important was that the clinical instructor possessed technical knowledge and competence. Optimum teaching skills by clinical instructors' teaching skills are essential. El Banon and Elsharkawy (2017) found that both clinical instructors and students selected the clinical instructors' ability to teach effectively as the most important characteristic.

Similarly, Plack's (2008) investigation also included crucial characteristics that all clinical instructors must possess optimal technical and teaching skills. These characteristics were also ranked highly in Ingrassia's (2011) investigation of students' and clinical instructor's perceptions of clinical instructors' characteristics. Teaching skills were an important attribute for Sarcona, Burrows, and Fornari (2015) in their study of dietitian field educators. Their findings acknowledged that field educators needed additional professional development to improve their teaching skills.

The ability to provide student feedback is also an important factor in the clinical instructor's effectiveness. Perram et al. (2016) study differs from some others in that the characteristics of the clinical instructor in multiple allied health professions were investigated. In this study in professions such as radiography, nuclear medicine, radiation therapy, nutrition and dietetics, occupational therapy and physical therapy, feedback was noted as one of the most valued characteristics of the clinical instructor. Nolan and Loubier's (2018) investigation of the students' reception of clinical instructor feedback noted that the clinical instructor-student relationship impacted how the feedback was received. As a result, they reported that it is vital that clinical instructors are trained in teaching strategies and techniques on how to provide such feedback.

Clinical instructors may also take on the role of supervision. In Ramel and Martin's (2017) study of nursing students, it was observed that each clinical instructor had a different approach to supervision and teaching. Some methods were negative as the teaching method was inconsistent thus adding to student stress. The researchers suggested that the clinical instructor should exhibit behaviors to minimize stress by owning a sense of humor, mentoring or additional instruction to decrease anxiety, thus improving clinical learning.

The relationship between the clinical instructor and the practitioner.

Practitioners and clinical instructors do not always agree on the educational process. Matsumura, Callister, Palmer, Cox and Larsen's (2004) qualitative study concerning practitioners' perception of nursing students' contribution to the clinical learning environment, expanded on Shahasavari et al.'s results. They determined that the practitioners had very distinct viewpoints of the students' clinical instructors, some of

which could be deemed as a barrier for the educator. In this particular study, using a survey that investigated nursing student's contribution to the clinical work environment, nurses were critical of the instructors citing their lack of knowledge of procedures and being a poor example for students to follow. Practitioners also stated that the clinical instructors should be the individuals performing the teaching duties, rather than staff nurses. This may have been attributed to the fact that this study revealed that practitioners felt they were far too inundated with patients to have time to educate students. In addition, practitioners stated that clinical instructors should spend more time espousing the positive aspects of the clinical learning environment, rather than the negative characteristics (Matsumura et al., 2004).

Similarly, Salamonson et al.'s (2015) findings indicated the indifference of nurses in teaching or the insufficient time available for them to teach. Zipp and Kolber (2014) who sought to identify teachable moments and barriers in the clinical learning environment, found that there was a disconnect between the clinical instructors' and practitioners' teaching and learning styles. Finally, in addition to their duties as an educator, the clinical instructor may also have an obligation as a direct healthcare provider. Meaning, while doing their job, they still have a responsibility to the student which can also become time-consuming (Thompson et al., 2016). Additionally, Needham et al. (2016) researched the clinical instructors' perception of best practice in clinical facilitation. Findings in this qualitative study revealed that a close affiliation with the clinical learning environments' staff was an important asset to the clinical instructor.

Influence of the practitioner. In the clinical component of most allied health care educational programs, the clinical instructor's main purview is to ensure an overall

positive clinical learning experience and evaluate students' clinical competency. However, as stated earlier, the clinical learning environment includes many individuals, and it is the practitioner with whom the student spends the most time in that environment. A compassionate relationship between the practitioner and student is necessary to strengthen clinical education (Ghrayeb, 2017).

Amid the clinical learning process, it is expected that the practitioner and clinical instructor join forces to induce student learning and the attainment of clinical prowess (Phuma-Ngaiyaye et al., 2017). It is the hope of program officials that both the practitioner and the student work side by side throughout the clinical experience until the student can work independently under indirect supervision. As stated in one of the theoretical frameworks for this study, using Vygotsky's (1978) zone of proximal development, allows the practitioner to observe, support, supervise and instruct students so that valuable learning takes place for a positive and productive learning experience. As was discussed previously, in Moscaritolo's (2009) literature review concerning methods to decrease nursing students' anxiety-causing factors, the relationship between the clinical instructor and the practitioner is paramount to the success of the relationship between the practitioner and student. Student anxiety could be reduced if the clinical instructor was a supportive liaison between the two (Moscaritolo, 2009). It should also be noted that practitioners have added responsibilities of regulating the supervision of students with their responsibility to patients (Perry, Henderson, & Grealish, 2018).

The importance of the role of the practitioner can be noted in several studies. Antohe, Riklikiene, Tichelaar, and Saarikoski (2016) et al.'s study of student nurses determined that the nurse as a practitioner was most influential on student nurses'

learning. Aktaş and Karabulut's (2016) study of nurses in Turkey concurred with Antohe et al.'s findings further stating that working side by side with the nurse gave rise to increased motivation. In a study by Phuma-Ngaiyaye et al. (2017) concerning nursing students' perception of the practitioner to their clinical learning, through semi-structured interviews, it was revealed that there is a high dependence on the practitioner. Since the nurse clinical educator has a plethora of responsibilities, it is left to the clinical staff to assume a role of clinical teaching. As a result, the researchers concluded that clinical staff should be provided with training to be better prepared to educate students (Phuma-Ngaiyaye et al., 2017).

The practitioner can also negatively impact the student's clinical success. In their investigation of circumstances that result in frustration for athletic training students, Bowman and Dodge (2013), states that, in part, students' perceived negative experiences with the practitioners may be due to the practitioner's unfamiliarity with the program curriculum guidelines and policies. Semi-structured interviews demonstrated that intervention by the clinical instructor to ensure that practitioners understand program requirements could be a mainstay for a positive clinical experience for the student. It should also be noted that sometimes, students prefer to work with only one practitioner in the environment as opposed to several (Sundler et al., 2014). In Sundler et al.'s (2014) investigation, these students also reported a negative experience when required to work consistently with different practitioners citing a lack of continuance.

As noted above, there are both negative and positive primary and secondary aspects concerning the practitioner in the clinical learning environment. In the paragraphs that follow aspects will be discussed in greater detail. Primary components would include

such things as helping students feel part of the team, time allotment for participation in procedures for ample learning opportunities, possessing a willingness to share their knowledge and experiences and, as alluded to above, familiarity with the educational program's requirements. Secondary circumstances that live in the clinical learning environment concerning practitioners include, but are not limited to, the administration of feedback to students, trusting and allowing students to work independently within the parameters of the profession, and being unaware of individual students' competence level. There are also behavioral factors in this environment between both groups to be considered. These may include unpreparedness by both groups, disengaged students, a feeling of students they are hindering the workload simply by physically being there, and students' perception of rudeness, unfriendliness, and intimidation by the practitioner.

Students desire to be part of the team. In any work environment, it is important to fit in. In the clinical learning environment, it is vital that for students to feel like they have a purpose and, therefore, want to feel like they are part of the team (D'Souza, Karkada, Parahoo, & Venkatesaperumal, 2015; Perry et al., 2018). D'Souza et al.'s research revealed that students valued interpersonal relationships and interactions with those individuals in the clinical learning environment. Socialization in the environment is a vital aspect to students feeling like they belong by allowing for their assimilation into the day-to-day activities of the clinical learning environment thus, their input being considered as valuable (Bowman & Dodge, 2013; Thompson et al., 2016).

Students need to feel as though they can collaborate with practitioners and being respected enough to do so, enhances their belief in themselves (Perry et al., 2018). Learning in the clinical learning environment not only gives students the opportunity to

experience a specific environment's culture but also to learn to be part of a community (Perry et al., 2018). The ability to take part in exams and procedures, rather than just observe, is the key for students to feel part of the team (Perry et al., 2018). There is, however, an interesting fact to be noted. In McSherry, Cottis, Rapson, and Stringer's (2015) study, it was reported that the student's desire to fit in may obscure the ability of the student to discern poor versus best practice.

There are other circumstances to be considered of the practitioners' significance. In Rose and McIntosh's (2015) investigation to categorize factors that impact the development of clinical competence, one category identified as most impactful was directly related to the clinical site. The items described in the category were the quality of the supervision of the practitioner to include feedback and guidance.

Participation opportunities. For a student, working independently is the actual goal for the clinical component of their education. To arrive at that level, actual hands-on practice in the clinical learning environment provides not only opportunities to put academic content into practice but provides for social interaction and a feeling of independence for the student (Burgess et al., 2014). However, having the time to work and practice with students can be a challenge for practitioners Parvan et al., 2018). Students may perceive their ability to participate actively in the clinical learning environment as being dependent on the types of procedures and caseload in the setting (Milanese, Gordon, & Pellatt, 2013). Because of this, there is no control over this learning environment in terms of which types and the number of learning opportunities become available to students and students. In addition, as the patients take priority over the educational process, this, too, may interfere with the student being able to be an active

participant in the day-to-day activities of the clinical learning environment (Milanese et al., 2013). As a result, students may be under pressure to obtain practice opportunities as they are presented, with or without being confident, ready, or prepared to do so (Bowman & Dodge, 2013). This may render students fearful and frustrated about meeting the program's requirements (Bowman & Dodge, 2013). Bowman and Dodge advocate for the practitioner to allow students the chance to take part in learning opportunities during times of an increased workload. Aljadi et al.'s (2017) study of physical therapy practitioners who also acted as clinical supervisors found that these individuals requested additional clinical time with the students to improve clinical education.

The practitioner can be solved or be the cause of this issue. A student who is more engaged is apt to be more participatory and therefore seek out additional learning opportunities (Milanese et al., 2013). However, a student may only feel comfortable to do so, under certain conditions and the influence of the practitioner may play a huge part in that decision. Students are more motivated if the practitioner understands the structure of the academic requirements (Bowman & Dodge, 2013; Burgess et al., 2014). Bowman and Dodge, in their qualitative investigation of frustrations of athletic training students in the clinical learning environment, noted that students become unmotivated when they are permitted to only observe. Results from their semi-structured interviews suggest a need for ample communication between the faculty of the educational institution and the practitioner. Earlier it was noted that this practice was highly recommended by Bisholt (2014). In addition, the researchers caution that negative interactions between practitioner and student causes additional stress thereby reducing motivation for student participation.

This is concurred by Subramaniam et al.'s (2018) study of those who supervise medical residents.

However, student participation efforts from the practitioners' perspective are somewhat different. As mentioned earlier, patient care takes priority over clinical learning. Matsumura et al. (2004) studied nurses' perceptions of working with students. In doing so, they prepared lists of both positive and negative factors brought about by the presence of students. Among the positive aspects were the enhancement of the nursing unit as a learning environment and in doing so, gave nurses the fortuity to be stimulated intellectually by providing them with mentoring opportunities (Matsumura et al., 2004). Another positive aspect was noted in Parvan et al.'s investigation of nurses supervising students. The practitioners realized when they worked side by side with students, they became very much aware of their own ability. On the contrary, negative viewpoints noted in a focus group in Eaton et al.'s study revealed that including students in the nursing unit made practitioners feel apprehensive about their own knowledge. In addition, practitioners remarked that students did not appreciate them and felt that difficult students would be disheartening. The researchers concluded that the clinical learning environment would foster the clinical learning environment but that to increase the participation of students in the nursing units, practitioners needed to make the time for them.

There are benefits and challenges of having students in the clinical learning environment. The opportunity to work with students was viewed as a positive as it provided a method of recruitment (O'Brien et al., 2017). However, from a negative standpoint, having students present in the clinical learning environment took time and effort which was sometimes seen as a deterrent (O'Brien et al., 2017). According to

O’Brien et al. (2017), the most important factor for employers was the students’ educational preparation, thus, clinical performance.

Students are not always able to obtain participation opportunities as much as they would like. Lack of the ability to participate in procedures may also be due to the lack of confidence of the practitioner who may need more education on teaching methods to increase their confidence level (Heinerichs, Curtis, & Gardiner-Shires, 2014). Also, the scarcity of patients needing procedures may also be a cause for the students' lack of participation opportunities (Milanese et al., 2013). Hoffman and Donaldson (2004) stated that the availability of time students can spend participating in performing procedures may be attributed to an increase or decrease in the patient level and both situations have their advantages and disadvantages. In times of an increased patient load, the time that a practitioner spends with them might be less, but students will still have learning opportunities. Conversely, when the patient level is lean, students can use that opportunity to study skills so that they are prepared when opportunities arise. Skoien, Vagstol, and Raheim (2009) agree by explaining that having enough time to work with patients is essential. They state that it is generally accepted practice within the culture of the physical therapy clinical learning environment that students need additional time.

Time constraints are also a factor for practitioners. AbuSabha et al.’s (2018) study of clinical educators of dietetic interns revealed that time constraints were a primary challenge to registered dieticians supervising interns. They found this to be due to a heavy workload and lack of staff.

Practitioners' willingness to share knowledge and experiences. The willingness of practitioners to share their knowledge is another important component of the students'

success in the clinical learning environment. The creation of a favorable, solid relationship with the practitioner fortifies learning (Ghrayeb, 2017). Students view those that are willing to discuss their experiences and offer guidance and direction as an excellent role model and, conversely, find it to be a frustration of those practitioners that refuse to do so (Bowman & Dodge, 2013). In addition, the practitioner has an advantage in this situation. Although being responsible for the supervision of students can be time-consuming, it also forces the practitioner to remain up to date in the profession and serves as a reminder to demonstrate best practice (Thompson et al., 2016). In the Parvan et al. (2018) study, practitioners viewed themselves as role models which the authors found tended to have them act accordingly.

Other studies concur that it is advantageous for the student to be around a practitioner who is willing to share experiences. In an investigation concerning retention in an athletic training program, through a survey to evaluate student retention, it was determined that opportunities to learn from practitioners' shared experiences influenced student retention (Young, Klossner, Docherty, Dodge, & Mensch, 2013). In particular, students found that shared knowledge from a variety of practitioners in the clinical learning environment was extremely beneficial as it provided them with many options for learning. This finding is consistent with the investigations of both Koontz, Mallory, Burns, and Chapman (2010) who completed a qualitative study using a focus group. When practitioners share their experiences, students are given an opportunity to learn alternative methods or different approaches and perspectives of practice. A student's confidence is strengthened when practitioners energetically share knowledge and experiences, thus enabling them to relate to the entire clinical learning environment and

feel part of the team (Skoien et al., 2009). Practitioners were more comfortable sharing knowledge and experiences once they realized the expectations

Communication with the educational institution, training, and teaching expertise of practitioners. It is important that the practitioner has some idea of the pedagogical process of clinical education, primarily an understanding that communication is essential. According to Burgess et al. (2014), an effective rapport between program officials and the practitioners may enhance communication and could cause an increase in the practitioners' willingness to share knowledge and experiences. If the clinical faculty do not have an amicable relationship with the practitioners it presents a challenge in the clinical learning environment for students (O'Mara, McDonald, Gillespie, Brown, & Miles, 2014). If practitioners are more involved in the educational process, then perhaps their relationship with clinical faculty could be improved. O'Mara et al. suggest approaches to incorporate practitioners, so they have a better idea of program requirements. They recommend discussions with practitioners concerning their theories on what makes up an optimal clinical learning environment.

Other studies agree with the above findings. Bowman and Dodge's (2013) qualitative study of frustrations of athletic training students also see a lack of communication between the program faculty and preceptors as an issue. For academic content to be demonstrated in practice, effectual communication is key between all individuals involved in the students' education (Heinerichs et al., 2014). In Manninen, Henriksson, Scheja, and Silén's (2015) review of literature emphasize the importance of the practitioner's cognizance of the student learning outcomes.

Practitioners may be technically competent, but not be one who can educate. Heinerichs et al. (2014) used an instrument to identify student frustration and found that practitioners may lack in teaching skills and providing professional development opportunities is essential as it may reduce dissatisfaction in students (Heinerichs et al., 2014). Because clinical education is convoluted, there should be a commitment by educational program officials to ensure that practitioners realize their role in the clinical learning environment (Ghrayeb, 2017; O'Mara et al., 2014; Perry et al., 2018). For example, being prepared by having the knowledge necessary for their role as an educator and the relationship with students will aid practitioners along with the use of teaching workshops, (Perry et al., 2018). This preparation will help them have more trust in students thus allowing more clinical opportunities for the students. Parvan et al. interviewed nurses using a descriptive phenomenology method of research. Their finding indicated a need for instruction to the clinicians on how to educate students. The researchers suggested that the educational institution assists with the training.

Practitioners lack trust or willingness to give students independence.

Practitioners need to be more willing to allow students a degree of independence. This was demonstrated in Heidari and Norouzadeh's (2015) study of Iranian nursing students. which cited dissatisfaction for not being allowed more independence in the clinical learning environment. When not permitted to work independently students feel like the practitioner is not showing patience, yet conversely, functioning under indirect supervision gives way to feelings of respect and trust (Delany et al., 2015). One theme in Manninen et al.'s (2015) review of the literature on the practitioner's impact, revolved around allowing students independence. Their investigation revealed that practitioners

need to learn to trust in the students' abilities. This could be easily accomplished as long as the practitioner was aware of the student learning outcomes and was always available when needed.

Giving students more responsibility as they progress is helpful. It is important that those individuals comprising the clinical surrounding understand that students should be considered a part of the community, meaning, a part of the day-to-day operation of the setting (Heinerichs et al., 2014). Their role is that of a health care worker, which takes on more meaning as they progress through the educational program and become more experienced and skilled (Heinerichs et al., 2014).

The more responsibility students are given, the more improved their confidence level becomes. Quality clinical assignments gives students the opportunity to improve their skills (Subramaniam et al., 2018). According to Ramel and Martin (2017), when students are given the opportunity to practice independently, they will approach clinical exams with more confidence. Students prefer to be allowed to work independently under the watchful eye of the practitioner and then discuss their performance through reflection techniques (Koontz et al.). To ease this concern, conversations with practitioners and program officials may help so that practitioners realize and understand the role of the student before the commencement of the clinical rotation (Heinerichs et al., 2014).

There is a challenge to let students work independently. Manninen et al. (2015) concluded that letting students function with minimal supervision has as much to do with knowing their skill level and stated that it was a challenge to balance students' needs with patient safety. However, knowing the skill level of the students helped the process.

Awareness of students' skill level. It is vital that practitioners are aware of the skill level of the student. One finding in Heinerichs, Curtis and Gardiner-Shires' (2014) investigation of students' frustrations in an athletic training program reveals a matter where practitioners would not give students the opportunity to perform exams up to their skill level. This may be because of poor communication between program officials and the practitioner or the practitioner's lack of teaching expertise (Heinerich et al.). However, from a different viewpoint, it is important that practitioners note when the competence level of the students has not yet met the skill needed for the procedure (Delany et al., 2015).

Students and practitioners. Students feel safe when the practitioner knows of their level of skill. Perry, Henderson, and Grealish's (2018) literature examined nurse clinical educator attributes conducive to students' learning and found that it was essential for them to know the students' skill level. Matsumura et al.'s (2004) quantitative study concerning practitioners' perceptions of student nurses revealed that the level of the student had great significance in terms of the novice student versus those more advanced. Using an instrument identifying students' clinical contribution to the workload, it was identified that more time needs to be spent with students with a lesser skill level and who are more tentative. Conversely, more advanced students are more confident, thus more helpful. Practitioners can easily assess the level of the student by using techniques such as questioning students about prior performed procedures, viewing simulated procedures or talking over various scenarios, or by working side with the student (Heinerichs et al. 2014).

Student feedback. It is imperative that students receive feedback from the practitioner. Feedback provides for an understanding of performance and should be a connected process between practitioner or educator and the student (Fowler & Wilford, 2016). The process should involve confirmation of positives and when corrective should be accompanied by recommendations for growth and development (deBeer & Martensson, 2015). The purpose of feedback is to assist and guide an individual to correct errors to develop proficiency (Adkoli, 2018). According to McSparron, Vanka, and Smith (2018), while observing students it is important to give timely feedback.

Clinical learning environments should be comprised of individuals who can not only oversee students but have the training, ability, and resourcefulness to furnish feedback (McSparron et al., 2018). It should be the student's responsibility to record feedback given to them, so they remember where they excelled, but more importantly, where improvement was needed. By keeping track of prior feedback, the student can then show progression to practitioners and show that noted areas of deficiency have been consciously improved (Weddle & Sellheimer, 2011). Bjurman (2018), in his examination of quality assurance in the clinical training of medical school students in Sweden, also found that regular and steady feedback was essential for an enhanced clinical experience.

Disengaged and unprepared students. Behavioral and interpersonal factors play a large part in the clinical learning environment. As stated earlier, prior research indicated that students' observation of clinical learning opportunities, rather than actual participation, may be a negative factor in the clinical learning experience. This issue is twofold as it can be due to students' inclination to only observe, or a lack of willingness of the preceptor to permit the student to participate. This can be related back to the

concept of trust as being a frustration for students that was discussed in Koontz et al.'s (2010) study.

According to Young et al. (2013) who studied student retention in athletic training programs, students felt that their clinical experience was subpar when they were not permitted to perform or even assist with procedures. Furthermore, another situation that causes students to become disengaged was discussed in Bowman and Dodge's (2013) investigation, which used semi-structured interviews to note athletic training students' frustration with the clinical learning environment, also revealed that they were performing tasks not directly related to patient procedures. Similarly, in the investigation by Antohe et al. (2016) of nursing student's satisfaction with the clinical learning environment it was found that student engagement was directly related to their satisfaction of the environment.

Some programs have taken on the initiative to educate practitioners. Henderson et al. (2010) took action to aid preceptors in circumventing disengaged students through in-services discussing how to interact with students. One suggestion was for practitioners to ask questions during a procedure to keep students continually engaged. Their findings, using a clinical learning survey, indicated an improvement when this method was practiced. Finally, students should understand that a preceptor can recognize when a student is uncommitted and will act accordingly (Slaughter-Smith, Helms, & Burris, 2012). Students may be disengaged for many reasons, but practitioners view this lack of interest as indifference and misuse of their teaching endeavor, making them reluctant to desire to do so (Slaughter-Smith et al., 2012). Students’ indifference has also reported as

a challenge in AbuSabah et al.'s investigation. Registered dietician nutritionists did not want to deal with disengaged students as they found it discouraging.

An unprepared student can be a frustration for all individuals in the clinical learning environment. Students, themselves, may become frustrated with their lack of preparedness and skills (Heinerichs et al., 2014). At times, they may not recollect formerly learned knowledge or execute a once learned skill correctly. This may be a frustration not only to students by causing them to become apprehensive and distressed but practitioners, as well (Bowman & Dodge, 2013). In their exploration of students' perception of the clinical learning environment, Koontz et al. (2010), using focus groups, reported that most student nurses felt they were not prepared clinically for some skills needed in the clinical learning environment. However, recognition of this, caused them to request additional practice opportunities. Ghrayeb (2017) reported, when surveying staff nurses to explore their perceptions of students, stated that practitioners have uncertain feelings concerning students' preparedness. The practitioners reported that although some students are clinically prepared and competent, many are not, and therefore appeared to show disinterest.

Students' negative aspects of practitioners. As stated earlier, practitioners greatly impact students' clinical educational experience and can do so negatively. These aspects can include students being ignored, unwanted and feeling like an annoyance. Feelings of abandonment occur when students feel ignored or unwanted (Gunay & Kilinc, 2018). Investigators using student journals found that when students feel ignored or intimidated, for example, when a question they have goes unanswered, learning is diminished in the clinical learning environment (O'Mara et al., 2014). Koontz et al. (2010) stated that

students sometimes report they feel that are an irritation to practitioners. They suggest that perhaps practitioners should try to recall their personal experiences as a student in the clinical learning environment to better understand students' perceptions.

Interviews revealed that those who feel they are more of a hindrance to practitioners may refrain from asking pertinent questions, thus further negatively impacting their clinical experience (Skoien et al., 2009). Through focus groups with nursing students, the authors found that these individuals are perceived as increasing the practitioner's workload (Eaton, Henderson, & Winch, 2007). However, the researchers discussed the increasing conversation with students to alleviate this perceived hindrance. According to Gunay and Kilinc (2018), others felt that clinical staff viewed them as being unimportant and did nothing to take part in the students' education. This severely abbreviated the students' motivation.

In tandem, van der Riet, Levett-Jones and Courtney-Pratt (2018) investigated a collaborative clinical learning environment for nursing students. This study reports that relationships within the clinical learning environment influenced student satisfaction. In an environment where the staff made them feel welcomed, students perceived a sense of belonging which heightened their clinical experience.

A practitioner who is not receptive to students, those that may be rude, unfriendly and intimidating practitioners, can be an issue and impact students' clinical education. Focus groups and journaling of nursing students identified challenges in the clinical learning environment that can sometimes stem from interpersonal relationships with practitioners, particularly if they are perceived as rude or unfriendly (O'Mara et al., 2014). The study by Sundler et al. (2014) using a survey instrument to evaluate student

supervision by practitioners indicated that the practitioners' demeanor and outlook were the most common reasons for dissatisfaction. In Babenko-Mould and Laschinger's (2014) survey of rudeness in the nursing clinical learning environment, it was revealed that students who experienced incivility became emotionally exhausted and fatigued.

According to Subramaniam et al. (2018), an abusive practitioner will affect the students' development. In their study of practitioners who supervised medical residents, the findings resulted in a need to know how to cultivate students to enrich learning. An abusive practitioner only serves to deter student learning by lessening the students' desire to participate. This impedes the development of clinical skills (Subramaniam et al. (2018). In van der Riet, Levett-Jones and Courtney-Pratt's (2018) study, however, it was determined that a supportive staff enriched students' education.

A student may avoid a practitioner who does not have a positive demeanor where students are concerned. The impact of these challenges may cause a loss of learning opportunities, as students might be reluctant to approach practitioners (O'Mara et al., 2014). The clinical instructor should be the individual who monitors this situation and intervenes when necessary. If not managed, this situation could affect retention and both the physical and mental health of the student (Babenko-Mould & Laschinger, 2014).

Theory-practice gap. Students need to see what is taught in the classroom, demonstrated in the clinical learning environment but unfortunately, this does not always occur. The theory-practice gap refers to the disparity of information disseminated in the classroom versus what is actually occurring in the clinical learning environment (Baird, 2008). Its importance is because of several factors, primarily the performance of practitioners relating to best practice. Reinforcement of best practice is needed, not only

for the formative evaluations of students in the clinical learning environment, but it may be related to the students' performance on the certification exam. More often than not, this is a major issue in the clinical area, as it affects the concept of putting academic content into practice into the clinical area, the purpose of clinical education.

Those individuals, who make up the clinical learning environment, must be aware of the entire educational process to include student learning outcomes. As noted in Bowman and Dodge's (2013) qualitative research, interviews with students showed that it is important to the student's clinical education that open lines of communication exist between the practitioner and school officials. Preceptors are often not aware of program expectations and the curriculum which can cause great concern for students. Better coordination between what is taught in the classroom and what occurs in the clinical learning environment is paramount to a successful clinical experience for students.

Unfortunately, the educational institution has only minimal, if any, jurisdiction over what occurs in the clinical learning environment (Egan & Jaye, 2009). According to Egan and Jay's literature review, there will continually be discrepancies between the didactic and clinical components--the flawless and the feasible, respectively. This can be a serious hindrance for program officials as it can result in great frustration by not reflecting the values of learning and technical competence as promoted by the educational institution (Egan & Jay, 2009).

Communication between the clinical learning environment and the educational institution is imperative. Egan and Jay (20090, like Bowman and Dodge (2013) and O'Brien et al. (2017) advocate for a significantly increased venue of social interaction between the educational institution and the clinical learning environment to include a

heightened and expanded conversation between the practitioner and the student. The need for increased communication between the clinical learning environment and the educational institution is also evidenced in Bjurman's (2018) study of Swedish medical school students' clinical training effectiveness.

Through a questionnaire, physician educators were investigated regarding the quality of teaching. Findings revealed multiple needed improvements beginning with the transparency of the curriculum to include a joint effort by both the clinical learning environment and the educational institution. Gunay and Kilinc's (2018) investigation of the theory-practice gap in nursing students in Turkey, found a significant gap. They suggested that nurse educators nationwide should revisit the curriculum to either reduce the amount of theory taught in the classroom or provide more simulation opportunities to better prepare students' clinical education.

There may be methods to close the gap. Weddle and Sellheimer (2011), recognizing the importance of the theory-practice gap, implemented and then tested a blueprint for bridging the gap between the classroom and the clinical learning environment. The educational institution wanted to ensure that all clinical education sites were integrated in terms of student learning and devised several components for this to occur. Through meticulous communication with the communities of interest, by attempting to standardize the clinical education component as much as was in the program's power to do so, there would be a better chance of reducing the gap between academic content and practice that occurs in the clinical learning environment. Their findings indicated that students were satisfied, compellingly, with the manner in which what was learned in the classroom was augmented in the clinical learning environment,

especially with the perception that practitioners were very much in tune with the material taught in the classroom. This supports Egan and Jaye's (2009) and Bowman and Dodge's (2013) research stating the importance of communication between program officials at the educational institution and the practitioners and supervisors in the clinical learning environment.

It should be noted that students may benefit, somewhat, from the theory-practice gap. An exploration, using focus groups, of nursing students' identification of positive aspects of their clinical education revealed that although there were instances of a theory-practice gap, it was a positive as long as the credibility of the exam and patient care were not hampered (Koontz et al., 2010). A reason for this may be because students were afforded opportunities to observe and be engaged in several methods to perform procedures different from what was taught in the classroom yet remain educationally valid.

The clinical learning environment in radiologic technology. Although both perceptions of students and clinical instructors, themselves, of the effectiveness of clinical instructors, have been addressed in research in the radiologic technology profession, there is minimal research concerning the radiologic technology clinical learning environment. However, the majority of what has been addressed in this literature review in other allied health professions such as athletic training, physical therapy, and nursing, along with medicine can be applied to radiologic technology education. Sandridge (2018) investigated recent radiologic technologist graduates who just entered the workforce to assess their confidence level. It was found that the more positive the clinical learning environment the better the confidence possessed by the recent graduate.

In the radiologic technology profession, as in the aforementioned health care professions, there are many facets of the clinical learning environment that can cause stress among students. In Mason's (2006) investigation of stress-causing elements for radiography students, it was revealed that the top three items were the apprehension of performing an exam incorrectly, being unprepared or feeling inexperienced, and feelings of intimidation by staff and instructors. The two latter items have been previously mentioned in this literature review as elements that hinder students learning (Heinerich et al., 2014; Koontz et al., 2010; Matsumura, 2004). Feelings of intimidation as a deterrent to a positive learning experience was alluded to in Moscaritolo's (2009) literature review concerning the clinical learning environment in nursing.

Conversely, radiography students' stress in clinical learning was lessened if they received timely feedback and also when practitioners and clinical instructors were always available when needed (Mason, 2006). Nolan and Loubier (2018) state that it is much better received if student trust can be established. Other methods of stress reduction occurred if students were allowed to make their own mistakes and if made, felt an understanding from staff that it was not detrimental to their clinical education. Through semi-structured interviews, it was noted that an understanding of the fact that students will make mistakes was concurred by Ernstzen and Bitzer (2012) in their investigation of what constituted a favorable learning environment for physical therapy students.

The practitioner is vital to the clinical education process in radiologic technology. The practitioners' willingness to share knowledge and the approachability of the staff were two situations, in Mason's (2006) survey, that was described by students as being conducive to their learning. This, again, confirms student desire to be in a welcoming

clinical learning environment and was concurred by both Hegenbarth et al. (2015) and Rindflesch et al. (2013) in their studies of nursing and physical therapy students, respectively.

There are many attributes of the clinical instructor that come into play where radiologic technology students are concerned. Students' perceptions of the most important aspects of the clinical instructor were also addressed in Mason's (2006) study. Student's responses included being knowledgeable, having a desire to guide students, and possessing a penchant for educating students and a demeanor whereby the clinical instructors were supportive and empathetic. Similar qualities have been noted in other studies by Bowman and Dodge (2013) and Ingrassia (2011). In addition, Ingrassia's (2011) study, ranking important characteristics of clinical instructors, also revealed that the top perceived quality of a clinical instructor was one who possessed excellent knowledge of the profession. Greenfield et al.'s (2012) research using interviews described caring as an important quality. Plack (2008) described the importance of a clinical instructor who had optimal teaching skills and Severinsson and Sand (2010) discussed the responsibility of the clinical instructor to create a supportive and empathetic clinical learning environment.

The clinical instructor in radiologic technology education is the primary individual responsible for making sure students are given ample opportunities for practice. Other areas discussed in Mason's (2006) study involved additional critical components also similar and concurring with prior research studies (Bowman & Dodge, 2013; Milanese et al., 2013; Shahsavari et al., 2013; Young et al., 2013). These include activities that hinder learning such as only being permitted to observe and not being able

to actively participate in exams and procedures, feedback and a feeling of being respected in the clinical learning environment (Mason, 2006).

Finally, the importance of communication between the program officials and practitioners is important to address due to the concept of what has been termed the theory-practice gap. As stated previously, the theory-practice gap occurs when, in the clinical learning environment, a student must struggle with the difference between material taught and assessed in the classroom and how that material is applied in the clinical learning environment (Baird, 2008). Cunningham et al.'s (2015) literature review describes the theory-practice gap as an area of research describing methods to remove, or minimally reduce the rift in radiography.

Radiologic technology clinical education. During the clinical component of radiologic technology education, the practitioner works more closely with the student in terms of observation of examinations and procedures, practice, and is available during times of independent learning. The clinical instructor acts as the gatekeeper and performs the students' evaluations and may also perform some aforementioned duties of the practitioner. The clinical instructor guides and evaluates the student through summative assessment, for 52 successfully completed performance competencies composed of the cognitive, psychomotor and affective domains to demonstrate proficiency (ARRT, 2017). While the practitioner is always employed by the hospital or medical imaging center, clinical instructors are employed by, either the educational institution or the clinical facility, where the clinical education is taking place (Fowler & Wilford, 2016). It is paramount that both individuals be perceived by the student to be technically effective

and have a demeanor conducive to learning, for a successful clinical learning experience to occur.

Clinical instructors are initially chosen by program officials based on their technical skills, and not necessarily because of educational expertise or ability. Initially, there is no educational requirement for the position other than certification by the American Registry of Radiologic Technologists (ARRT) (Giordano & Harris, 2012). As a result, because training in education is not required for the position, clinical instructors may begin their tenure with little, if any, experience (Thompson et al., 2015). This may cause clinical instructors with little or no knowledge of teaching strategies or effective behaviors until or unless professional development opportunities are offered or required. As a result, many clinical instructors learn while on the job which may not be perceived by students as effective (Cunningham, Wright, & Baird, 2015; England et al., 2017). Finally, the clinical instructor who may have a limited teaching ability because of a lack of knowledge in instructional strategies may be less effective at evaluating students (Rose & McIntosh, 2015).

While the clinical instructor primarily acts as the gatekeeper and performs the students' evaluations and assessments, the practitioner (staff technologist) works more closely with the student in terms of observation of examinations and the performing procedures, practice, and availability during times of independent learning. While the practitioner is always employed by the hospital or medical imaging center, clinical instructors are employed by, either the educational institution or the health care facility.

It is important to understand the phenomenon of the students' perception of the clinical component of their education in terms of how it is impacted by the culture of the

clinical learning environment. As important are those individuals that comprise it to include the practitioners and clinical instructors. From a historical perspective, radiography educational programs appropriate these clinical sites, based more on necessity, than the attributes of the educational opportunities received by the student (Giordano & Harris, 2012). As stated previously, the clinical component has a well-defined curriculum and is vital to identify the students' perception of practices that are, and those that are not, conducive to their learning. This learning environment, typically a radiology department of a hospital or a freestanding imaging center, involves not only the clinical instructors' contribution to teaching and learning but the practitioners' involvement. The degree of the practitioners' acceptance of students is most important to the learners' experience in the clinical learning environment.

There are many factors that need to be considered for the student to be successful in passing the ARRT certification examination. The primary factor depends on the classroom component of students' education (ARRT, 2017). Learning in the clinical learning environment is critical to the student's success as an eventual practitioner (Ingrassia, 2011). However, according to the ARRT Radiography Certification Handbook (2017), the student is not deemed eligible to sit for the certification exam until the program director verifies clinical competency. This verification is based solely on the clinical instructor's formative assessment of clinical competency. The clinical instructor, in turn, depends on the support of those in the clinical learning environment, most especially the practitioner, with whom the student spends most of their time.

As the sample for this study involves students from four radiologic technology programs in two different states, New Jersey and New York, it is essential to note that the

educational program requirements for each state differ significantly. While New York's competency-based clinical requirements meet those delineated by the ARRT and ASRT, New Jersey's requirements exceed these standards (New Jersey Department of Environmental Protection, 2017; New York State Department of Health, 2015). According to the New York State Department of Health, the educational institution is responsible for adherence to the curriculum to include clinical standards required by the ARRT and ASRT.

In contrast, according to the New Jersey Department of Environmental Protection, there are several other standards that must be met in addition to those ensuring that the ARRT clinical education requirements are met. These requirements include but are not limited to: Evaluations that may only be performed by approved faculty and not by the practitioner, mandatory documented laboratory proficiency and practice attempts in the clinical learning environment that must be verified by a practitioner or program faculty prior to competency evaluation, and additional continual and terminal competency evaluations to demonstrate progression. The latter requirement exceeds the ARRT required a number to determine a progression from easy to difficult procedures. While it is possible that individual radiography programs throughout the state of New York are exceeding the minimum clinical requirements, it is not mandated as it is in New Jersey.

Methodology and instrumentation/data sources/research materials. A qualitative methodology will be used for this study. This methodology was selected because it will allow for a detailed examination of a phenomenon as it really exists. Recent studies cited here indicate that there is an almost equal amount in the use of either qualitative or quantitative methodology concerning clinical education. Questionnaires

with open-ended questions and semi-structured interviews appear to be the instrument of choice for those studies using a qualitative or mixed method (Chang et al., 2015; England et al., 2017; Foster et al., 2015; Fowler & Wilford, 2016; Francis et al., 2016; Glynn et al., 2017; Hegenbarth et al., 2015; Moonaghi et al., 2015; O'Brien et al., 2017; Perram et al., 2016; Rose & McIntosh, 2015; Salamonson et al., 2015). For some studies, questionnaires or interviews were combined with focus groups (Chang et al., 2015; Foster et al., 2015; Fowler & Wilford, 2016; Hegenbarth et al., 2015).

The purpose of this qualitative descriptive study was to explore how second-year radiologic technology students in New Jersey and New York perceive their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The researcher's hope for the research is to not only identify students' perceptions of their ability to learn based on the ability of the clinical instructor and practitioner and the ability of the practitioner to provide targeted practice and effective feedback. To summarize, this research is a qualitative descriptive study. Sources of data included a questionnaire and semi-structured interviews.

Summary

In this chapter, the researcher has described the background of the problem and the gap in the research. The noted gap addresses the need for more research concerning the impact of the clinical instructor and practitioner in the clinical setting, specfically related to students' targeted practice and providing effective feedback of that practice In the literature this gap is further defined through researchers' recommendations for future research concerning the knowledge and skills of clinical instructors as well as the

training of clinical instructors to improve their ability to provide feedback and (Francis et al., 2016; Nolan & Loubier, 2018). Additional research is needed to understand and identify how the practitioner (staff radiologic technologist) is used as a resource by students as well as the impact of their feedback on students' learning (Fowler & Wilford, 2016; Shanahan, 2015).

The literature review portion examines four primary topics relating to the radiologic technology clinical learning environment. The initial topic described concerns the clinical learning environment, (i.e., radiology department, nursing ward, physical therapy room or trainer's room, etc.) as a whole, primarily concentrating on the culture of the setting and the individuals who comprise it. The culture of the environment is individualistic, in nature, as each culture has its own set of idiosyncrasies and some clinical environments are more gracious, pleasant and approachable than others.

As the research studies described here demonstrate, this social aspect affects the students' clinical learning experience (Preethy et al., 2014). Students have stated that the demeanor of the individuals in the clinical learning environment was the most important aspect concerning their comfort level (Hegenbarth et al., 2015; Preethy et al. 2014). In addition to the social aspect of the clinical learning environment, almost as important to students is the availability of learning opportunities and staff and practitioners, who are willing to work with students through the learning process. (Rindflesch et al., 2013; Salamonson et al., 2015).

The second primary topic is related to the influence of the clinical instructor's teaching methods, particularly their role, responsibility, and demeanor. The clinical instructor oversees students through real-life clinical practice and creates a positive and

supportive environment (Greenfield et al., 2012; Severinsson & Sand, 2010). The bond that the student has with this individual may result in the student's level of satisfaction with the clinical learning experience (Ramel & Martin, 2018).

The next topic involves the demeanor of the practitioner who has a considerable influence on the student's clinical experience. Practitioners who are willing to share their knowledge and experience as well as have a confidence level in them due to professional development opportunities are most beneficial to the student's education (Bowman & Dodge, 2013; O'Mara et al., 2014; Young et al., 2013). On the contrary, students have reported that practitioners perceived to be rude, unfriendly, or intimidating demeanor present a challenge to them, thus a loss of learning opportunities (O'Mara et al., 2014; Sundler et al., 2014).

The final primary topic of the literature review describes the impact of the practitioner on the students' clinical learning experience. The practitioner, as the individual who spends the most time with students, may be the one most important individual to them and therefore should be the most approachable (Ingrassia, 2011; Preethy et al., 2014). This impact is enormous as it essentially relates to the level of practice and participation opportunities the student can and will achieve in addition to feedback. As the student's participation in this environment is the crux of the clinical experience, it is a vital aspect. However, for a plethora of reasons due to either the student or practitioner and the perception of both to either individual, this can be viewed as a crucial deterrent. It must be noted that not all lack of student participation relates to the practitioner as the student may opt to not participate fully because of feelings of unpreparedness or even disengagement on their part. However, students have reported

disengagement to be due to a continual lack of the practitioner not allowing them to take part in patient exams and procedures or being directed to perform non-patient duties, thus rendering students to be uninterested (Young et al., 2013).

To perform this exploration, a qualitative descriptive study approach was used to gather and compile information regarding the radiologic technology student's perception of the clinical learning environment. The majority of studies discussed in this literature review have used the qualitative approach and this method has been employed in this current study. Most of these qualitative studies engaged the use of a semi-structured interview or survey as the research instrument. As a result, the data sources for this study initially consisted of a two-part questionnaire, closed-ended questions seeking demographic information and, second, three general open-ended questions concerning the clinical learning environment.

An additional data source included face-to-face semi-structured interviews. The following chapter will provide detailed information regarding the methodology, design, population and sample selection for the study, data collection, and analysis. In addition, the trustworthiness of the study will be fully discussed, as well as ethical considerations and limitations and delimitations.

Chapter 3: Methodology

Introduction

Chapter 3 will focus on the methodology for the study. The chapter will reiterate the problem statement, the methodology, the research design, population and sample selection, data collection and analysis procedures, sources of data, and trustworthiness of the design. The researcher will also discuss the ethical considerations involved in the study. Limitations and delimitations for this study are also included.

The purpose of this qualitative descriptive study was to explore how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The clinical learning environment includes an assigned or dedicated clinical instructor, radiologic technology practitioners, supervisory personnel, radiologists, staff, and patients. All of these individuals take part in the student's clinical learning experience, but it is the clinical instructor and practitioner with whom the student spends the majority of the time. The student's success is very much dependent upon these individuals so that the academic content taught in the classroom can be brought into practice in the clinical learning environment. The clinical learning environment is essential for psychomotor skills development and to meet the clinical competency requirement of the American Registry of Radiologic Technologists (ASRT & AEIRS, 1992).

Statement of the Problem

It was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of

clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. Researchers agree on the importance of future research to examine students' perceptions of their ability to learn from clinical instructors and practitioners (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). Researchers recommend further study of the influence of clinical instructors and practitioners in terms of how students perceive their ability to provide targeted practice and effective feedback, and the impact feedback has on students' learning (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015).

Of the two primary types of individuals in the clinical learning environment who may influence the student's clinical education, it is the clinical instructor who acts as the gatekeeper. The individual designated as the clinical instructor is a certified and registered practitioner but with an additional and somewhat different role to incorporate instruction and formal, summative assessment of the student's competency (ASRT & AEIRS, 1992; JRCERT, 2018b).

Conversely, the practitioner (staff technologist) is also a certified, registered radiologic technologist with day-to-day responsibilities, which primarily include the production of medical images for diagnosis (ARRT, 2018). The practitioner works more closely with the student in terms of observation of examinations and procedures, practice, and reflection, and is available during times of independent learning (ASRT & AEIRS, 1992; JRCERT, 2018b). In addition, this individual is expected to understand the curriculum and be able to provide supervision and formative feedback to the student (JRCERT, 2018b). While the practitioner is always employed by the hospital or medical

imaging center, clinical instructors may be employed by either the educational institution or the clinical learning environment, where the clinical education is taking place

As stated previously, the clinical component has a well-defined curriculum. As such, it is vital to identify the students' perception of practices that are, and are not, conducive to their learning (ASRT, 2014). Overall, the knowledge gained concerning students' perceptions of their ability to learn, viewed both positively or negatively, will allow both clinical instructors and practitioners to be much more mindful when around students and to understand methods that help or hinder learning. In addition, students' perception of their ability to learn from clinical instructors and practitioners may help make the clinical learning experience clear cut and concrete so that students know and understand the expectations placed upon them.

Research Questions

The phenomenon of this study was how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The following research questions focus on student perceptions and guided this study:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?

Targeted practice, opportunities for students to perform radiographic procedures learned in the classroom during their assigned clinical rotations, occurs under the supervision of a clinical instructor and /or practitioner (ASRT & AEIRS,1992). Effective feedback, a manner in which formative assessments are made of students' performance by the practitioner and clinical instructor, occurs through their observation of the students' execution of the exam and followed by evaluation of the resultant radiographic image (ASRT & AEIRS, 1992). In short, students' primary learning resources in the clinical learning environment come through the influence of the clinical instructor and practitioner.

There were two data sources for this study which included a two-part questionnaire followed by face-to-face semi-structured interviews. The researcher's decision to use a questionnaire in addition to interviews was based on the research literature (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). A questionnaire is a valuable method to gather and assess an individual's ideals, positions, and convictions of a certain topic (Saldana, 2016). For this study, a two-part questionnaire was used. The researcher first included closed-ended questions seeking demographic information and, second, three general open-ended questions concerning the clinical learning environment. These general questions were based on the research questions to encourage participants to provide their perceptions in as much detail as possible.

Questions were carefully sequenced to help participants become comfortable completing the questionnaire and to hopefully make their answers honest and sincere. A final question asked if students would be willing to participate in face-to-face semi-

structured interviews which were composed of open-ended questions. The researcher had an expert panel composed of three colleagues who teach and research in the profession, one of them being the researcher's content expert for the dissertation. Both the questionnaire and the interview questions were reviewed by all three individuals and revisions were made as a result of feedback (Appendix G).

The interview was constructed by using open-ended questions relative to the research questions, and with careful sequencing, to explore the information sought in research questions. Interviews were performed in a face-to-face manner at the students' educational institution. Both the questionnaire and interview questions addressed the research questions, and which were consistent with the ASRT *Clinical Education Competency Evaluation Model* document. This document was designed to provide structure and a plan for clinical education as well as present an approach for assessment (ASRT& AEIRS,1992). The researcher used the questionnaire (Appendix D) to first gather basic demographic information and, secondly, included three general open-ended questions to elicit responses of how students best learn. The semi-structured open-ended interview questions (Appendix D) were developed to answer research questions specifically concerning students' perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners to provide targeted practice and effective feedback.

Data collection methods were twofold. The first was a two-part questionnaire and data was collected electronically through SurveyMonkey®. A program official from students' educational institutions was provided to a link to SurveyMonkey® which was emailed to the programs' students. The semi-structured interviews took place in a face-to-

face format at the students' educational institution in either New Jersey or New York. Data from SurveyMonkey® was imported into the qualitative data analysis software, MAXQDA which was then combined with data imported from the interviews for coding (MAXQDA, 2018).

Research Methodology

This study used a qualitative method because it was appropriate to be able to demonstrate a thorough insight into the subject matter at hand so that it can be adequately characterized and disseminated (Bloomberg & Volpe, 2016). Qualitative research allows for an idea to be formed and to be explored. (Bloomberg & Volpe, 2016). In the case of this study, a qualitative method was used to explore how radiologic technology students' perception of their ability to learn from clinical instructors and practitioners. It was possible that through the use of a qualitative method, a thorough understanding of the phenomenon could be obtained (Bloomberg & Volpe, 2016).

A qualitative method, as opposed to a quantitative or mixed methods study, was the most appropriate for this study, because it provided insight into how individuals manage in a real-life setting (Yin, 2016). An understanding of students' views of the reality of learning from clinical instructors and practitioners and being able to account for the circumstances of this reality are two examples of what makes qualitative research, rather than quantitative more viable for this study (Yin, 2016).

A quantitative method seeks to quantify results while a qualitative method seeks to understand the scope and diversity of the phenomenon, which in this research study, represents the perceptions of individuals (Bloomberg & Volpe, 2016; Yin, 2016). Since this study concerned the exploration of the perceptions of students of their clinical

learning, a qualitative method was an appropriate venue. While quantitative research seeks to examine cause and effect, a qualitative study seeks to examine real-life experiences (Bloomberg & Volpe, 2016). Another difference between quantitative and qualitative research references the researcher's role. For a quantitative investigation, the researcher views the investigation as an outsider whereas in a qualitative study the researcher maintains an insider view as in this study (Bloomberg & Volpe, 2016).

Prior research of clinical education also demonstrated why a qualitative study will better serve as the methods of choice for this study. The research performed by Rose and McIntosh (2015) was accomplished using a qualitative method to explore students' perceptions of specific components concerning the overall quality of the clinical learning environment. Finally, England et al. (2017) used a questionnaire in their qualitative study using both open and closed questions to seek students' perceptions of supervision. Using open-ended questions as a data source has been indicated in each of these research studies and enables a venue to obtain students' perceptions in a descriptive manner. Numerical data obtained in quantitative research would not be a means to provide in-depth data needed to examine students' perceptions of the clinical learning environment.

Furthermore, a qualitative study was used due to the nature of the research questions and the data needed for this investigation. For example, the use of the research questions in this study sought to explore an intricate and abundant description of the perceptions of radiologic technology students' experience with clinical instructors and practitioners (Patton, 2015). Specifically, students' perceptions that were examined included their experience in obtaining targeted practice opportunities and effective feedback from these individuals. As a result, a qualitative study was the best as this

method to allow for the focus of this investigation to be about the circumstance of student learning. (Patton, 2015). Finally, a mixed-methods approach, which involves the use of both qualitative and quantitative components, is used so that a problem can be thoroughly understood. For this study, it was not necessary to employ quantitative elements to obtain a comprehensive understanding of the phenomenon.

Research Design

A descriptive study design was employed for this qualitative research. According to Sandelowski (2000) and Holly, (2019), a descriptive design involves an extensive review of a phenomenon as it naturally exists. For this research, a descriptive design allowed for a comprehensive description of the phenomenon of radiologic technology students' perception of their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback (Marshall & Rossman, 2016). This design provided an exploration of the student's perceptions of their ability to learn from clinical instructors through their perception of clinical instructors ability to provide targeted practice combined with effective feedback.

The units of observation were students enrolled in radiography programs in New Jersey and New York as both groups are educated with the same curriculum. The unit of analysis was the student's perception of their ability to learn based on their perception of the ability of clinical instructors' and practitioners' ability to provide targeted practice and effective feedback. There are numerous qualitative research designs discussed in the literature, but a descriptive design was selected as the best choice for this study (Bloomberg & Volpe; Marshal & Rossman, 2016; Patton, 2015; Yin, 2016).

For example, a phenomenological design would not have been appropriate for this study. Phenomenological studies look at data for the basic necessary elements of an individual's experiences (Patton, 2015). This study sought to understand the radiologic technology students' perception of their actual experiences, themselves. Ethnography is related more to an examination of the culture of individuals (Patton, 2015). This study was investigating a group of individuals' perceptions of aspects of their clinical experience, which in this study was the perception of their ability to learn from specific individuals, and not of the clinical experience, itself.

A descriptive study, seeks to explain a phenomenon and as a result, was chosen as the research method to study the context of students' ability to learn based on practitioners' and clinical instructors' ability to provide targeted practice and effective feedback (Sandelowski, 2000). Finally, the purpose of grounded theory is to understand a specific phenomenon and then to generate a theory from the data collected (Bloomberg & Volpe, 2016. As a result, a descriptive design was chosen as the type of a qualitative method for this study because it allows for the acquisition of data that is valuable and abundantly strong to demonstrate the elements of a phenomenon in a clear manner (Bradshaw, Atkinson, & Doody, 2017). Finally, the unit of analysis for this study, the study sample participants, are second-year radiologic technology students, students from four randomly selected radiologic technology programs in the states of New Jersey and one in New York.

Population and Sample Selection

The general population for this study was radiologic technology students from JRCERT accredited programs in the United States. The target population from which this

study was drawn encompassed second-year students from three programs in New Jersey and one in New York. The sample was comprised of 33 participants for the questionnaire from that 12 participants for the interview.

As stated above, the study's sample comprised second-year students from four JRCERT accredited programs, three in New Jersey and one in New York for a total sample size of 33 for the questionnaire and from those respondents, 12 individuals participated in the interview. In addition to being enrolled in a pre-selected program in New Jersey or New York, the criteria for the sample were that students needed to be in their second year of a two-year course of study from selected JRCERT accredited programs in New Jersey and New York. It was important that second-year students, only, be included. These students had participated in at least t to three to four semesters of clinical education which was a longer duration, thus an increase in experience than a first-year student. The additional time in the clinical rotation was both advantageous and essential for this qualitative descriptive study.

Initially, participants were recruited through the program information obtained from the JRCERT. The sample was intentionally selected, from specific educational institutions in both New Jersey and New York making the sample purposive (Yin, 2016). Second-year students were chosen as the criteria, as purposive sampling, because these individuals possessed an awareness and aptitude most germane to the topic at hand (Holly, 2019).

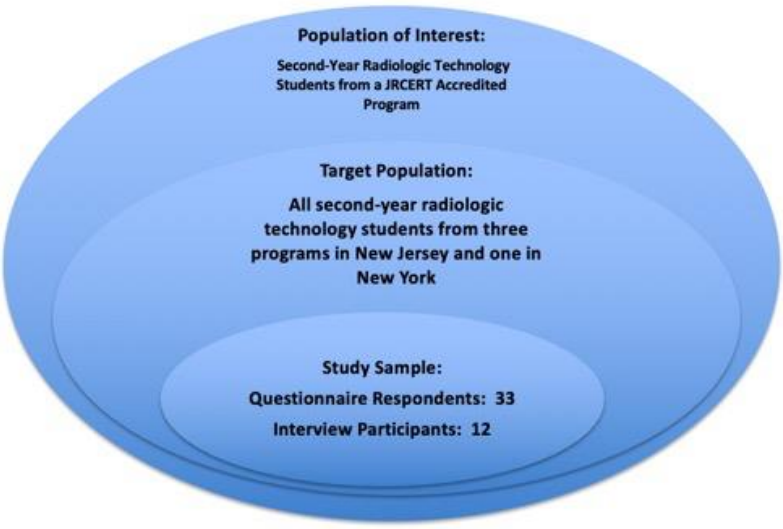

Figure 1. Population, target population, and sample breakdown

Site authorization and recruitment. Before IRB approval, the researcher requested site authorization from the Radiologic Technology Program Directors from randomly selected educational institutions attended by students who were intended to be part of the sample (Appendix F). This occurred by following the GCU Procedure and Guidelines for Obtaining Site Authorization to Conduct Research, which included, but was not limited to a letter of request, a copy of the full proposal, and a sample of the authorization/cooperation letter to be given to all participants. Additional content of this correspondence included the relevance of the research study, what was being asked of the participants (initial questionnaire and possibly a follow-up interview), and the method to ensure confidentiality and privacy for the interview. Once approval was procured, from GCU as well as the site, the researcher proceeded with the recruitment process through the program directors.

Through email correspondence, the program director from each educational institution was provided with a link to the SurveyMonkey® questionnaire as well an introductory letter to send to students through their college email accounts to complete

the questionnaire. Since the questionnaire was also intended to be used as recruitment for a potential interview, participants for the semi-structured interviews were selected from those who responded yes and provided an email address to a question on the questionnaire requesting willingness to participate in a face-to-face interview. There were 10 participants who indicated their willingness to be interviewed to meet the minimum guideline number needed for this qualitative descriptive study. Eventually, though, not all those who initially were willing to participate were able to be contacted. However, through snowball sampling, the researcher was able to meet the minimum number of twelve participants required for the interviews.

Qualitative sample size. A questionnaire was used for the initial form of data collection and followed up with face to-face semi-structured interviews. Second-year students were recruited for the questionnaire. There were 45 responses to the questionnaire, which exceeds the guideline for the minimum number of participants for questionnaires, however, 12 were incomplete resulting in a total number of 33 participants.

The number of participants for the final sample for interviews, drawn from the questionnaire respondents, was 12 students, eight from New Jersey and four from New York. Initially, ten participants, five in each state, indicated on the questionnaire that they were willing to be interviewed. Of the ten individuals who originally agreed to participate, only eight responded to an email to set up a meeting place and time (Appendix L). The email requested identification of the individual by name and educational institution attended so that the researcher could arrange a convenient time and place to perform the interview. Snowball sampling occurred at two separate

interview sites when four additional individuals were willing to be interviewed during the time the researcher was at their educational institution interviewing confirmed individuals. This demonstrated a form of convenience sampling as the snowball sampling allowed for a convenient method to recruit participants (King et al., 2019). As a result, there was a final total of 12 participants interviewed.

To account for attrition, the researcher invited 98 individuals for potential participation in the interviews and was able to interview 12 participants which exceeded the minimum of 10 individuals. Through email correspondence, the researcher checked in with program directors weekly. Program directors, in turn, sent follow-up emails and had face to face conversations with second-year students to further the recruitment process by explaining the importance and relevance of this research to students. Multiple data sources were used through the questionnaire and semi-structured interview. Figure 2 demonstrates the distribution of the sample by state and data source.

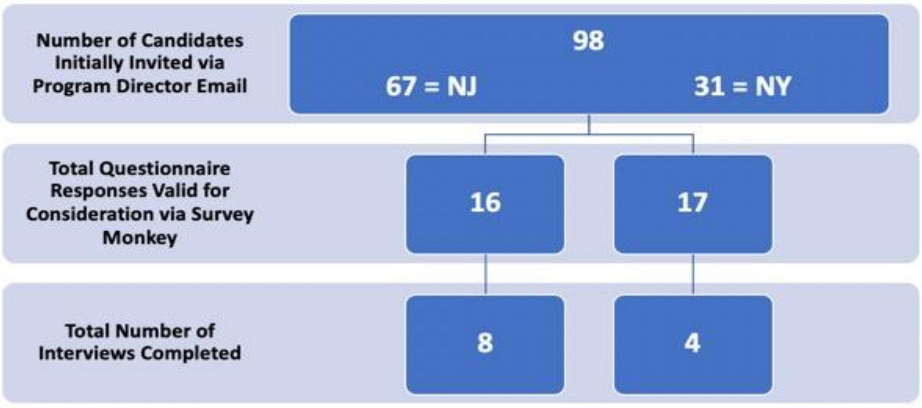

Figure 2. Distribution of the sample.

The sampling process for the study was purposive (Yin, 2016). The researcher selected only second-year students from New Jersey and New York for participation in the study. Only second-year students were recruited because this group of individuals had

sufficient clinical education experience to hopefully provide abundant information into the phenomenon being explored (Saldana & Omasta, 2018). Students from two different states were recruited to provide some divergence (Yin, 2016). The selected students were screened through program officials' verification of status and the demographic questions in part one of the questionnaire.

Sources of Data

There were two sources of data for this study, a questionnaire and a semi-structured interview. The use of two data sources was imperative to provide magnitude to the data gathered for this study (Saldana & Omasta, 2018). While developing the data sources, the researcher was mindful of the purpose of the study and the research questions. The formation of both the questionnaire and interview questions was developed through prior research. These prior studies included those that demonstrated gaps noted in prior research (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015) as well as from Ingrassia's (2011) and Mason's (2006) research on clinical instructor's characteristics and students' clinical stressors, respectively, all in addition to Fowler and Wilford's (2016) and Nolan and Loubier's research concerning feedback.

The three general open-ended questionnaire questions as well as the three interview questions concerning student acceptance in the clinical learning environment were developed to note most memorable positive or negative moments that resonated most with participants. This was to obtain a general idea of how students perceived their most and least beneficial learning experiences and questions were based on Mason's (2006) study relating to a welcoming clinical learning environment and factors that

affected students' stress levels (Appendix D). The remaining interview questions were developed to seek more specific information. Questions were first asked regarded the clinical instructors followed by those seeking information about the practitioners (Mason, 2006). Because the researcher was mindful of the purpose of the study and the research questions, the content of the remaining interview questions included students' perception of their ability to learn based on both clinical instructors and practitioner's ability to provide practice and feedback (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015).

These questions included items relating to the effect of specific stressors noted in Mason's (2006) research as well as Shanahan's (2015) research concerning the impact of the practitioner on learning. Additional questions sought students' perception regarding clinical instructor's and practitioners' behavioral characteristics and the effect of interpersonal skills of these individuals on students' perception of their ability to learn, (Ingrassia, 2011; Mason, 2006; Perrim, et al.). Finally, questions regarding feedback, whether it was provided and sufficient were also asked and based on the studies of Fowler and Wilford (2016) and Nolan and Loubier (2018)

An expert panel vetted both data sources. The panel was composed of three colleagues who teach and research in the profession, one of them being the researcher's content expert for the dissertation. Although not all members of the expert panel possessed a doctorate degree, the individuals chosen to vet the data sources are extremely familiar with the context of the research, the clinical opportunities within the geographic region and the specific challenges faced by radiologic technology students. For example, James Johnston, Ph.D., R.T. (R)(ARRT), FASRT is the Content Expert on the

researcher's committee. He is presently the Provost of Midwestern State University and still a member of the faculty of MSU's Radiologic Technology Department. He has authored many several books and many research articles which are published in reputable peer-reviewed journals. Professor Emeritus [redacted], M.Ed, R.T.(R)(M)(ARRT), FASRT is a retired Radiologic Technology Program Director (over 40 years). She is also a Past President and former board member of the Board of Directors of the American Registry of Radiologic Technologists (ARRT, Certification Agency) and a Past President and former board member of the American Society of Radiologic Technologists (ASRT, Professional Society) and a past member (over 20 years) of the NJ Radiologic Technology Licensing Board. Finally, [redacted], M.A., R.T.(R)(ARRT), FASRT was the retired Chief of the NJ Bureau of Radiological Health, Department of Environmental Protection (11 years) as well as a former Radiologic Technology Program Director (7 years) and. All three individuals are a Fellow of the American Society of Radiologic Technologists, the highest honor bestowed upon a Radiologic Technologist. All three expert panel members have lectured extensively on the state and national level.

Both the questionnaire and the interview questions were reviewed by all three individuals and revisions were made as a result of feedback (Appendix G). All three members of the expert panel approved the questions on both the questionnaire and semi-structured interview. The only request for change came from Dr. Johnston who suggested editing of the choices for the age of participants and separation of questions, both for clarification (now a mute point). Dr. Johnston later suggested that the students number of semesters of clincial education also be asked to ensure the clinical level of the student.

During the IRB approval process, the IRB requested that questions regarding the age, gender, ethnicity, name of educational institution be removed. The question regarding the name of the educational instituion was changed to reflect only the state in which their program was located and all other questions regarding the IRB's request were removed. The questions were not field tested.

In terms of how data sources were disseminated, first, a questionnaire was provided through a link to SurveyMonkey® sent, by the program director, to students' college email accounts for completion. To maintain consistency throughout the interview process, open ended questions allowed for all participants to receive the same question in the same order (Bernard, Wutich & Ryan, 2017). In addition, open-ended questions were used as they are void of answers with similar choices which enabled participants to answer in their own words (Check & Shutt, 2012). Both were important to a qualitative descriptive study to obtain data as rich in detail as possible.

The second source of data was the use of semi-structured interviews implemented in a face-to face-format. Participants were chosen from those questionnaire respondents who volunteered to participate based on questionnaire responses asking for participation. According to Bloomberg and Volpe (2016), interviews give rise to abundant and expansive descriptions and a semi-structured format will allow the exploration to be more concentrated. The interviews were constructed of open-ended questions to explore the students' perceptions of their ability to learn based on their perception of the ability of clinical instructors and practitioners to provide targeted practice and effective feedback. Saldana and Omasta (2018) state several advantages to the use of semi-structured interviews. This data collection method allows opportunities for follow-up questions, a

change in the course of the questioning, and the ability to move the conversation in a different direction if deemed necessary. The researcher hoped the interview gave a detailed explanation of the student's perceptions of the effectiveness of both the clinical instructor and practitioner. Patton (2015) endorses the use of several types of questions such as those that inquire about feelings, experience, behavior, opinions, and values. Richards and Morse (2013) suggest preparing a preliminary set of questions along with an additional group of prepared probing questions Leavy (2017) discusses the importance of the sequencing of questions. The researcher, using prior research concerning gaps in the literature, developed the interview questions, mindful of both Patton's (2015), Richards and Morse's, and Leavy's suggestions.

Questions that were asked for both data sources were based on common issues investigated and explored from prior research concerning the students' learning experience in the clinical environment (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). These questions were asked so that participants were encouraged to provide their perceptions in as much detail as possible. Specifically, the topics of the general open-ended questions within the questionnaire were more of a general inquiry to note where the student perceived the most and least learning from clinical instructors and practitioners to take place. In the semi-structured interview, open-ended questions sought more specific responses to understand the exact attributes of clinical instructors and practitioners that influenced the students' ability to learn or those attributes that deterred learning (Appendix D). The researcher hoped the questionnaire combined with the semi-structured interviews increased awareness and comprehension of the students' experience in the clinical learning environment by asking about values,

attitudes, and beliefs, specifically focusing on the clinical instructor and practitioner and their actions relating to the student's ability of both groups of individuals ability to teach through targeted practice and effective feedback.

Trustworthiness

Research must be considered trustworthy. Trustworthiness refers to the quality of a study and the precision of the methodology (Leavy, 2017). However, according to Shenton (2004), some researchers are skeptical of the scholarly merit of qualitative research. A declaration by the investigator that the research is reliable is not sufficient in some cases (Marshall & Rossman, 2016). Because of the subjective nature of qualitative research, there is a need for increased accountability of this method of research to the academic community (Chess, 2017; Lincoln & Guba, 1985). As a result, Lincoln and Guba (1985) introduced alternate terminology, credibility, transferability, dependability, and confirmability to quantitative research, all to ensure the value, thus trustworthiness, of a qualitative study.

Credibility. To ensure rigor in a qualitative study, credibility is one of four terms, as stated in the paragraph above that have put forth by researchers. Credibility is a term that addresses an affirmation by researchers that their translation of participants' views is accurately presented, without bias (Lincoln & Guba, 1985). Credibility is concerned with transparency and the reader's expectation that the investigation was implemented in such a way that the findings were coherent (Hayes & Singh, 2012; Saldana & Omasta, 2018; Yin, 2014). In short, credibility demonstrates that the research was performed competently and that the findings as a result of the research provide a true representation of the experiences of the study's participants. (Chess, 2017; Saldana & Omasta, 2018)

Several strategies ensure credibility for this study:

- More than one data source, a questionnaire, and a semi-structured interview was used for this study (Bloomberg & Volpe, 2016; Chess, 2017) Appendix D.
- Member checking was performed (Appendix Q) in part and to the extent that most participants verified transcripts for accuracy and were allowed to make any changes (Bloomberg & Volpe, 2016; Chess, 2017).
- Data collection was meaningful to the methodology and research questions (Saldana & Omasta). Appendix E
- There were a sufficient number and variety of participants (Appendix K) (Saldana & Omasta).
- Participants were made aware of and were given opportunities to decline to participate or to cease participation at any point before and during both the questionnaire and interview (Shenton, 2004).

Transferability. Ensuring transferability is another method to demonstrate trustworthiness of a study. Transferability refers to whether an investigation's findings can be adapted to other contexts such as a larger group of individuals, other settings, or situations (Amankwaa, 2016; Connelly, 2016; Lincoln & Guba, 1985). This is an important concept because what can be learned in one setting might be effective in another researcher's situation (Bloomfield & Volpe, 2016). To achieve transferability, it is the responsibility of the investigator to provide a rich, detailed and thick description of the research or phenomenon to demonstrate how the findings of a study can be applicable, thus transferred, to another study's situations (Amankwaa, 2016; Chess, 2017; Connelly, 2016; Shenton, 2004).

Several strategies ensure transferability for this study:

- The phenomenon has been described in thick, rich detail with more than ample material from which results can be easily reviewed and transferred to other, similar circumstances (Amankwaa, 2016; Bloomberg & Volpe, 2016; Lincoln & Guba, 1985).

- A meticulous description of the steps taken regarding the recruitment, data collection, and data analysis processes ensured confirmability.

Dependability. Another method to ensure trustworthiness is dependability. Dependability addresses the ability of the research process to result in similar findings if repeated through an assurance that the exploration process was coherent, could be tracked, and was chronicled (Lincoln & Guba, 1985; Shenton, 2004). It represents the extent of documentation of the procedures used for the research of the study (Chess, 2017). For a study to be considered dependable the procedure for data collection and the process for interpretation of the data must be traceable (Bloomberg & Volpe, 2016).

Several strategies ensure dependability for this study:

- An inquiry audit, having other researchers review the study, was performed in this study through the dissertation committee. In addition, seeking IRB approval and the Academic Quality Review proceedings also ensured that this study's findings were considered to be dependable.
- Use of overlapping of data sources (Shenton, 2004). Both a questionnaire and semi-structured interviews were used. Interview questions were derived from the more general questions initially used in the questionnaire. General questions used in the questionnaire were expanded to be more specific.
- An audit trail was developed through evidence produced in this study to include transcripts of interviews, audio recordings, and electronic documentation of data from the questionnaires. In addition to records of the data analysis process are also available (Appendix R) developed (Chess, 2017).

Confirmability. Confirmability is the final method to demonstrate trustworthiness. The researcher must present the study's findings as a representation of the experiences of the phenomenon under investigation as those solely of the study's participants and not of the inclinations of the researcher (Shenton, 2004). Succinctly put, bias, thus intrusiveness, from the researcher, must be avoided (Hays & Singh, 2012).

Several strategies ensure confirmability for this study.

- In chapter 4, the researcher included an abundant use of participants' quotations (Chess, 2017).
- The researcher made transparent any weaknesses in the study (Shenton, 2004).
- A detailed description of codes and the coding process and how patterns and themes developed and provided by the researcher (Chess, 2017).
- The researcher included a sufficient amount of evidence through documentation of interview schedules as well as number of minutes and pages transcribed, all to verify the analysis and the findings of this study (Chess, 2017).

Data Collection and Management

The sites for this study were chosen as a matter of geographic convenience for the researcher. Site authorization was first established by an informal conversation between the researcher and the radiography program directors of each educational institution to see if there was interest and a willingness for the program to be a part of the study. Following a positive response from all four program directors, the researcher emailed a formal site authorization recruitment letter to each program director. This letter included an introduction of the researcher, the purpose of the correspondence, and an explanation of the research to also include the research questions.

In addition, the researcher explained the proposed process to be used to provide students access to the questionnaire and the way participants would be selected for the interviews. All program directors responded almost immediately, stating that they would forward the researcher's request to the IRB of their respective institutions. The IRB of three of the sites gave authorization contingent upon IRB approval from Grand Canyon University and one approved without conditions. In addition, the researcher explained the proposed process to be used to provide students access to the questionnaire and the manner in which participants would be selected for the interviews.

The manner in which data collection took place in this study was twofold to first include a questionnaire which was followed up with voluntary semi-structured interview. The purposive sample for this study was comprised of 33 second-year students from four JRCERT accredited radiologic technology programs, three in New Jersey, and one in New York and from that, 12 participants for the interview. A total of 45 individuals participated in the questionnaire with 33 that were completed, thus viable. Of the 33 respondents, initially 12 individuals indicated a willingness to participate in the semi-structured interview. After a follow-up email to arrange an interview time and place, four individuals did not reply which reduced the number to eight. However, due to snowballing, four individuals were added making 12 total interviews. Therefore, the final sample total of participants resulted in 33 usable questionnaire responses and 12 interviews (Appendix K).

Questionnaire. The link to the SurveyMonkey® questionnaire also provided an attached cover letter to include a request to participate and a description of the research in addition to a statement of anonymity just prior to the formal consent form, to be electronically approved. In the consent form, participants were informed that the only way that data could be linked back to them was by providing an email address should they be "willing to participate in a follow-up interview" thus ensuring confidentiality instead of anonymity.

Participant approval of the consent form was set up in a two-fold manner. So as not to assume informed consent, there were two initial questions directly following the consent form. The first contained a question giving the student the choice to consent or not to consent to the study. The second was in the form of verification, to once again

agree to consent. If the student, on the second verification question declined consent, SurveyMonkey®, through a "Question Skip Logic" disqualification design automatically closed the questionnaire and the participant received a disqualification message designed by the researcher (SurveyMonkey®, 2019c).

The questionnaire was anonymous to ensure that the participants' well-being was protected. It was specifically designed, through SurveyMonkey®, so that no identifying information was available (SurveyMonkey®, 2019d). According to the Terms of Use on the website, SurveyMonkey® has an extensive security statement that addresses items such as the physical security of their infrastructure, access control, personnel, and vulnerability management and regular penetration testing. There is a statement in the company's Terms of Use that acknowledges "that by giving us your content, you are trusting us to treat it appropriately" (SurveyMonkey®, 2019b). The website also states that they "will treat your content as confidential information and only use and disclose it in accordance with these Terms" (SurveyMonkey®, 2019b). All data for both the questionnaires and the interviews will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

The terms involve such factors as the content being made public by the account holder or were already known by SurveyMonkey® before the formation of the account or "received from a third party without the knowledge of breach of any obligation" to the account holder. Finally, SurveyMonkey® states that the account holder will possess ownership of the content and that the company will have no rights to the content except for the need to provide the services (SurveyMonkey®, 2019b). Data received from the

questionnaires had identifiers removed through a specific setting when designing the questionnaire (SurveyMonkey®, 2019d).

Interview. The second manner of data collection, semi-structured interviews, was conducted based on those who indicated a willingness to participate. In the questionnaire, respondents were given the option of volunteering to participate in a follow-up interview and if they were willing, to provide an email address to be contacted at a later date. Initially, the researcher had hoped to select individuals for the interview from a pool of those who volunteered and based on their comments in the questionnaire's open-ended questions. The rationale for this was that the researcher wanted to be sure that those selected for the interview answered with thick, rich descriptions of the phenomenon. However, due to the small number of usable questionnaires and an even smaller number of respondents who were willing to be interviewed, to meet the minimum number of participants required for this study the researcher chose all students who volunteered for the interview.

To arrange the interview, the researcher emailed willing participants with the following information: An assurance of confidentiality, approximate duration of the interview, and a request for information as to which educational institution they were attending so that a suitable date and time of the interview could be determined and arranged. The researcher performed the interviews at each program’s facility. At the researcher's request interviews were held in a private area in either a classroom, boardroom, or a faculty office, so that they were held privately and with no interruptions. Just prior to the start of the interview, participants were given a hard copy of a consent form to sign.

The interview was considered confidential and, as such, it was also crucial to protect the identity of the students' interview data (King et al., 2019). The confidentiality of the interview, to protect the identity of the students, was addressed in the informed consent given to participants just before the start of the interview. Interviews were digitally recorded with each participant's permission and transcription was performed by Trint.com (2019a), an automated transcription service. The researcher reviewed the transcripts and recordings to be sure that the transcription service transcribed the interview text accurately. Pseudonyms were used during the transcription.

Data Analysis

The purpose of this qualitative descriptive study was to explore how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback.

The following research questions sought to explore radiologic technology students' perceptions of the clinical learning environment:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?

Thematic analysis was the method used to analyze data sources that included questionnaires and semi-structured interviews. The use of a questionnaire was a twofold

process. Part one was appropriated for demographic information and reported as descriptive statistics. Part two of the questionnaire included three general open-ended questions relating to the research questions, in addition to a question asking participants to indicate interest in participating in a follow-up interview (Appendix D). This instrument was administered electronically through SurveyMonkey®, prior to performing individual semi-structured interviews and, as stated previously, was used as the basis for recruiting participants for the interviews. SurveyMonkey® data can be exported into MAXQDA for future analysis (MAXQDA, 2018). The second source of data, the face-to-face semi-structured interviews, was composed of questions based on allied health clinical education topics from prior research and was identified in the literature review that was applied to the two research questions (Appendix D).

Individuals willing to transition participation from the questionnaire to the semi-structured interview were only identified by an email address supplied by the participant in a specific question in the questionnaire. As stated above, to analyze the qualitative data obtained from the open-ended questions on the questionnaire and the semi-structured interviews, thematic analysis was used to ultimately generate themes for this study. A process using Braun and Clarke's (2006) six steps was used for thematic analysis. The following describes this process:

Step 1: Familiarization with the data. The first step discussed by Braun and Clarke was to become familiar with the data. Before the coding process, discussed below in the second step to become as cognizant with the data as possible, the researcher read and reread data from both the questionnaire and interview. Furthermore, each interview transcript was meticulously read for verification of accuracy.

Step 2: Assignment of preliminary codes. Codes were developed for both questionnaires and interviews. Through inductive analysis, the researcher initially developed very broad codes and then later recoded and relabeled them to be more specific using clearer cut, less broad codes. Codes were identified using open coding to allow for the type of responses desired to answer the research questions. Questionnaire and interview data were combined. Axial coding was used to move from codes to categories. For example, the research question, "How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?" allowed for the identification of codes based on participants' responses. These responses mentioned such aspects as those involving the clinical instructor's willingness to teach, provide feedback, being approachable and available, or the practitioner being knowledgeable, giving students the ability to perform procedures with them or being rude or not being helpful, to name a few.

Similar codes resulted from the second research question, "How do students perceive their ability to learn based on their perception of the ability of practitioners to provide targeted practice and effective feedback?". Data was organized through the creation of a research database file. This file was subdivided into folders of data obtained through questionnaires and interviews and then further broken up to reflect separate folders to relate individually to the two research questions for this study. Data from the questionnaires and interviews were then exported to MAXQDA to be further organized for analysis.

Step 3: Discovering patterns. Patterns and themes were then discovered from codes and categories. Codes were compressed to develop categories. Through the

establishment of categories, themes were constructed as categories were synthesized to generate these themes.

Step 4: Reviewing themes. Themes were reviewed to reaffirm their relevance to the research questions. Themes were examined to be sure that they were distinctly different from each other (Braun and Clarke, 2006).

Step 5: Define and name themes. Once identified the researcher carefully named the themes in such a way that a particular theme's data set would be very apparent. Furthermore, the themes were defined based on which facets of the data were represented by each theme. After naming themes, the final stage is conducted.

Step 6: Production of a report. In this final step, using the research questions as a guide, a report of findings was produced. The report of findings was also discussed in the results section of chapter four and five. All 6 steps were followed in succession.

Ethical Considerations

The protection of participants in this study was essential so it was important to establish ethical boundaries. These boundaries are regulated by the Belmont Report, which was developed following past unsafe practices involving participants (Hays & Singh, 2012; Saldana & Omasta, 2018). In this study, the researcher adhered stringently to the protocol rooted in the Belmont Report and the Internal Review Board of Grand Canyon University. The result of the Belmont Report was the development of three primary ethical objectives for researchers to apply moral standards (Hays & Singh, 2012; Saldana & Omasta, 2018). They include respect for persons, beneficence, and justice.

Respect for persons. The first moral principle to be delineated is *respect for persons*. This describes the researcher’s responsibility to ensure that participants are

provided with all the pertinent information necessary concerning the study before engaging in the research process (Hays & Singh, 2012; King & Harrocks, 2019; Marshall & Rossman, 2016; Saldana & Omasta, 2018). The individuals involved needed to understand that their participation was voluntary and knew exactly what was expected of them and what the research entailed, including any ramifications (Hays & Singh, 2012; King & Harrocks, 2019; Marshall & Rossman, 2016; Saldana & Omasta, 2018).

In this study, all participants were fully informed of all attributes of the investigation at the time of the initial email, from the program director, containing the link to the questionnaire. This process was repeated through the consent form given before the start of the interview process. It was reiterated that participation was voluntary, and the subjects can withdraw from the study at any time.

Beneficence. Another moral principle to be described is *beneficence*. This element of the Belmont Report requires that the researcher makes certain that no harm comes to the participant (Hays & Singh, 2012; Saldana & Omasta, 2018). The welfare of subjects must be assured (King et al., 2019). The benefits of participation in the study should be amplified and any harm, diminished (Hays & Singh, 2012; Saldana & Omasta, 2018). In this study, benefits and risks were outlined. Some benefits included a better understanding by educators and practitioners of the radiologic technology students' perspective of clinical education because students' perceptions were heard and analyzed (Miles et al., 2019; Saldana & Omasta, 2018). An additional benefit was the attainment of insight on the students' part of the culture of the clinical learning environment. However, since students, through open-ended questionnaires and semi-structured interviews

revealed their perception concerning the clinical learning environment, students might feel threatened and be at risk in this setting (Miles et al., 2019).

Justice. The final moral principle is justice. This relates to fairness in terms of all types of participants being treated equitably (King et al., 2019). In addition, the selections of subjects should be performed in such a way that no groups are unfairly included or excluded (Yin, 2018). For this exploration, so as not to exclude anyone, great care was taken to include two similar, yet different groups of students---one group of participants are from an educational institution in New Jersey and one from New York. The groups were similar, in that all students followed the same clinical education curriculum yet, different in that the group from New Jersey's clinical requirements are more stringent as they exceed the minimum standards.

Following IRB approval, correspondence was sent to the program director, which provided a link to the questionnaire. A cover letter was attached that included a statement of anonymity issued by the researcher. The cover letter also included a detailed explanation of the study, its purpose, and how the information obtained will be used. This was in addition to a statement concerning the researcher's denial of a conflict of interest. A formal consent form, to be electronically approved, was also attached. So as not to assume informed consent, there were two initial questions directly following the consent form. The first will contained a question giving the student the choice to consent or not to consent to the study. The second was in the form of verification, to once again agree to consent. If in the second verification question, consent is declined, SurveyMonkey®, through a "Question Skip Logic" disqualification design automatically closed the questionnaire and a disqualification message will be received (SurveyMonkey®, 2019c).

A signed consent form was required for the administration of the interview. In a similar manner as the questionnaire cover letter, the signed, written statement detailed the purpose and nature of the research and the exact role of the participants. In addition, participants were told in the statement that this process is completely voluntary and that they were free to terminate the completion of the interview at any time. The anonymity of the questionnaire was strictly maintained. This occurred through careful control of data management ensured through the use of a specific setting on SurveyMonkey® and the use of pseudonyms for the interview (SurveyMonkey®, 2019d). Electronic data was stored and secured on a flash drive, which will be encrypted. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

Limitations and Delimitations

As stated in Chapter 1, there were several limitations and delimitations to this study. A limitation is a feature in the design or method used in the study that may slant or distort the analysis of the study and limitations must be recognized and substantiated (Bloomberg & Volpe, 2016). Delimitations are those features that place a barrier around the study to indicate the confines of the study's breadth (Bloomberg & Volpe, 2016).

Limitations. Bloomberg and Volpe (2016) state that limitations are outside circumstances that could have a resultant effect on results by altering the aim of the study. The following is a list of the limitations for this study:

1. This study was limited by the number of incomplete questionnaires returned to the researcher thus demonstrating a reduced number of the sample size.
2. Originally, interview participants were to be recruited and selected based on their respective responses to the questionnaire. However, due to the low number of those who indicated an interest, all students who volunteered for the interview were selected. At the outset, the researcher hoped to select interview participants

from those individuals who provided more in-depth descriptions to answers in the open-ended questions in the questionnaire. The hope was that these individuals would do the same during the interview process.

3. This study was limited by the uneven number of the sample size distributed in each state, as there were double the number of participants from New Jersey. Had there been a more equal number of participants the researcher may have been able to note a difference between descriptions of participants as New Jersey has a more stringent clinical requirements than New York.

4. Demographic questions were minimal. The only demographic information permitted by the GCU IRB was students' year in the program and the state in which the program was located. As information concerning participants' age, gender, ethnicity was unknown.

Delimitations. According to Bloomberg and Volpe (2016), a delimitation is a method for the researcher to identify how the aim of the study was contained and why alternative approaches to the study were not used. The following is a list of the delimitations for this study.

1. This study was delimited to a sample of only second year radiologic technology students. This is because, for the most part, these students had at least three to four semesters of clinical education, which was sufficient time for information to be obtained. Since second-year students took part in the clinical education component for a longer duration than a first-year student, they had more experience. This additional time in a clinical rotation was advantageous for this qualitative descriptive study.

2. This study was delimited to the only students from a radiography program accredited by the JRCERT who were interviewed. Some radiography programs fall under the umbrella of institutional accreditation. The difference is that programmatic accreditation ensures the student a proper clinical experience. Institutional accreditation, while accepted by the ARRT does not closely evaluate the clinical component. As a result, the clinical component requirements may not be as stringently adhered to nor verified in a program using only programmatic accreditation as opposed to following the JRCERT Standards of Accreditation.

Summary

This chapter began with restating the problem, purpose statement, and research questions. This was followed by a discussion concerning the research methodology and

design, population and sample selection, and the sources of data to be used in the study. Finally, the trustworthiness of this study was also described as well as the identification of the data collection, management, and analysis procedures in addition to a description of ethical considerations related to this study.

The methodology for this study was qualitative as it gives way to how individuals manage in a real-life setting (Yin, 2016). The rationale for using this method, as opposed to a quantitative method, was that a qualitative method allowed for the perceptions of individuals to be explored whereas a quantitative method relied on an investigator's interpretations and assumptions (Yin, 2016). A qualitative methodology allowed the researcher to address the research questions in this study which sought to explore a rich description of the perceptions of radiologic technology students' experience with the clinical instructors and practitioners in the clinical learning environment (Patton, 2015).

The design chosen for this qualitative investigation was a qualitative descriptive study. A qualitative descriptive study allows for an exploration of individuals' perceptions of a phenomenon so that the researcher can discover and explain the meanings (Merriam & Tisdell, 2016). Specifically, this descriptive study allowed the researcher to explore the issues defined in the problem statement, which addressed how it was not known how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of the clinical instructor and practitioner to provide targeted practice and effective feedback.

Data sources for this study included interviews, a two-part questionnaire. The first portion of the questionnaire included closed-ended questions to gather pertinent demographic information for this study to include only the state that the student's

educational institution was located and the number of clinical semesters that students had attended. The second portion of the questionnaire included three general, open-ended questions to gain insight into participants' perceptions of how they best learn. Interview questions solicited more detailed and comprehensive information to further relate to the research questions. Data analysis procedures were discussed in detail. The concept of trustworthiness was addressed to verify the study's worth as well as ethical considerations to ensure the protection of participants. Chapter 4 will present the data analysis and a discussion of results. Specifically, the chapter will discuss how data was analyzed. Specific data will be provided for the participants in the questionnaire and interviews.

Chapter 4: Data Analysis and Results

Introduction

The purpose of this qualitative descriptive study was to investigate how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. This exploration was geared toward clinical instructors and practitioners (staff radiologic technologists) to gain insight into students' perceptions of how to better facilitate student learning in the clinical environment. Enhancing the clinical education process may, in turn, enhance patients' healthcare. The researcher conducted a qualitative descriptive study using an online questionnaire and semi-structured face-to-face interviews to gather data to answer the research questions.

The general population for this study was radiologic technology students from JRCERT accredited programs in the United States. The target population was composed of radiologic technology students from three JRCERT accredited programs in New Jersey and one in New York. The sample population included students in the second year of their education from three programs in New Jersey and one in New York, to include 33 respondents for the questionnaire and from those individuals, 12 participants for the interview. Descriptive statistics involved only the number of completed plus in-progress semesters and the state in which the student's educational institution was located. To ensure substantive clinical education experience, note that the number of completed/in-progress semesters was important as it verified that students were in the second year of a two-year program.

The research questions addressed the phenomenon of students' perceptions of their ability to learn based on their perception of the clinical instructors' and practitioners' ability to provide targeted practice and effective feedback. They are as follows:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?

This chapter will provide an overview of the results of the study including descriptive statistics and a profile of the sample. Also included will be the data analysis procedures and the results of the data analyses. The chapter will conclude with a summary of the results of this study.

Descriptive Findings

The specifics of the data collected as well as the characteristics of the purposive sample will be discussed in this section. Demographic descriptive data were gathered in the first section of the questionnaire which was administered through SurveyMonkey®, an online survey development software. Participants for this study included second-year radiologic technology students from JRCERT accredited programs in New Jersey and New York. Descriptive data included the state the participant's program was located and the total number of both completed plus current clinical semesters in which the student participated. The number of candidates invited for New Jersey was 67 and for New York, 31. As a result, a total of 98 second-year students were invited to participate through an

email sent by their respective program director composed of the link to the questionnaire. The number of clinical semesters participants completed was between three and four, with most participants in New Jersey having completed four semesters of clinical education, and the majority of respondents in New York, completing three semesters. Figure 3 below demonstrates this descriptive data.

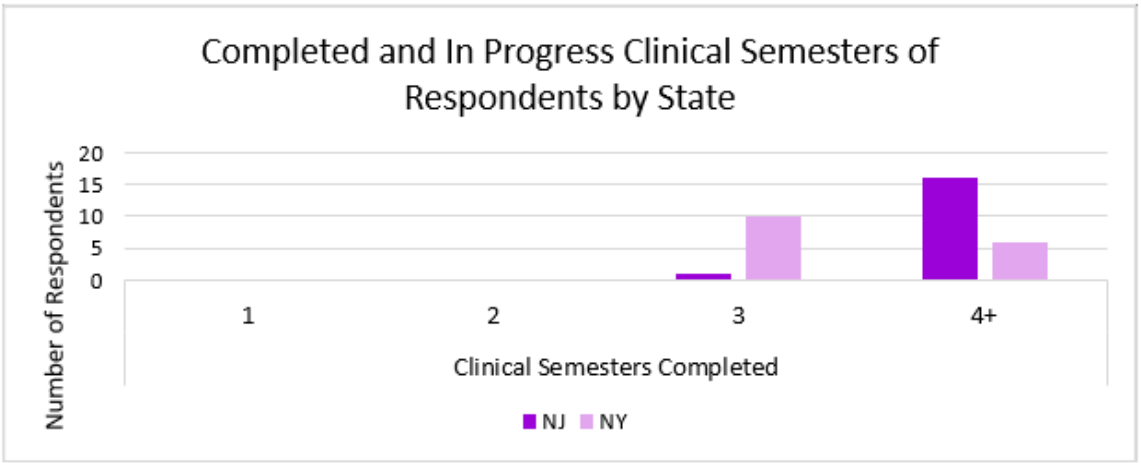

Figure 3. Completed Clinical Semesters and In Progress by State

There were two data sources used for this study, a questionnaire and face-to-face semi-structured interview. Table 1 describes the number of valid (completed) questionnaires by state.

Table 1.

Summary of Questionnaire Data

	Number of Valid Questionnaires
New Jersey	16
New York	17
Total	33

Table 2 collectively describes the number of interviews conducted, the duration of interviews, and the number of transcript pages. Table 3, which follows provides this information per participant.

Table 2.

Summary of Interview Data

	Number of Interviews	Duration of Interviews (Minutes)	Number of Transcript Pages (Single Spaced)
New Jersey	8	179	48.25
New York	4	99	26.75
Total	12	254	75

Table 3.

Summary of Interview Data Per Participant

Respondent	Duration of Interviews (Minutes)	Number of Transcript Pages (Single Spaced)
P1NJ	28.47	7.5
P2NJ	19.38	6.5
P3NJ	18.23	5.75
P4NJ	18.31	7.75
P5NJ	18.56	5.25
P6NJ	18.22	3.5
P7NJ	18.19	5.5
P8NY	23.19	10.5
P9NY	41.47	7.75
P10NY	15.58	3.75
P11NJ	15.54	6.5
P12NY	19.34	4.75

Data Analyses

The analytical approach for data analysis for this qualitative descriptive study was thematic analysis using qualitative questionnaires and semi-structured interviews as data sources. Thematic analysis was used as the method to analyze data from the questionnaires and interviews using steps described by Braun and Clark (2006).

According to Braun and Clarke (2006), Thematic analysis can furnish an abundant, comprehensive, and intricate description of the data received. Braun and Clarke identified steps to describe the thematic analysis process. These steps essentially involved coding and categorizing to be followed by the identification of themes from the data and were all applied to the following research questions:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback.

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback.

Specifically, the six steps suggested by Braun and Clarke (2006) which are used to describe the thematic analysis process for this study are as follows: 1) Become familiar with the data, 2) Code data, 3) Seek to discover patterns and themes, 4) Review identified themes to verify their relevance to the research questions, 5) Provide specific meanings to themes and closely identify these themes to specific relatable segments of data, 6) Describe results.

Preparation of raw data for analysis. After data collection was completed for the questionnaires administered through SurveyMonkey®, responses related to the research questions were exported to MAXQDA. The researcher first manually transferred data from the open-ended questions from the SurveyMonkey® questionnaire into a Word document and then exported the document to MAXQDA to begin the coding process.

As interviews were completed, the video/audio files were sent to Trint.com, an automated transcription software, for transcription. Transcripts were then downloaded into a Word document at which point the researcher compared the transcript with the audio file for accuracy. Once accuracy was achieved, the transcripts were imported into MAXQDA along with the questionnaire transcripts. Once exported into MAXQDA, all data was organized through the creation of a research database file. This file was subdivided into folders of data obtained through questionnaires and interviews. Data was then further broken up to reflect to separate folders, one to relate to the clinical instructor and the other to the practitioner to begin the coding process. The steps describing this process, using Braun and Clarke's six steps to thematic analysis, are noted below:

Step 1: Familiarization with the data. The first step was to become familiar with the data. This step is where the researcher truly begins to understand the data by becoming absorbed and engrossed in its contents. For this study, the researcher looked, first, to participants' replies to the open-ended questions in the questionnaire and then to the transcripts from the interviews (Braun & Clarke, 2006). The questionnaire was given through SurveyMonkey®, so the researcher was able to easily acquire the data. The interviews were transcribed through a speech-to-text software application, Trint.com, that uses artificial intelligence to automatically transcribe the data. By reviewing every transcript for accuracy by comparing them to the recordings, the researcher became more acquainted with the interview data. The actual coding process occurred in the second step through MAXQDA, a tool used to aid in data analysis and will be discussed in step two below.

Step 2: Assignment of preliminary codes. Both the document composed from the questionnaire and the transcripts from the interviews were imported into MAXQDA for coding. It was there that the second step occurred, the assignment of preliminary codes to now obtain a more comprehensive involvement with the data (Braun & Clarke, 2006; Braun, Clarke, Hayfield, & Terry, 2019). Coding was initially performed by the researcher by reviewing all data, questionnaires, and individual interview transcripts, line by line to assign a label to words or groups of text (Kuckartz, 2014). Text that was not related to the research questions was not labeled. Through coding, a word or a short phrase is assigned to a set of information obtained from the data (Saldana & Omasta, 2018). For this study, the researcher used open coding. For open coding, the researcher assigned words or a phrase to describe the codes (Hayes & Singh, 2012). From there, the codes were then put into categories, using the axial coding method. Here, with relevance to the research questions, codes were compared and those with similar data or patterns and were placed into labeled categories (Marshall and Rossman, 2016; Saldana & Omasta).

Similar codes can be identified in both the interviews and the questionnaires as well as across both research questions. For example, the most prevalent codes, occurring in both the questionnaires and interviews are clinical instructor yells at students and clinical instructor is disrespectful. Regarding the practitioner, the most prevalent codes, occurring in both the questionnaires and interview are practitioner being willing to teach and practitioner allows a student to practice independently, practitioner will not allow a student to practice procedures, practitioner rushes student through the practice of procedures, practitioner yells at students. and practitioner disrespects students.

Step 3: Discovering patterns and themes from codes and categories. In the third step in the thematic analysis process, the researcher then sought to first discover patterns and then themes from the codes and categories being sure to ascertain their relevance to the research questions to determine which data would be best to answer the questions (Braun & Clarke, 2006). Themes were then reviewed, defined, and named. According to Braun and Clarke (2006), by reporting a theme extracted from the data, the researcher then can explain the data abundantly. Through thematic analysis in this study, the reality of the experiences of the participants with the clinical instructors and practitioners were able to be accounted for in a true manner (Braun & Clarke).

In searching for themes in this manner, the researcher was able to grasp the importance of the data related to the research questions (Braun & Clarke). Since codes were related to either student learning through targeted practice and effective feedback, interpersonal skills of the clinical instructor and practitioner, and opportunities provided by both for the independent practice of procedures, categories were developed, as such. For example, some categories were labeled “student learning from the clinical instructor (or practitioner), positive and negative interpersonal skills of the clinical instructor (or practitioner), and independent learning allowed from the clinical instructor (or practitioner). Table 4 demonstrates themes and their relationship to the research questions and will be discussed further concerning both research questions.

Table 4.

Themes and their relationship to the research questions.

Research Questions	Themes	Description of Themes
RQ_1 How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?	Theme 1: Students perceive the ability of the clinical instructor to provide targeted practice and administer effective feedback as very impactful to the clinical education process.	For learning to occur, clinical instructors must demonstrate procedures followed by using targeted practice opportunities. Reviewing students' performance and resultant radiographic images to provide effective feedback also aids in the learning process.
	Theme 2: Interpersonal skills of the clinical instructor while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner.	Learning is impacted in either a negative or positive manner by clinical instructors. Students want to be respected. For example, students are negatively impacted when reprimanded in front of others by clinical instructors.
	Theme 3: Students desire more opportunities for targeted practice that can be performed independently with no interference from the clinical instructor yet followed by effective feedback.	The availability of independent practice is important to students. They believe that independent practice opportunities are scarce as clinical instructors are not providing opportunities for students to practice procedures completely on their own.
RQ_2 How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?	Theme 4: Students perceive the ability of practitioners to provide targeted practice and administer effective feedback as very impactful to the clinical education process.	Positive learning for students occurs when practitioners are willing to allow the students to work closely with them by providing practice opportunities, being willing to teach and provide feedback. However, from a negative standpoint, students feel that practitioners who are not willing to teach in terms of answering students' questions, and those that do not permit students the opportunity to correct their own mistakes.
	Theme 5: Interpersonal skills of practitioners while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner.	Positive interpersonal skills include practitioners with a welcoming personality and those who understand that mistakes will be made by students. Negative interpersonal skills encompass those practitioners that exhibit no interest in students and as such, are not helpful, nor available to them. Other negative aspects include students' perception of a lack of respect and being made to feel incompetent. In addition, being reprimanded, especially in front of the patient and a practitioner who is not helpful are also negative aspects.
	Theme 6: Students desire more opportunities for targeted practice that can be performed independently with no interference from practitioners yet followed by effective feedback.	Students want to be permitted to practice procedures independently rather than just watching practitioners or instances where practitioners allow students to practice but then take over the procedure.

Step 4: Reviewing themes. For the fourth step in this practice of thematic analysis, the researcher further reviewed themes to ascertain their relevance to the research questions, which involved students' perception of their ability to learn based on their perception of the clinical instructor and practitioners' ability to provide practice and feedback (Braun & Clarke, 2006). Specifically, inductive thematic analysis, which involves the use of the data received directly from participants for coding, categorizing and discovering patterns, was used for this study (Kuckartz, 2014; Patton, 2015). Inductive analysis differs from deductive analysis which uses empirical data, thus, theories already in existence (Kuckartz, 2014). For this study, inductive analysis was chosen. It was best since this study's design is descriptive and the inductive method, uses the data, itself, to allow for more desirable comprehension, enabling a better approach to analyze respondents' rich descriptions of the phenomenon being researched (Hayes & Singh, 2012).

Step 5: Define and name themes. In step five, a review of the themes occurred to not only give specific meaning to them but to finalize and closely identify the themes with the specific parts of the data in which they are most relevant to be sure that they relate to the research questions.

Step 6: Production of a report. In this step, the production of a report is described below in the Results section.

Results

The researcher identified themes that materialized from the combination of the data sources and align with the research questions. The research questions for this qualitative descriptive study are:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?

The findings for this study are formulated by the research questions and the themes associated with each question. The themes were noted across both data sources which included the questionnaire and semi-structured interviews. The codebook can be found in the appendix (Appendix P).

Research question 1. The first research question was: How do students perceive their ability to learn based on their perception of the ability of the clinical instructor to provide targeted practice and effective feedback? Through analysis of the open-ended questions of the questionnaire and semi-structured interviews three themes were developed. These themes relate to the degree of impact of the provision of targeted practice and effective feedback from the clinical instructor, interpersonal skills of the clinical instructor, and students' availability from the clinical instructor for independent practice. Coding to arrive at themes for this research question involved combining responses dealing with how students best learn from the clinical instructor.

Theme 1: Students perceive the ability of the clinical instructor to provide targeted practice and administer effective feedback as very impactful to the clinical education process. Students learn best from a clinical instructor who is knowledgeable, challenges and guides them and one who does not just explain but demonstrates

procedures in a hands-on manner. Questionnaire findings demonstrated that students best learned from a clinical instructor who at first practiced procedures along with them. Participant Q12 stated,

> Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right...this just made me feel more confident in my skills.

Providing feedback is just as beneficial to students. Participant P7NJ stated,

> They look at the images to see if there are ways that I can improve them. If I can make it better next time, they teach us and expand on what we need to do so that we can give the radiologists what they need to see.

Conversely, little or no feedback from the clinical instructor can be frustrating to a student. Participant P5NJ described an ideal, preferred situation, "I would like them to look at those exams a little more. You know…pop in on me while I'm doing the exams…just to let me know I'm getting better and better."

Theme 2: Interpersonal skills of the clinical instructor while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner. The interpersonal skills of a clinical instructor are also important to student learning. Poor or negative interpersonal skills, for example, a demeanor that is not conducive to student learning can deter a student's progress. According to respondents these skills include being rude and intimidating and yelling at students, and finally, not making the students the top priority or ignoring them by not being available or approachable. Participant P1NJ described the intimidation perceived by stating, "I mean I understand what I did wrong, but it was how she said it to me that made me feel horrible.

Like, you know, like I don't *belong* here. I don't *deserve* to be here, just like that." A feeling of being ignored was being perceived by P7NJ,

> I feel like sometimes I can see them getting like aggravated or like annoyed. You ask them a certain question when they're in conversation with somebody from the hospital that they know and I feel like sometimes if their student is asking a question or a student wants help doing something, I feel like that should be their number one priority rather than a conversation they had about going out to eat last week or going out for a drink or whatever, you know?"

From a positive outlook, clinical instructors that demonstrate tough love, are caring and patient, approachable, and available, all with a relaxed demeanor enhance student learning. In terms of tough love, participant P12NY stated, "I like that are strict about certain things because I prefer structure." Those that are caring and patient also make a difference according to participant P9NY who stated, "They don't get mad if you keep asking the same questions. That's very important…because we're students…we're going to keep asking the same questions."

Theme 3: Students desire more opportunities for targeted practice that can be performed independently with no interference from the clinical instructor yet followed by effective feedback. It was found that how students best learn, or do not learn, relied heavily on not just being able to practice procedures *with* the instructor but being allowed to work independently, even if under direct supervision. Students' comments reflected a positive perception of being able to attempt a procedure on their own to truly understand and learn. Participant P5NJ explained, "She let me do everything. She never, like, interrupted me, never like tried to jump in and say, don't do it this way or no, you're doing

this wrong. Not at that moment, but after the exam was completed." This participant went on to say, "…she'll give me some advice. But she never, interrupted me at all unless she had to." This description was concurred by participant P1NJ who stated, "The clinical instructor just let me do it my way." Participant P10NY described their likes and dislikes concerning being able to practice independently with the clinical instructor,

> The ones that say to me like, no…no you watch me. If you watch me you will know what to do. For me…no…I don't like that. It's best to let me do it and then when I am finished, come in and make any necessary corrections. That's what works best for me.

Summary of research question 1. The following themes, all related to the clinical instructor, were identified in answering the first research question: Learning and feedback, interpersonal skills, and the availability of independent practice. All three themes, in one way or another, describe the impact, either positive or negative, on students' perception of their ability to learn based on their perception of the ability of the clinical instructor to provide targeted practice and effective feedback in the clinical setting. The most prevalent factors were the clinical instructor's ability to work with students to improve their performance, students need to be treated respectfully and having a clinical instructor who sees the students as their top priority. Finally, feedback, when given and available, was very much a part of the learning process for students.

Research question 2. The second research question was: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback? Similar to the themes discussed relating to the first research question, the following three themes concerning the

practitioner, also reference the degree of the impact regarding the provision of targeted practice and effective feedback and the practitioner's interpersonal skills, in addition to students being given opportunities for independent practice.

Theme 4: Students perceive the ability of practitioners to provide targeted practice and administer effective feedback as very impactful to the clinical education process. Participants' comments regarding learning and feedback appeared to be more prevalent when referencing the practitioner as compared to the clinical instructor. There were many comments concerning both positive and negative aspects concerning students' perception of their ability to learn based on the ability of the practitioner to provide targeted practice and effective feedback. For example, some positive comments can be noted in the responses to the question concerning practitioners that helped students learn the most. Participant P5NJ had this to say:

> …but one, in particular, is really good. Anything you ask him or (if you) ask him for any help or any assistance he tends to explain to you and then why they do it that way… and then he shows you so that you remember for next time. He never gets irritated with questions.

This perception of successful learning was concurred by participant P10NY who stated:

> It is with a technologist who knows what they are doing and will explain everything to you. One that is opened to helping students…(they) don't have to help us…one that cares about the students, cares about the patients, and still reading and learning.

Having a knowledgeable technologist was also mentioned as a catalyst for learning by several other participants. For example, participant P7NJ had this to say:

> Like, during surgery, he'll point to the monitor and explain to me why this line is going a certain way or like why they're doing something or why they're cutting or removing something. He has a lot of knowledge on the way things should be done.

Participant P8NY stated,

> The technologists that I learned the most from, are those that I've observed multiple times. Like one or two times at least before doing a case with them…where you can see that they obviously know what they're doing and that they are doing it correctly. They're getting good looking images. So, I again sort of like respect for their work and their way of doing things.

Conversely, from a negative aspect, participants pointed out several instances of not being able to learn from practitioners. One of these instances of negative learning regard the practitioners' unwillingness to allow students to even attempt to practice procedures along with them. For example, participant P9NY stated, "They would just say, sit there and don't touch anything. It's frustrating because I'm here. I could at least get you the patient and bring them into the room." Along the same line, participant P7NJ explained,

> They just did the whole thing as I just stood there. I feel like they have to understand that students need the opportunities to finish exams. I understand it could get slow (slow them down) …but that's just a part of the whole (learning) process.

Participant P3NJ explained their frustration with the inability to learn from a practitioner by not being allowed to practice procedures on patients, “He doesn't let us practice, doesn't really let us touch the patient. He’ll teach us everything. He'll say, you should do it this way…you should do it that way, but never lets us do anything. No hand on, hands-on. And, again, I can't learn that way.”

Practitioner availability is another aspect of learning important to students. Participant P8NY puts it succinctly, “...they are there if I need them.” Participant P5NY explained,

> So, this tech would always be around, but he wouldn't be breathing on your neck. Some other techs do, but he would actually say no, do it this way instead, or you're doing this wrong. He would also say things like I know you've passed this but let me help you get better. He would always help me a lot when it came to that.

Feedback from the practitioner is valued by students as evidenced by participant P3NJ’s reflection,

> I get feedback…but I think the best feedback is them telling me that I did an amazing job and I did it good. No repeats and I just feel good about myself. So, the techs give a lot of good feedback and feedback where it's needed.

Opposite from this, though, participant PP5NJ states, “I mean, sometimes they would do it (give feedback) but I would like more.” and participant P6NJ explained, “No. No, they don't (give feedback). They're not really reviewing with you. It's like you take the image then on to the next one.”

Theme 5: Interpersonal skills of practitioners while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner. A practitioner's interpersonal skills can be an asset or a deterrent to the students' perception of their ability to learn in the clinical environment. A practitioner with a welcoming personality is appreciated and desired by students. This is evident by the statement by participant P8NJ when asked about those practitioners most enjoyed working with,

"He has a really good personality. I think that's what it is. Very open and welcoming. He would say and here's your patient, not his patient, my patient. Then he would say now you do it, okay?" Similarly, participant P8NY admitted, "There are certain technologists that I've really bonded with who have really helped me." Participant P9NY took the time to explain,

> …most of them when I really sit down and talk to them…they love their job and they're good people. You know, they have compassion. I just feel like the people that have really helped me had that trait…they like their job. They like to help people and they're nice enough that they do what they can to accommodate the patient. You don't always see that.

Conversely, many students experienced working with practitioners whose interpersonal skills were perceived to be sub-par. This could be seen in practitioners who students perceive to have little or interest in them. Participant P7NY explains, "I just feel like sometimes they just want to do the cases and not deal with students so they can just have easier workday" and participant P10NY relates, "Well, I've heard some

technologists feel that students are going to take their job. Some want nothing to do with students. Some do not even talk to us." Yet another participant, P12NJ explained,

> I just felt like I was isolated as far as his interaction with me. Anytime I would make a mistake or wasn't sure about something, he would be very condescending towards me or just put me down as far as my images. I felt like it was a personal jab towards me. It was very embarrassing. That's just unnecessary.

A common topic from participants regarding practitioners' interpersonal skills was the mention, from several participants, of being "yelled at." Participant P8NY remembered an incident his first week in the clinical learning environment when he wasn't moving fast enough for a practitioner,

> Don't yell at me like from at the control panel when I'm in front of the patient. That's what broke me that first week. I didn't want to go back and it was sad because it was like he scarred me and I didn't want to go through that again.

He later went on to say, "When someone is yelling at you, even if what they are saying is right, it just gets me flustered and it doesn't really stick with me." Participant P9NY relayed a similar incident when he admittedly froze when positioning a patient, "The technologist started treating me and talking verbally to me in a really bad way. I moved on from it but I didn't appreciate being treated that way. They shouldn't treat anyone like that. If you don't want to teach us, then tell your boss you don't want to be with students. According to participant P8NY, an alternative to being yelled at, especially in front of the patient, is where the practitioner,

> …could make subtle suggestions of how I can improve rather than embarrassing me in front of the patient by yelling at me. They could just quietly tell me about the mistake so I could go back and quietly correct it.

Theme 6: Students desire more opportunities for targeted practice that can be performed independently with no interference from practitioners yet followed by effective feedback. Based on participants' responses, being able to perform procedures independently allows students a self-assessment of their technical ability in the clinical learning environment. Without independent practice, the perception by students is that they never really know if their performance is completely acceptable. Participant P6NJ further explained, "Well, if I make a mistake, they can take over. Okay. So, you're done. That's it. You get one chance and that's it." Participant P11NJ discusses their frustration,

> There is a technologist that corrects everything you do as you are doing it. He repositions your patient, reconfigures the control panel, etc. So, in the end, if the image is not good, you don't know if it was something you did because you really didn't do it completely because the technologist adjusted everything I did.

Several participants discussed the advantages of being able to practice independently and their appreciation for being able to do so. Participant P5NJ explained that the confidence that the practitioner has in the student is helpful. He goes on to say,

> I am always concerned because patients…come in different shapes and sizes and sometimes I have some difficulty positioning them. So, that is why I would ask them to check me, but they just say go ahead and take the exposure. It's like they really trust me. And then the image will come out.

Participant P8NY described how just having the practitioner around was comforting. He put across his ideal situation for independent practice,

> What I enjoy is when they kind of look in the room to see what I'm doing and can maybe catch any errors that could be corrected in real-time. They would allow me to (position the patient) …they wouldn't necessarily correct it. I think the best thing I like is when they sit back and they let me do a case by myself. Even though they're observing, they're seeing what I'm doing. They allow me to do my own thought process.

This preference was similar to participant P3NJ who commented, "…he (the practitioner) would stand off to the side and I'd position. Then, he'd come over and check. He would say it was good or recommend something to me to make it better. He wouldn't physically show me but would recommend it to me and then let me physically do it."

Summary of research question 2. The following themes, all related to the practitioner, were identified in answering the second research question. As with the case with the first research question, all three themes describe the impact, either positive or negative, on students' perception of their ability to learn based on the ability of the practitioner to provide targeted practice and effective feedback in the clinical setting.

The most prevalent factor was a need for the practitioners to have the desire to want work with students on a day-to-day basis so that students can first observe the practitioner and then work together so that the student can learn and do so with sufficient feedback. As noted in the previous discussion concerning the first research question, feedback, when given and available, was essential. Another important factor is for practitioners to have an understanding of the students' eagerness, to work independently

under the practitioners' watchful eye. Finally, the practitioner must be aware of how their demeanor affects student learning in terms of how they are treated and respected.

Unexpected findings. The researcher identified two unexpected findings. The first was related to both the first and second themes relating to the first research question. These themes described the impact of clinical instructors concerning their ability of the clinical instructor to provide targeted practice and administer effective feedback and to the impact of clinical instructors' interpersonal skills on learning.

Typically, the clinical instructor is an advocate for the student. The clinical instructor's role differs from that of the practitioner as he or she is required to be cognizant of the goals of the educational institution, maintain an understanding of the objectives and the clinical evaluation process of the students' clinical rotation, and be aware of the clinical level of each student (Joint Review Committee on Education in Radiologic Technology, 2018). In the case of this study, an unexpected finding revealed that some clinical instructors were not acting in this capacity as described in students' comments in terms of not providing targeted practice or effective feedback in addition to exhibiting negatively perceived interpersonal skills.

The second unexpected finding was related to the third theme, the availability of independent practice, and was found to be present as a factor for both research questions involving the clinical instructor and the practitioner. The researcher found that the students lacked opportunities for unassisted practice of procedures. Both clinical instructors and practitioners did not allow or permit enough independent practice for students to be able to self-assess. Both unexpected findings and implications for further research on these topics will be further discussed in Chapter 5.

Summary

In Chapter 4 the researcher presented the findings to answer the two research questions. The purpose of this qualitative descriptive study was to explore how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The research questions addressed the phenomenon of how second-year radiologic technology students perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners to provide targeted practice and effective feedback. They are as follows:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?

The researcher used two data sources, an online questionnaire and semi-structured face-to-face interviews to gather data to answer the research questions. Questionnaires were administered through SurveyMonkey®, an online survey tool and all but one of the semi-structured interviews were in a face-to-face format. Interviews were transcribed through Trint.com, an online transcription service. Transcribed interviews were reread several times and compared with the audio files. The coding of all data sources was used for the analysis of data through MAXQDA software.

Summary of themes. There was a total of six themes combined for both research questions. Appendix N demonstrates a sample of quotations by data source and code for each of the six themes. Limitations were primarily due to the decrease in the sample size due to attrition and the lack of participation in the questionnaire due to incomplete submissions. In addition, due to the low number of completed questionnaire responses, interview participants were not chosen based on responses to open-ended questions, but rather all those who volunteered were selected to meet the minimum number of interviews stated in Chapter 3.

Chapter 5: Summary, Conclusions, and Recommendations

Introduction and Summary of Study

Radiologic technologists, certified by the American Registry of Radiologic Technologists, are medical professionals who play a vital and essential role in healthcare in the United States. Technologists perform diagnostic medical imaging procedures (x-rays) such as orthopedic exams, for diagnosis by a radiologist, a medical doctor who specializes in the interpretation of medical images (ASRT, 2018). The purpose of this qualitative descriptive study was to investigate how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback.

The educational environment for radiologic technology students includes a *didactic* (classroom) and *clinical* (radiology department or medical imaging center) setting. The *didactic* setting is where the academic content of the curriculum (anatomy, positioning procedures, patient care, radiation protection, and equipment operation) is taught in the classroom. The *clinical* setting of the curriculum is where didactic knowledge is brought into practice, where students can perfect their skills through experience and eventual assessment (ASRT, 2018). Therefore, this study was important because the clinical setting is a primary component of the students' education in as much as it provides students the opportunity to advance and cultivate their skills to develop proficiency. Furthermore, it is the clinical instructor and the practitioner who are the primary individuals who influence student learning and understanding in the clinical learning environment (ASRT & AEIRS, 1992).

The sample population for this study was radiologic technology students in their second year of study from four institutions located in New Jersey and New York. A qualitative methodology was used for this study. This methodology was selected because it allowed for a detailed examination of a phenomenon as it existed (Yin, 2016). The researcher chose a descriptive design for this qualitative research so that the study's phenomenon could be explored as it naturally existed (Holly, 2019; Sandelowski, 2000).

The phenomenon for this study was how second-year radiologic technology students in New Jersey and New York perceive their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The researcher identified gaps in the research involving the knowledge, skills, and training of both clinical instructors and practitioners, how the practitioner is used by students as a resource, and the provision and impact of the feedback given by clinical instructors and practitioners. This qualitative descriptive study was designed to address those gaps through data collection involving questionnaires and semi-structured face-to-face interviews. The researcher collected data using a questionnaire and semi-structured interviews.

The questionnaire served two purposes. First, participants were asked to provide demographic information to include the total number of semesters that were completed and in-progress in addition to the identification of the state where the participants' educational institution was located. Secondly, the questionnaire included three general open-ended questions relating to the students' thoughts and feelings on how the learning environment influenced their ability to learn. This enabled the process of open coding

that was used for this study (Bloomberg & Volpe, 2016). The second data source, semi-structured interviews included questions based on topics revealed in prior research as identified in the literature review and related to both research questions.

The research questions that guided this study were as follows:

RQ1: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

RQ2: How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback?

Summary. The remainder of this chapter will include a summary of findings and conclusions developed from this research. In addition, theoretical, practical, and future implications will be discussed in addition to the study's strengths and weaknesses. The chapter will conclude with recommendations for further research and future practice.

Summary of Findings and Conclusion

The purpose of this qualitative descriptive study was to examine how second-year radiologic technology students in New Jersey and New York perceived their ability to learn based on their perception of the ability of clinical instructors and practitioners (staff radiologic technologists) to provide targeted practice and effective feedback. The study was conducted based on the following research questions:

Research question 1. How do students perceive their ability to learn based on their perception of the ability of clinical instructors to provide targeted practice and effective feedback? In the clinical learning environment, students learn by practicing

radiographic procedures on actual patients (Knight, 2018). According to the JRCERT (2018b), the radiologic technology clinical instructor is responsible for the supervision, education, and assessment of students in the clinical learning environment. In addition, the clinical instructor is expected to understand the goals of the educational institution, and to be knowledgeable of all aspects regarding the profession (JRCERT, 2018b).

For clinical instructors to be effective, they must guide students through clinical procedures through mentoring, by helping students develop critical thinking skills (Mason, 2016; Perram et al., 2016). This should be accomplished through targeted practice and effective feedback and most importantly, ensuring that practice, thus clinical competency opportunities, occurs by overseeing the day-to-day clinical learning while students are with practitioners (Glynn et al., 2017). In addition, clinical instructors' interpersonal skills are impactful to the student. Clinical instructors can create a caring environment by supporting students through their purposeful presence, deliver feedback, help students gain confidence, and keep order in the clinical process **(**Banon & Elsharkawy, 2017). The following paragraphs identify themes established for this study based on this first research question.

Theme 1: Students perceive the ability of the clinical instructor to provide targeted practice and administer effective feedback as very impactful to the clinical education process. Clinical instructors' teaching skills rely, in part, on their technical knowledge and competence (Ingrassia, 2011). As stated in chapter 2, in radiologic technology, clinical instructors are initially chosen by program officials based on their technical skills, and not necessarily because of educational expertise or ability (Giordano, 2008). Initially, there is no educational requirement for the position other than

certification by the American Registry of Radiologic Technologists (ARRT) (Giordano & Harris, 2012). As a result, to start, many clinical instructors learn on the job and through professional development opportunities which are later required by the accreditation agency (JRCERT, 2018b). Overall, this study demonstrated that positive learning for students occurs when the clinical instructor is willing to allow the student to work closely with them by allowing them practice opportunities and by being willing to teach them and provide feedback. However, from a negative standpoint, students indicated that some clinical instructors were not willing to teach in terms of being amenable to letting students ask questions, giving them opportunities to practice procedures, and not providing students the opportunity to correct their own mistakes.

Many participants in this study revealed that it was important that the clinical instructor be there to challenge and guide students by encouraging and sometimes even talking students through procedures. One participant stated,

> **…** the clinical instructors that I like are the ones that make me think…the ones that kind of don't just say good job. And they talk to you…they challenge. They ask me these questions that I don't know the answers to a lot of the time. And they kind of help me get there without giving me the answer.

Participants also discussed the importance of a clinical instructor who not only explains things to them but demonstrates, as well. One participant explained,

> Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skill.

Conversely, some respondents expressed dissatisfaction with a clinical instructor who did not demonstrate procedures to them. For example, one participant stated, “They don't really demonstrate. I feel like in this business you need to see it.” Finally, a clinical instructor who is knowledgeable, is quite helpful, especially by assuring that the theory taught in the classroom carries over to the clinical learning environment. Respondents prefer a clinical who knows and uses proper procedures of the positioning of exams equivalent to what is taught in the classroom. From a negative perspective, regarding a clinical instructor who wasn’t aware of what students were being taught, one participant stated, “They question everything I am doing…like, why are you doing this…you are supposed to do it this way…stuff like that.” On the contrary, another participant responded. “I like it when they're knowledgeable and know what they're talking about. I feel like I've had maybe two clinical instructors that have really given you kind of more than just a textbook answer on what's going on.”

According to EL Banon and Elsharkawy (2017), one of the duties of an effective clinical instructor is to provide feedback. In Nolan and Loubier’s (2018) exploration of students’ acknowledgment of feedback, it was determined that feedback provided by the clinical instructor was highly regarded by students. The same can be said for participants in this study. Providing sufficient feedback to students in terms of performance and evaluation of radiographic images is a necessary responsibility of the clinical instructor (Mason, 2006; Nolan & Loubier, 2018). In terms of feedback from clinical instructors, participants were nearly evenly divided on whether they were getting a sufficient or insufficient amount from clinical instructors. Regarding obtaining sufficient feedback, one participant described the favorable process,

> They look at the images to see if there are ways that I can improve them. If I can make it better next time, they teach us and expand on what we need to do so that we can give the radiologists what they need to see.

Conversely, another respondent who felt they were not getting enough feedback explained his preference, "I would like them to look at those exams a little more. You know…pop in on me while I'm doing the exams…just to let me know I'm getting better and better."

Theme 2: Interpersonal skills of the clinical instructor while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner. Students appreciate positive interpersonal skills from a clinical instructor (Ramel & Martin, 2018). As such, clinical instructors should strive to develop a climate of compassion where students can feel comfortable interacting with clinical instructors who have a positive caring manner (Clawson & Curtis, 2018). It is vital to students' learning that clinical instructors recognize the importance of their ability to relate to the circumstances that clinical students experience (Clawson & Curtis, 2018). Overall, in this study, students discussed the impact of both positive and negative interpersonal skills of the practitioner. Positive interpersonal skills aid in learning and include a practitioner who is helpful, kind and one with whom the students feel they can bond. Students perceive that the negative interpersonal skills of a practitioner deter learning. These behaviors would include feelings of disrespect and being demeaned, being yelled at, rushed when performing a procedure, and a practitioner who is unprofessional.

Participants in this study valued a clinical instructor with positive interpersonal skills such as those with whom they felt comfortable and who was patient, caring, and motivational. For example, one participant communicated why a comfort level was important,

> I would like the clinical instructor to be someone that you can go to, like if you have an issue, like not necessarily with a case but with something that's affecting your learning. I prefer someone who I can feel comfortable enough to approach them and say this is what is going on or how I am feeling.

Students also preferred a clinical instructor who was approachable, available, and demonstrated tough love. A respondent discussed why being approachable was essential:

> I prefer somebody who has good balance between being a professional but also being someone who you can be open with and interact with on a more personal level. I might feel like certain questions may be looked at as dumb. But if the clinical instructor is friendly, but not that friendly, still professional…then it would be better.

In terms of why tough love was an attribute that was valued, one respondent succinctly explained, “She was tough. And she made me better. So, I appreciate that.”

Students identified clinical instructors with negative interpersonal skills as those who did not make the students their top priority by being unapproachable and not available and those who they perceived to be rude and intimidating in terms of being yelled at and disrespected. The latter was demonstrated in a study concerning the bullying of nursing students by clinical instructors (Luhanga, Puplampu, Arvidson, & Ogunade, 2020). Bullying, while not specifically stated as such by respondents in this current study,

was referred to as behavioral interactions where the student was being belittled or treated as unimportant. Interestingly, this study's findings revealed that the highest incidence of bully occurred from the clinical instructor (Luhanga et al., 2020).

Being unapproachable and not available was a common thread among participants. For instance, a respondent related their frustration over a clinical instructor not being there when needed, "Sometimes, he is like, not around when you need the help. I would say that that would be the worst…not being around. This participant discussed a clinical instructor who was both unavailable and unapproachable,

> The worst part (is) about a not being open to communication…to be able to tell you certain things or if I find I lack something…how am I going to let you know or how is the clinical instructor going to let me know if he or she doesn't see me.

Additional factors concerning negative interpersonal skills of clinical instructors were due to rudeness, intimidation, and disrespect, most often regarding how they were spoken to and mentioned several times by participants. For example, one participant had this to say when discussing a clinical instructor perceived to be both rude and intimidating,

> My worst interaction with a clinical instructor would be when I (tested with) this one instructor who would just look at the images, not say anything, and just walk away. And I'm like, okay…did I pass? Did I fail? Can you tell me what I did wrong? But that one was just, oh, you did something that I didn't like.
>
> Another respondent described this similar experience with a clinical instructor,
>
> …sometimes you would take an exposure and she would just kind of like stare at you and you are kind of waiting to hear feedback. And you are like, is this good?

You want me to repeat it or do you want me to go on to the next thing or what am I supposed to do next?

Finally, several participants discussed their displeasure of how they were spoken to, especially in front of patients. One participant *stated, "*I don't react good that way when they just yell at me like…yelling like loudly," and another explained,

> I don't learn very well being yelled at. I could do okay under pressure, but when you're yelling at me to do this, fix that, I can't do it…makes me forget…now, I look like an idiot in front of the patient.

Theme 3: Students desire more opportunities for targeted practice that can be performed independently with no interference from the clinical instructor yet followed by effective feedback. The availability of students to practice independently is a vital component to radiologic technology education, thus being a very important aspect to students, themselves (Mason, 2006). As stated in chapter two, the clinical learning environment is a setting for students to bring theory from the classroom into the clinical site to practice and refine their skills (Ghray, 2017; Skaalvik, Norman, & Henriksen, 2011). As the gatekeeper, the clinical instructor oversees and also provides independent practice opportunities for students to guarantee that competency testing requirements are available (Glynn, McVey, Wendt, & Russell, 2017).

The students' value in independent practice opportunities provided by the clinical instructor was demonstrated and evident in students' responses to research question one. Some respondents had this to say regarding the clinical instructor providing the opportunity for independent practice, "The best way to learn is to let me do it." and, "The

clinical instructor just let me do it my way." When discussing the ideal learning situation when being permitted to perform cases independently, one participant explained, "It's best to let me do it, and then when I am finished, come in and make any necessary corrections. That's what works best for me." Similarly, another responded, "...my best interaction with a clinical instructor---she would let me fix it—correct my mistake." However, not all participants were satisfied with the amount of independent practice available. A respondent expressed his dissatisfaction by stating,

> You can review the classroom information but there needs to be some practice. I don't learn from a clinical instructor that keeps on going over and over something but not actually getting any hands-on practice. In the clinical environment, I need to practice.

Research question 1 conclusions. Thematic analysis of research question one has revealed several conclusions. A clinical instructor's function is to guide students through the clinical component of radiography education. One way that this can be accomplished is through the provision of targeted practice opportunities and feedback (Fowler & Wilford, 2016; Nolan and Loubier, 2018). This research has revealed that students expect that the clinical instructor either provides or ensures that clinical learning opportunities are made available and met. Additionally, participants indicated that they wanted to be guided and challenged by clinical instructors. They perceived that they were able to learn more from a clinical instructor who not only explained but demonstrated procedures. Furthermore, participants conveyed that clinical instructors who they perceived as knowledgeable concerning the theory taught in the classroom was more advantageous. This helped to reduce any type of disparity between the classroom and the

clinical learning environment. Finally, receiving feedback was important. Many students were satisfied with the amount of feedback received by the clinical instructor, yet others felt that they were not getting enough.

Results of this study demonstrated that interpersonal skills were a major factor in the students' perception of their ability to learn from clinical instructors. Students in this study reported that they learned best from a clinical instructor who was helpful, kind, and caring. These attributes lead to an increased comfort level, meaning the clinical instructor was approachable and available to students. As a result, moments of tough love were appreciated rather than viewed as a learning deterrent. Those clinical instructors who exhibited a negative demeanor were perceived by respondents to hinder learning. This includes adverse personality aspects such as those who do not prioritize students' needs and those clinical instructors whose students felt were not approachable nor available.

Finally, independent practice opportunities were identified by students to be a viable, if not essential learning method. However, many respondents revealed that these occurrences were not always made available by the clinical instructor as much as they felt they should have been. Respondents were adamant about being able to perform procedures with no or very minimal assistance from the clinical instructor to obtain a true self-evaluation of their clinical ability.

Research question 2. How do students perceive their ability to learn based on their perception of the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback? While the clinical instructor's primary role, as discussed in the section above, is to ensure an overall positive clinical learning experience, the practitioner has the responsibility of maintaining an understanding of the

clinical competency system which includes the realization of student supervision and, most importantly, recognizing the importance of their support of the clinical education process (JRCERT, 2018b). In the clinical education environment, it is the practitioner with whom the student spends the most time in that setting and has been described as a primary resource for student knowledge (Shanahan, 2015). A compassionate relationship between the practitioner and student is necessary to strengthen clinical education (Ghrayeb, 2017). Amid the clinical learning process, it is expected that the practitioner and clinical instructor join forces to induce student learning and the attainment of clinical prowess (Phuma-Ngaiyaye, Bvumbwe, & Chipeta, 2017).

As with the clinical instructor, the practitioner's (staff radiologic technologist) role is described, in part, as one to champion the objectives of the students' clinical education, be cognizant of students' development, as well as accept the importance of the need for students to be supervised in the clinical learning environment (JRCERT, 2018b). It is important to students that the practitioner allows them the opportunity to first observe, then perform procedures together until competence is achieved for independent practice (ASRT & AEIRS, 1992). Overall, respondents in this study valued a practitioner who was willing to participate in their learning process by being willing to use their experience to guide and direct them.

Theme 4: Students perceive the ability of practitioners to provide targeted practice and administer effective feedback as very impactful to the clinical education process. Overall, for this study, positive aspects of student learning with a technologist include, first and foremost, being willing to teach. For example, one participant preferred situations where he could, "…work closely with the technologist with the opportunity of

observation and then taking care of patients with supervision." Another stated, "When the technologist takes the time to break down the steps they are taking and explain it to me while I'm actually performing the exam. It allowed me to do it myself in the right way." Finally, another respondent concurred by describing a teaching moment with the practitioner,

> So, the tech went through it step by step how to just even select the patient and go through the exam. And they would (go on to) explain that for this exam, we do it laying down because the radiologist likes it this way. It was like just the way that they explained things…and not in a demeaning way.

Other positive aspects noted by respondents in this study are being knowledgeable. One respondent described why a knowledgeable practitioner, due to experience is very helpful,

> I think that's one of the best learning opportunities that they can give to me experience-wise…we all look at the books and that's what we know to do. But if there's a trauma case that doesn't go by the book, because maybe a patient can't move their arm a certain way, the tech is (able) to explain to us what and why they are doing differently.

Likewise, another participant related this,

> I remember that this one time there was this really difficult case. I was with the technologist and he's showed me different things. He explained to us that sometimes what is in the book doesn't always work. He showed different ways of doing things…different modifications of positioning.

Respondents recounted several negative aspects that they perceived to have deterred learning from the practitioner. Many of these responses dealt with aspects such as the practitioners' disinterest in educating students or their lack of teaching skills. A participant stated, "The interaction with some technologists was quiet sometimes. Some of them do not have pedagogical skills and are not tolerant when students make mistakes, and their comments make you feel like you don't know anything.*"* Another participant described an incident with a practitioner by revealing this, "Another bad experience is when I had a chance to do something I've never done before. But the technologist didn't really have the patience to work with me and just took over the case."

> Practitioners' feedback was essential to students' learning. One respondent stated, "The technologists usually are the ones that initially are with you….so generally when you're doing a patient, even if the technologist isn't in the room with you, I still have to ask them to take a look at it. Immediately they'll look at it. They'll say if it was good or if I did something that could be improved.
>
> Feedback is welcomed as can been seen with this participant's statement,
>
> There are certain techs that are definitely better at being very critical, which is frustrating cause you're like, c'mon it looks perfect! They don't think so. That's good. I want them to tell me… like you had to move them over and it and it would've been more centered.

Another respondent implied that the positive feedback kept them motivated and confident,

> …and if something came up incorrectly positioned, they'll tell us. So, I get feedback that way… But I think the best feedback is them telling me that I did an

> amazing job, and I did it good. No repeats and I just feel good about myself. So, the techs give a lot of good feedback and feedback where it's needed.

However, not all participants responded favorably in terms of practitioners' feedback. When the respondent was asked if practitioners were providing sufficient feedback, the reply was,

> No. No, they don't. They're not really reviewing with you. It's like you take the image then on to the next one. Sometimes where they're by the computer and the image comes up right away, they tell you take the next one and you don't even get to see that image before you take the next one.

Another respondent had a similar experience and expressed frustration, "I feel like sometimes I wish they just took the time, like a couple minutes, and just answered some of the questions that the students had. I feel like that would be a lot better for everybody."

Theme 5: Interpersonal skills of practitioners while providing targeted practice and effective feedback can greatly affect student learning in either a positive or negative manner. According to Shanahan's (2015) exploration of students' learning in the clinical setting, experienced radiologic technologists are a resource to students. The responses present in the data for this study indicated that the interpersonal skills of these individuals can enhance or deter learning. Respondents referred to many aspects of interpersonal skills of practitioners in both a positive and negative manner. Positive aspects included a practitioner who had a welcoming personality, was helpful, understanding, and a practitioner with whom the student could bond. Conversely, negative aspects included practitioners who disrespected and yelled at (sometimes in

front of a patient during a procedure) students, those that had no interest in teaching students, and those who were unavailable to them.

Those practitioners who were perceived to have a welcoming personality made students feel like the practitioner wanted them around. For example, one respondent said this about one of the practitioners he worked with, “He has a really good personality. I think that's what it is. Very open and welcoming. He would say and here's your patient, not his patient, my patient. Then he would say now you do it, okay?”. Another participant had this to say about practitioners at a clinical site where he felt he learned,

> “…most of them, when I really sit down and talk to them…they love their job and they're good people. You know, they have compassion. I just feel like the people that have really helped me had that trait…they like their job. They like to help people and they're nice enough that they do what they can to accommodate the patient. You don’t always see that.”

Other participants discussed how important it was to them to have helpful practitioners. For example, one individual stated that one of his most memorable days was, “…when I worked with the best technologist, I have ever worked with so far. She’s kind and so helpful she showed me what it is to be a great tech.” Learning from a practitioner who was understanding was vital to some respondents. One individual explained that he was able to learn from both new and experienced practitioners but the important thing to keep in mind was that these practitioners

> …remembered where they came from…that they were a student at one point. They weren't always so great. So, they know that it's okay that you make mistakes. It’s better that they can work with me and catch a mistake before it’s too

> late it rather than yelling at me. So, it's better to have technologists who are more modest and willing to accept human error versus those that make you feel like there's something wrong with you.

As stated previously, negative aspects of practitioners' interpersonal skills mentioned by participants included practitioners who disrespected and spoke harshly to students, at times in front of a patient during a procedure, those that had no interest in teaching students and those who were unavailable to them. One participant explained his reaction to being spoken harshly to, **"**When (I) have someone who (I) feel is attacking (me, I) tend to like shut down. You're just like they're just going to yell for everything, so I'm not going to validate what they say." Another respondent explained, "When someone is yelling at you, even if what they are saying is right, it just gets me flustered, and (what I am trying to learn) doesn't really stick with me." Some participants stated that practitioners were speaking harshly to them in front of patients during a procedure. One individual described his feelings afterward,

> Don't yell at me like from at the control panel when I'm in front of the patient. That's what broke me that first week. I didn't want to go back and it was sad because it was like he scarred me and I didn't want to go through that again."

Another, described this incident,

> I was trying to position a patient, and I guess I froze. The technologist started treating me and talking verbally to me in a really bad way. I moved on from it, but I didn't appreciate being treated that way. They shouldn't treat anyone like that. If you don't want to teach us, then tell your boss you don't want to be with students.

Finally, a third participant discussed how he would have preferred the practitioner acted toward him,

> The technologist could make subtle suggestions of how I can improve rather than embarrassing me in front of the patient by yelling at me. They could just quietly tell me about the mistake so I could go back and quietly correct it.

Participants want to feel respected. One participant described his perception of disrespect in this manner,

> I just felt like I was isolated as far as his interaction with me. Anytime I would make a mistake or wasn't sure about something, he would be very condescending towards me or just put me down as far as my images. I felt like it was a personal jab towards me. It was very embarrassing. That's just unnecessary.

Another respondent described how he felt after working with a practitioner who he felt disrespected and the impact,

> It was like, after that day, I didn't want to work with that technologist because of the way he treated me. He made it seem like I didn't know what I was doing when I know for a fact, I was doing things right.

Some practitioners, respondents felt, had no interest in them or were unavailable. Participants who felt practitioners wanted no part in their clinical education stated the following, "I just feel like sometimes they just want to do the cases and not deal with students so they can just have easier workday." and, "I'm being ignored…they don't even care if I'm in the room.", and finally, "Well, I've heard some technologists feel that students are going to take their job. Some want nothing to do with students. Some do not

even talk to us.” Participants also discussed their perception of practitioners not being available,

> I feel like they get so annoyed sometimes that they have to get up to come over to the computer monitor and check (my images). Then sometimes they'll be like, oh, no, don't ask me, ask this person. Then that person will be like, oh, don't ask me. And then sometimes there's nobody there. So, the patient has to wait…

Another respondent relayed this example of unavailability of the practitioner,

> …maybe they're having a bad day and they hand me the requisition and they tell me to go get the patient and do the case. I sometimes have to remind them they have to be in the room because I just can’t do it without supervision, but they are just no, go just do it.

Theme 6: Students desire more opportunities for targeted practice that can be performed independently with no interference from practitioners yet followed by effective feedback. As stated in the section describing research question one, being able to perform procedures independently is greatly preferred by students. The responses from participants in the study not only indicated this preference but have also expressed a level of frustration if this need is not met. To radiologic technology students, independent practice describes their opportunities to perform a procedure with only minimal assistance from the practitioner, in addition to the student being able to correct their own mistakes, without the practitioner taking over. This participant’s description explains the following positive situation,

> …they allow us to do everything. They stand off to the side…. I'm thinking of this one specific person…he would stand off to the side and I'd position. Then, he'd

> come over and check. He would say it was good or recommend something to me to make it better. He wouldn't physically show me but would recommend it to me and then let me physically do it.

Another respondent described a satisfying situation, “I think like the best thing is when they sit back, and they let me do a case by myself. Even though they're observing, they're seeing what I'm doing. They allow me to do my own thought process.”

As described earlier, students have experienced negative situations regarding independent practice opportunities given by practitioners which they perceive as frustrating. For example, one respondent described a situation where he was refused the opportunity to perform a challenging procedure independently,

> So sometimes there are certain exams that I would like to do but they (the technologists) think it is going to be too complicated and would only let me do some of the case...I feel like they have to understand that students need the opportunities to finish exams. I understand I could get slow. But that's just a part of the whole process.

Research question 2 conclusions. The JRCERT, in their *Standards of Accreditation for an Accredited Educational Program in Radiography*, state that the radiologic technologist practitioner (clinical staff) is expected to be knowledgeable about the educational institutions’ policy regarding the clinical competency system and be aware of students’ supervision provision. The practitioner should also be cognizant of the progress of the student, in addition to the educational institutions’ general policies and procedures (JRCERT, 2018b). Finally, they should fully support the educational process.

The research in this study revealed several elements concerning the practitioners' impact on the students' clinical learning concerning their ability to teach and provide feedback.

In this study, in terms of learning through targeted practice and effective feedback, a practitioner who was willing to teach was an attribute, as perceived by many respondents, that enhanced their learning. Ideally, participants wanted to be able to first observe practitioners, then work together to perform the procedure, and finally, be able to perform a procedure independently under the practitioner's supervision. During the observation stage and even while working hand-in-hand participants welcomed any knowledge that could be imparted by the practitioner. They perceived that a practitioner's experience made her or him knowledgeable, which was extremely helpful to students. Nonetheless, not all practitioners were perceived by participants to be willing to teach. Some were perceived to be completely disinterested when working with students.

Practitioners who possessed a welcoming demeanor, meaning they were helpful and understanding, was appreciated in the learning process. Conversely, some participants described incidences of being disrespected, primarily by being spoken to harshly and at times in front of a patient. The availability of being afforded opportunities of independent practice, performing procedures on their own, was an important component to students learning. In this manner, respondents felt they were able to attain an accurate measurement of their skill level, which enabled an awareness of any needed improvements.

Summary of the relation of findings to the significance of the study and advancing scientific knowledge. This study aimed to add to the body of research to provide an understanding of which factors best enhanced the clinical education process. It

was hoped that this study would enhance the body of knowledge which was derived from prior studies concerning effective clinical learning (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). The anticipation for this research involved insight that could be provided for the focus of future training of the clinical instructor, and more so, for the practitioner. These research questions were intended to meet the gaps identified in the literature regarding both the clinical instructor and the practitioner. Gaps concerning the clinical instructor were related to this individual's knowledge and skills as well as their ability to provide feedback (Francis et al., 2016; Nolan & Loubier, 2018). Gaps concerning the practitioner were identified as their ability to provide targeted practice and effective feedback as well as how they were used as a resource by the student (Fowler & Wilford, 2016; Shanahan, 2015).

It is believed that this study identified a need for additional professional development opportunities for both clinical instructors and practitioners. For clinical instructors, more training is needed for an understanding of students' needs in terms of feedback and interpersonal skills, especially course climate, meaning how to incorporate a better, more comfortable learning environment between the student and the clinical instructor. For practitioners, who, according to Giordano (2008), typically receive very little or no training on teaching skills, professional development is needed to incorporate these skills and to provide an understanding to these individuals of their worth and, more importantly, their impact on the students' clinical education.

Implications

The implications of this research could greatly enhance the clinical education component of radiologic technology education regarding both clinical instructors and

practitioners. Relating to the themes revealed in this study, both groups of individuals must be aware of their responsibility to the student. This responsibility includes the realization of the heightened impact of their ability to provide targeted practice and administer effective feedback. Additionally, the clinical instructor and the practitioner must also be aware of how their interpersonal skills, during these practice opportunities and while providing feedback, can affect students' clinical learning experience in a positive or negative manner. Finally, all of the above should also include an understanding of the importance of students' desire for more opportunities for independent practice. The latter was an unexpected implication that arose in this research involving a lack of an eagerness of clinical instructors and practitioners to permit students to practice procedures in an autonomous, unconstrained matter.

Theoretical implications. Two theoretical foundations are the basis for the study of second-year radiologic technology students' perception of the clinical learning environment. The first of the theoretical frameworks is Lev Vygotsky's theory of the zone of proximal development. This theory refers to the difference between what a learner can accomplish with help and what can be accomplished without help. When relating the zone of proximal development to radiologic technology clinical education, this concept is the crux for clinical education in this profession and directly relates to themes one and three pertaining to clinical instructors and themes four and six, pertaining to practitioners, all which describe the impact of targeted practice and to what should eventually evolve into independent practice. To describe the process further, initially, the student learns various concepts in the classroom environment and then brings that theory from the classroom into the clinical setting. This occurs first by observation, then targeted

practice with the clinical instructor or the practitioner, and then, finally to where the student can practice with minimal assistance and later perform independently, relating to the above-mentioned themes. Conversely, many respondents felt they were ignored and therefore not able to partake in observation and practice opportunities. More crucially, by not being permitted the freedom of independent practice from either clinical instructors or practitioners, students did not perceive an ability to learn from either individual.

The second theoretical foundation portrayed in this study refers to Sternberg's triarchic theory of intelligence. This theory describes the adult learning phenomenon and comprises analytical creative and practical thinking. Essentially, this theory is in connection with establishing proficiency, which is the goal of the competency-based clinical education process in radiologic technology (Leggett, 2015). As noted in themes one, three, four and six, the research in this study, has demonstrated students' concern with achieving proficiency and competency through preliminary, then, later independent practice, the results demonstrate an even greater need for a focus on teaching through targeted practice and effective feedback skills for the clinical instructor and practitioner.

For students to better achieve their needed, and more importantly, desired goals of independent practice both clinical instructors and practitioners alike should be provided professional development opportunities. These opportunities should focus on methods to enhance teaching through targeted practice and effective feedback and to provide methods to improve interpersonal skills to provide these individuals with the consciousness of how their demeanor impacts learning, as well as a willingness to permit students to perform procedures independently. Overall, practitioners should be enlightened to how much they impact students' during the clinical experience.

Practical implications. Several practical implications emerged from the results of this study for both clinical instructors and practitioners that could help radiologic technology programs strengthen the clinical component of their curriculum. The utilization of these implications could benefit the clinical education of the radiologic technology student. These practical implications include overseeing targeted practice, providing additional feedback, improving interpersonal skills, and allowing students more independent practice, all of which are noted in the themes described in this study.

Based on the findings of this study as seen in themes one and four which depict clinical instructors and practitioners, respectively, opportunities should be made available to students to perform radiographic procedures learned in the classroom during their assigned clinical rotations. These opportunities may be precluded by the students' observation of the clinical instructor or practitioner to be followed by practice with one or the other as the student becomes more competent and then requires less supervision or assistance. Since clinical education in radiologic technology is competency-based, clinical instructors and practitioners must realize that targeted practice opportunities are sequential and should be scaffolded (ASRT & AEIRS, 1992; Leggett, 2015). This coincides with the themes three and six which identify students need for additional opportunities to practice independently. For example, the practice becomes targeted when a student is first able to observe a procedure being performed, to then move on to practice along with the clinical instructor or practitioner, and then continue to practice with less and less direct supervision until competency is achieved and documented through a summative evaluation. Findings in this research demonstrated that both clinical

instructors and practitioners need to be more aware of the importance of this component of clinical education.

In terms of providing feedback, as referenced in themes one and four, the findings in this study indicate that students appreciated and found it beneficial when feedback was given by both clinical instructors and practitioners. This finding is supported by EL Banon and Elsharkawy (2017). Their results revealed that feedback was one the responsibilities of the clinical instructor and a lack of feedback was a detriment to students' clinical education. Perram et al.'s (2016) supported this finding and they found that feedback was one of the most valued characteristics of the clinical instructor. In addition, feedback is just as important when provided by the practitioner and the results in this study demonstrate that it should be part of the day-to-day learning process for students when with the practitioner. Feedback provides for an understanding of performance and should be a connected process between practitioner or educator and the student (Fowler & Wilford, 2016). McSparron et al. (2018) state that clinical learning environments should be comprised of individuals who, among other attributes have the resourcefulness to furnish feedback.

The results of this study also indicated that both clinical instructors and practitioners should realize the impact of both negative and positive interpersonal skills. Themes two and five illustrate the importance of the impact of both clinical instructors' and practitioners' interpersonal skills in terms of a negative or positive experience for students. This finding is supported by Ramel and Martin (2018) who state that clinical educators empower the students' clinical experience through their execution of interpersonal skills and effective leadership and supervision. The findings in this study,

also indicate that the demeanor of both individuals affects student learning. Prior research has indicated students' dissatisfaction with the interpersonal skills of clinical instructors and practitioners. These aspects can include students being ignored, unwanted, and feeling like an annoyance which can cause feelings of abandonment (Gunay & Kilinc, 2018). Respondents in this study indicted feelings of being ignored. They described instances of being around clinical instructors who did not make students a priority and practitioners who were completely disinterested in them.

Additionally, this research found that students perceive feelings of abuse by being talked to harshly and sometimes in front of patients during procedures. Prior research has found that an abusive practitioner will affect the students' development which impedes the development of clinical skills (Subramaniam, Sambasivan, & Silong, 2018). Students indicated that they needed to be in a caring and supportive clinical environment. In the study by Clawson and Curtis (2018), it was found that a high comfort level in the clinical learning environment began with their perception of the caring behavior of the clinical instructor. Finally, a clinical instructor's approachability is crucial as indicated in this study. In Ingrassia's (2011) study which ranked the most important characteristics of a clinical instructor, approachability was found to be the highest-ranked characteristic as perceived by both students and clinical instructors.

The final implication involves allowing students more independent practice as described in themes three and six. Participants in this study who were able to experience independent practice opportunities were content and grateful. However, others were extremely dissatisfied with the lack of opportunities where they could perform

procedures unassisted. Prior research has indicated that having the time to work and practice with students can be a challenge for practitioners (Parvan et al., 2018).

Future implications. Future implications for this study, to address the identified themes involving clinical instructors' ability to provide practice and feedback, understand the impact of their interpersonal skills, and permitting independent practice by students involve the design of several professional development workshops or seminars for both clinical instructors and practitioners. These training sessions should include methods for providing effective feedback, course climate to include why and how interpersonal skills are impactful to the student and finally, perhaps a focus group of both clinical instructors and practitioners to understand why both groups are reluctant to allow students to practice independently. Additionally, there is a need for more communication between the educational institution and the clinical learning center to address all of the above implications.

Strengths and weaknesses of the study. There are several weaknesses in the study. First, the sample size was small and restricted to only four educational institutions in two states. This may affect transferability. Although all students should be educated under the same curriculum as created by the ASRT and required by the JRCERT, there may be some regional differences in terms of clinical practices and the clinical learning environment (ASRT, 2017; JRCERT, 2018b). It is unknown why, but several respondents began but did not complete the questionnaire. Second, students may not have answered interview questions honestly as there may be supposed fear from repercussions.

Also, as discussed in the unexpected findings section, above, it was not expected that the clinical instructor did not always act as an advocate for the student. This could be

the case because, while some clinical instructors are employed by the educational institution, others are employed by the clinical site and designated the position of clinical instructor by a joint decision of the educational institution and site. The significance of the latter is that the individual's loyalty is first to the site, in their role as a practitioner, and then to the student. This may be an explanation for the difference in their approach to the student. This could be a weakness for this study as the researcher did not seek this delineation during the data collection process.

There were several strengths to this study. One, the number of respondents for the number of questionnaires was lacking, however, the number of participants for the interviews was sufficient. In addition, while the fact that participants' responses on the questionnaire and in the interviews may not have been honest as stated earlier as a weakness, the researchers believe that the responses in the interviews were sincere. Two, triangulation was used for the data sources to demonstrate a convergence of the data sources. Three, the researcher was extremely cognizant of the confidentiality of the interviews as all participants were assigned a code. This was communicated to all interview participants before the start of the interview which served to increase their honest participation. Finally, interview participants were sent a copy of the transcript as member checking was used to further verify the accuracy of the interview.

Recommendations for Future Research. There are five recommendations for future research that address the themes identified in this study. The first is to include a similar study with a larger sample size to include participants from many more educational programs. A second recommendation is to include participants from different regions of the country. Third, this study focused on the perceptions of radiologic

technology students. The researcher recommends further research be conducted to focus on the practitioner and a fourth recommendation would be further research to focus on the clinical instructor, all paying particular attention to the themes noted in this current research. The final recommendation is for further study is to delineate those clinical instructors who are employed by the educational institution from those who are employed by the clinical site. Also, regarding those clinical instructors employed by the clinical site, there should be an exploration of what deterrent's, if any, prevent these individuals to act as an advocate for students.

The themes that are relative to the above recommendations for further research would involve all six in terms of a comparison to note if the themes revealed in this study are relative in other parts of the country as well as with a larger sample size. In addition, a study which focuses on the perceptions of clinical instructors and practitioners may provide more insight on the perspective of these individuals in terms of targeted practice, effective feedback, interpersonal skills and why independent practice opportunities are not as prevalent as some students prefer.

Further examination or addressing gaps. There are several areas for further examination of the gaps in this study. Further examination is needed to address the role of the practitioner to explore their understanding of the essential part they play in the students' clinical education. This is particularly so due to the themes relating to the importance of providing practice opportunities, administering feedback and understanding the impact of their interpersonal skills, all identified themes in this research. In addition, the reluctance of both the clinical instructor and the practitioner to allow students independent practice should be investigated, to provide their perspective

of the themes which discuss students' desire for more independence when performing procedures.

Recommendations that relate to the study's significance. As stated in chapter one, more information was needed to identify the student's perspective of what is most beneficial within the clinical learning environment (England et al., 2017; Holmstrom & Ahonen, 2016; Rose & McIntosh, 2015). Increased knowledge of the students' perspective of their ability to learn may help produce the most highly skilled radiologic technologists through well prepared clinical instructors and practitioners. This study has helped to close the gaps identified as the knowledge and skills of the clinical instructor, the clinical instructor and practitioner's ability to provide feedback, how the practitioner is used as a resource in providing practice opportunities to students (Fowler & Wilford, 2016; Francis et al., 2016; Nolan & Loubier, 2018; Shanahan, 2015). The results of this study, and the themes that arose from it, indicated that additional training of both clinical instructors and practitioners is needed in the areas providing feedback, and the importance of interpersonal skills to student learning. Also revealed was a deficiency in the practitioner and clinical instructor in allowing students to practice independently.

Recommendations that relate to scientific knowledge. As stated earlier in this chapter, the anticipation for this research was that insight could be provided for years of focus for future training of the clinical instructor, and more so, for the practitioner. The researcher believes that this insight has been obtained. There is a need for training of both clinical instructors in the importance of positive interpersonal skills and the effect of these skills, or lack thereof, on students' clinical education, as described in themes two and five. The recommendation is that clinical instructors and, again, more importantly,

practitioners realize that for students to learn procedures, they must be permitted to perform procedures independently as identified in themes three and six. Students will never know their strengths or weaknesses unless allowed to perform in an unassisted manner.

Recommendations that relate to the theoretical foundation section. The two theoretical frameworks for this study, Lev Vygotsky's theory of the zone of proximal development and Sternberg's triarchic theory of intelligence are related to practice opportunities for radiologic technology students. Vygotsky's theory is related to the student first observing the practitioner and then eventually being able to perform independently. Sternberg's Triarchic Theory of Intelligence relates to establishing proficiency and competency, which is the goal of clinical education in radiologic technology (Leggett, 2015). As a recommendation, to achieve proficiency and competency, students must be provided sufficient practice opportunities and with eventual independent practice, as noted in themes three and six

Recommendations for Future Practice. To address themes one and four describing the impact of practice and feedback, a recommendation for future practice includes exploring how clinical instructors, as the gatekeeper, can be more responsible for students' accessibility to obtain sufficient practice so that eventual competency in the performance of radiographic procedures can be performed independently. The clinical instructor is the liaison between the educational institution and the clinical education site (JRCERT, 2018b). It is their responsibility to ensure a successful clinical rotation for students.

A second recommendation is that students be treated with respect with the hope that mutual respect is present between the clinical instructor or the practitioner and the student. A third recommendation is that practitioners be more cognizant of the needs of the student. This can be done by being approachable so that the student can take full advantage of the practitioner's knowledge and experience. Practitioners must realize that they are what the student aspires to be, and their impact is great. Both of these recommendations are a result of themes two and five relating to interpersonal skills of the clinical instructors and practitioners.

It is also recommended that future practice involve continual dialog between the educational institution and the clinical site, in particular with the practitioner. This would help to address themes one and four. It may be that the practitioner is not aware of their significant role in the clinical education of the student and perhaps dialog between the two groups can look at concerns from both the clinical site and the educational institution to make decisions in the best interest of the student.

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Appendix A.

Site Authorization Letters

Site authorization(s) on file at Grand Canyon University.

Appendix B.

IRB Approval Letter

GRAND CANYON UNIVERSITY

3300 West Camelback Road, Phoenix Arizona 85017 602.639.7500 Toll Free 800.800.9776 www.gcu.edu

DATE:	August 19, 2019
TO:	Jennett Ingrassia
FROM:	Grand Canyon University Institutional Review Board
STUDY TITLE:	Radiologic Technology Students' Perceptions of an Effective Clinical Learning Environment
IRB REFERENCE #:	IRB-2019-1217
SUBMISSION TYPE:	Submission Response for Initial Review Submission Packet
ACTION:	Determination of Exempt Status
REVIEW CATEGORY:	Category 2

Thank you for your submission of New Project materials for this research study.

Grand Canyon University Institutional Review Board has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations. You now have GCU IRB approval to collect data.

If applicable, please use the approved informed consent that is included in your published documents.

We will put a copy of this correspondence on file in our office.

If you have any questions, please contact the IRB office at irb@gcu.edu or 602-639-7804. Please include your study title and reference number in all correspondence with this office.

Appendix C.

Informed Consent

Grand Canyon University
College of Doctoral Studies
3300 W. Camelback Road
Phoenix, AZ 85017
Phone: 602-639-7804
Email: irb@gcu.edu

INFORMED CONSENT FORM: Interview

INTRODUCTION

The title of this research study is, Radiologic Technology Students' Perceptions of an Effective Clinical Learning Environment.
I am Jennett M. Ingrassia, a doctoral student under the supervision of Dr. Peggy Dupey in the College of Doctoral Studies at Grand Canyon University. The purpose of this study is to examine how second-year radiologic technology students in New Jersey and New York perceive their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to educate and provide feedback

KEY INFORMATION

This document defines the terms and conditions for consenting to participate in this research study.

How do I know if I can be in this study?

- >18 years old
- Second-year radiologic technology student
- Enrolled in a in a radiologic technology program accredited by the Joint Review Committee on Education in Radiologic Technology in New Jersey or New York

You cannot be in this study if:

- < 18 years old
- Not a second-year radiologic technology student
- Not enrolled in a in a radiologic technology program accredited by the Joint Review Committee on Education in Radiologic Technology in New Jersey or New York

What am I being asked to do? If you agree to be in this study, you will be asked to: Participate in a face to face interview (Approximately 60 minutes)

- ***When?*** May, 2019
- ***Where?*** At your educational institution
- ***How?*** In person

Audiotaping:

I would like to use a voice recorder to record your responses. You can still take part if you do not wish to be recorded. All data in this study will be protected. Your identity will be secured through alpha codes and pseudonyms will be used throughout the transcribing process of the data received. Electronic data will be stored and secured on a flash drive, which will be encrypted. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

Who will have access to my information?

Myself, and/or, my dissertation chair, and my dissertation committee

Participation is voluntary. However, you can leave the study at any time, even if you have not finished, without any penalty or loss of benefits to which you are otherwise entitled. If you decide to stop participation, you may do so by informing me electronically or in person. If you choose to leave the study, none of the information you provided will be used in the study.

- ***Any possible risks or discomforts?:*** There are no foreseeable risks or discomforts associated with this study OR list any physical or psychological risks/discomforts.

- ***Any direct benefits for me?*** No

- ***Any paid compensation for my time?*** Participants will not get paid for their participation.

How will my information and/or identity be protected? Your identity will be secured for the interview through alpha codes and the use of pseudonyms that will be used throughout the transcribing process of the data received. Electronic data will be stored and secured on a flash drive, which will be encrypted. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation

PRESENTATION OF INFORMATION COLLECTED

Once completed, this research will be presented the dissertation committee and to the Dean of the College of Doctoral Studies at GCU.

PRIVACY AND DATA SECURITY

- ***Will researchers ever be able to link my data/responses back to me?***
  No, the researcher will be using pseudonyms.

- ***Will my data include information that can identify me (names, addresses, etc.)?***
  Only the US state in which your school is located will able to be identified.

- ***Will researchers assign my data/responses a research ID code to use instead of my name?***
  Yes, your identity will be secured through alpha codes and pseudonyms will be used throughout the transcribing process.

- ***If yes, will researchers create a list to link names with their research ID codes?***
  Yes

- ***If yes, how will researchers secure the link of names and research ID codes? How long will the link be kept? Who has access? Approximate destroy date?***

Electronic data will be stored and secured on a flash drive, which will be encrypted. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

- ***How will my data be protected (electronic and hardcopy)? Where? How long? Who will have access? Approximate destroy or de-identification date?***

Electronic data will be stored and secured on a flash drive, which will be encrypted. Both electronic and hard copy data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

- ***Where and how will the signed consent forms be secured?***

Consent forms will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and erasure of digital documentation.

FUTURE RESEARCH

Once identifiers, name, and location of the educational intuition you are attending, are removed from these data collected for this study, the de-identified information could be used for future research studies or distributed to other investigators for future research studies without additional informed consent from you or your legally authorized representative.

STUDY CONTACTS

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by Jennett M. Ingrassia who can be reached at jingrassia01@my.gcu.edu o[redacted]

If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the College of Doctoral Studies at IRB@gcu.edu; (602) 639-7804.

VOLUNTARY CONSENT

PARTICIPANT'S RIGHTS

- You have been given an opportunity to read and discuss the informed consent and ask questions about this study;
- You have been given enough time to consider whether or not you want to participate;
- You have read and understand the terms and conditions and agree to take part in this research study;
- You understand your participation is voluntary and that you may stop participation at any time without penalty.

If your study involves anonymous online survey - Please include 'I agree' and 'I do not agree' buttons.

I agree I do not agree

Your signature means that you understand your rights listed above and agree to participate in this study

Signature of Participant or Legally Authorized Representative _____ Date _____

INVESTIGATOR'S STATEMENT

"I certify that I have explained to the above individual the nature and purpose, the potential benefits and possible risks associated with participation in this research study, have answered any questions that have been raised, and have witnessed the above signature. These elements of Informed Consent conform to the Assurance given by Grand Canyon University to the Office for Human Research Protections to protect the rights of human subjects. I have provided (offered) you a copy of this signed consent document."

Signature of Investigator _____ Date _____

Grand Canyon University
College of Doctoral Studies
3300 W. Camelback Road
Phoenix, AZ 85017
Phone: 602-639-7804
Email: irb@gcu.edu

INFORMED CONSENT FORM: Questionnaire

INTRODUCTION

The title of this research study is The Radiologic Technology Students' Perceptions of an Effective Clinical Learning Environment.

I am Jennett M. Ingrassia a doctoral candidate under the supervision of Dr. Peggy Dupey in the College of Doctoral Studies at Grand Canyon University. The purpose of this form is to provide you, as a possible participant of this investigation, with information to assist you in making a decision to participate in this research study.

The purpose of this study is to examine how second-year radiologic technology students in New Jersey and New York perceive their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to educate and provide feedback.

KEY INFORMATION

This document defines the terms and conditions for consenting to participate in this research study.

How do I know if I can be in this study?

- > than 18 years old.
- Second-year radiologic technology student.
- Enrolled in a radiologic technology program accredited by the Joint Review Committee on Education in Radiologic Technology in New Jersey or New York

You cannot be in this study if:

- < than 18 years old.
- Not a second-year radiologic technology student.
- Not enrolled in a radiologic technology program accredited by the Joint Review Committee on Education in Radiologic Technology in New Jersey or New York

What am I being asked to do?

If you agree to be in this study, you will be asked to take part in a study that will investigate how second-year radiologic technology students feel about their ability to learn in the clinical environment based on how the clinical instructors and staff radiologic technologists to educate and provide feedback. At first, you will be asked to complete an online questionnaire to provide general demographic information and to answer three general open-ended questions about your thoughts on how the clinical learning environment affects your ability to learn. Additionally, you will be asked to tell whether you are willing to participate in a follow-up face-to-face interview to take place at your school.

If you agree to take part in the questionnaire, you will receive a link via Survey Monkey, an electronic survey tool. You will have the right to skip any questions in the online questionnaire or interview at any time. You may also withdraw from the study at any time without any negative results.

Audiotaping:
N/A

Who will have access to my information?
Myself, my dissertation chair, and my dissertation committee

Participation is voluntary. However, you can leave the study at any time, even if you have not finished, without any penalty or loss of benefits to which you are otherwise entitled. If you decide to stop participation, you may do so by informing me electronically or in person. If you choose to leave the study, none of the information you provided will be used in the study.

- ***Any possible risks or discomforts?***: There are likely to be no risks or hurt associated with this study OR any physical or psychological risks/discomforts.
- ***Any direct benefits for me?*** No
- ***Any paid compensation for my time?*** Participants will not get paid for their participation.

How will my information and/or identity be protected? Your identity will be protected through alpha codes on the questionnaires and interviews and false names will be used throughout the recording process of the data received. Electronic data will be stored and secured on a flash drive, which will be coded. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and deletion of digital documentation.

PRESENTATION OF INFORMATION COLLECTED

Once completed, this research will be presented the dissertation committee and to the Dean of the College of Doctoral Studies at GCU.

PRIVACY AND DATA SECURITY

- ***Will researchers ever be able to link my data/responses back to me?***
  No, the researcher will be using false names.
- ***Will my data include information that can identify me (names, addresses, etc.)?***
  Only the US state in which your school is located will able to be identified.
- ***Will researchers assign my data/responses a research ID code to use instead of my name?***
  Yes, your identity will be secured through alpha codes and false names will be used throughout the transcribing process.
- ***If yes, will researchers create a list to link names with their research ID codes?***
  Yes
- ***If yes, how will researchers secure the link of names and research ID codes? How long will the link be kept? Who has access? Approximate destroy date?***

Electronic data will be stored and secured on a flash drive, which will be encrypted. All data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and deletion of digital documentation.

- ***How will my data be protected (electronic and hardcopy)? Where? How long? Who will have access? Approximate destroy or de-identification date?***

Electronic data will be stored and secured on a flash drive, which will be encrypted. Both electronic and hard copy data will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and deletion of digital documentation.

- ***Where and how will the signed consent forms be secured?***

Consent forms will be stored for three years in a locked safe at the researcher's residence and then destroyed through shredding of paper documents and deletion of digital documentation.

FUTURE RESEARCH

Once identifiers, name, and location of the educational intuition you are attending, are removed from these data collected for this study, the de-identified information could be used for future research studies or distributed to other investigators for future research studies without additional informed consent from you or your legally authorized representative.

STUDY CONTACTS

Any questions you have concerning the research study or your participation in the study, before or after your consent, will be answered by Jennett M. Ingrassia who can be reached at jingrassia01@my.gcu.edu or [redacted]

If you have questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the College of Doctoral Studies at IRB@gcu.edu; (602) 639-7804.

VOLUNTARY CONSENT

PARTICIPANT'S RIGHTS

- You have been given an opportunity to read and discuss the informed consent and ask questions about this study;
- You have been given enough time to consider whether or not you want to participate;
- You have read and understand the terms and conditions and agree to take part in this research study;
- You understand your participation is voluntary and that you may stop participation at any time without penalty.

If your study involves anonymous online survey - Please include 'I agree' and 'I do not agree' buttons.

I agree I do not agree

Your signature means that you understand your rights listed above and agree to participate in this study

_____ _____

Signature of Participant or Legally Authorized Representative Date

INVESTIGATOR'S STATEMENT

"I certify that I have explained to the above individual nature and purpose, the potential benefits and possible risks associated with participation in this research study, have answered any questions that have been raised, and have witnessed the above signature. These elements of Informed Consent conform to the Assurance given by Grand Canyon University to the Office for Human Research Protections to protect the rights of human subjects. I have provided (offered) you a copy of this signed consent document."

Signature of Investigator_____ Date_____

Appendix D.

Copy of Instruments

Instrument #1: Questionnaire

Part 1: Demographics

1. In which state is the educational institution you are attended located?

New Jersey
New York

2. Including the summer(s) and the one currently in progress, how many semesters of clinical education have you completed/attended up to this point?

First
Second
Third
Fourth
Fifth or More

Part 2: Open Ended Questions

1. Considering your time in the clinical environment, what are some of the most memorable moments you've experienced, and why?

2. In terms of learning, what experiences in your assigned clinical rotation site were **most** effective, and why?

3. In terms of learning, what experiences in your assigned clinical rotation site were **least** effective, and why?

Part 3: **Interview Request**

1. Would you be willing to participate in a follow-up face to face interview at your educational institution.

2. If yes to the above question, please provide a valid email

Instrument #2: Interview

In terms of the clinical education environment, in general,

1. Do you feel like you are part of the team at your clinical site?

2. Do you feel ignored at your clinical site?

3. Do you feel that you are given sufficient opportunities for practice at your clinical site?

Regarding the clinical instructor,

4. Describe the best interaction, in terms of learning and feedback, you have had with clinical instructors and why.

5. Describe the worst interaction, in terms of learning and feedback, you have had with clinical instructors and why.

6. In terms of interpersonal skills and demeanor, what characteristics do you most appreciate in a clinical instructor and why?

7. In terms of teaching ability, what characteristics do you most appreciate in a clinical instructor and why?

8. In terms of interpersonal skills and demeanor, what characteristics do you least appreciate in a clinical instructor and why?

9. In terms of teaching ability, what characteristics do you least appreciate in a clinical instructor and why?

10. Think about clinical instructors who you learn best from. What attributes do they possess that make you feel that way?

11. Think about the clinical instructors who you learn least from. What attributes do they possess that make you feel that way?

12. Do you feel as if you are being given sufficient feedback from the clinical instructors?

Regarding the staff radiographer,

13. Describe the **best** interaction, in terms of learning and feedback, you have had with **staff radiographers (practitioners)** and why.

14. Describe the **worst** interaction, in terms of learning and feedback, you have had with a **staff radiographer (practitioner)** and why.

15. Thinking about **staff radiographers (practitioners)**, what type of technologists do you feel that you learn from the best/most, and what actions do they take that make you feel like you are learning?

16. Thinking about **staff radiographers (practitioners)** that you learn from the least, what is it about them that makes you feel that way?

17. Do you feel like you are being given sufficient feedback from **the staff radiographer (practitioner)**?

18. Do you feel like you are properly supervised?

Appendix E.

Description of the Relationship of the Questionnaire and Interview Questions to the Research Questions

Questionnaire: Relationship to Research Questions

Question	Rationale	Research Question	Gap
Demographic **1. Educational Institution** **2. Number of Clinical Semesters in Program**	**Educational Institution**: To distinguish students in programs in NJ and NY. Curriculum requirements are significantly different for each state. **Semesters in Program**: To affirm that the sample is comprised of all second-year students as they have had more clinical education experience	N/A	N/A
1. Considering your time in the clinical environment, what are some of the most memorable moments you've experienced, and why?	To elicit responses of how students best learn. Some responses might relate to generalities such as the overall culture of the clinical setting to include teamwork, friendliness of staff and an overall willingness of the setting to the presence of students. However, additional responses may include information more specific to the clinical instructor and practitioner. Some students may discuss the more technical aspects such as patients, equipment, department protocol, etc. and these student responses will not be included.	**R_1:** How do students perceive their ability to learn based on the ability of clinical instructors to provide targeted practice and effective feedback? **R_2:** How do students perceive their ability to learn based on the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?	Note: These general questions will aid in terms of comparison with prior research but not as an official gap in the research.

Interview Guide: Relationship to Research Questions

Question	Rationale	Research Question	Gap
1. Do you feel like you are part of the team at your clinical site?	General questions will aid in terms of comparison with prior research, as well as align with gaps.	**R_1:** How do students perceive their ability to learn based on the ability of clinical instructors to provide targeted practice and effective feedback? **R_2:** How do students perceive their ability to learn based on the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?	- CI teaching methods, feedback and students' receptiveness **(Nolan and Loubier, 2018)** - Knowledge & skills of the CI **(Francis, et al., 2016)** - How is the practitioner used as a resource by the students? **(Shanahan, 2015)** - Note if practitioners are allowing students sufficient practice and are able to properly provide feedback on a daily basis **(Fowler & Wilford, 2016)**.
2. Do you feel ignored at your clinical site?			
3. Do you feel that you are given sufficient opportunities for practice at your clinical site?			
4. Describe the **best** interaction, in terms of learning and feedback, you have had with **clinical instructors** and why.	Seeking to learn what interpersonal skills and attributes are most appreciated by students, and what are less desirable/helpful for student learning. The researcher then plans to compare their responses to prior research described in the literature review.	**R_1:** How do students perceive their ability to learn based on the ability of clinical instructors to provide targeted practice and effective feedback?	- CI teaching methods, feedback and students' receptiveness **(Nolan and Loubier, 2018)** - Knowledge & skills of the CI **(Francis, et al., 2016)**
5. Describe the **worst** interaction, in terms of learning and feedback, you have had with **clinical instructors** and why.			
6. In terms of both interpersonal skills and demeanor as well as teaching ability, what characteristics do you **most** appreciate in a **clinical instructor** and why?			
7. In terms of both interpersonal skills and demeanor as well as teaching ability what characteristics do you **least** appreciate in a **clinical instructor** and why?			
8. Think about **clinical instructors** who you learn **best** from. What attributes do they possess that make you feel that way?			

Question	Rationale	Research Question	Gap
9. Think about **clinical instructors** who you learn **least** from. What attributes do they possess that make you feel that way?			
10. Do you feel as if you are being given sufficient feedback from **clinical instructors**?			
11. Describe the **best** interaction, in terms of learning and feedback, you have had with **staff radiographers (practitioners)** and why.	Seeking to learn what interpersonal skills and attributes are most appreciated by students, and what are less desirable/helpful for student learning. The researcher then plans to compare their responses to prior research described in the literature review.	**R_2:** How do students perceive their ability to learn based on the ability of practitioners (staff radiologic technologists) to provide targeted practice and effective feedback?	- How is the practitioner used as a resource by the students? **(Shanahan, 2015)** - Note if practitioners are allowing students sufficient practice and are able to properly provide feedback on a daily basis **(Fowler & Wilford, 2016)**.
12. Describe the **worst** interaction, in terms of learning and feedback, you have had with **staff radiographers (practitioners)** and why.			
13. Thinking about **staff radiographers (practitioners)**, what type of technologists do you feel that you learn from the **best/most**? What actions do they take that make you feel like you are learning?			
14. Thinking about **staff radiographers (practitioners)** that you learn from the **least**, what is it about them that makes you feel that way?			
15. Do you feel as if you are being given sufficient feedback from the **practitioners (staff radiographer)**?			

Appendix F.

Site Authorization Recruitment Letter

Grand Canyon University
College of Doctoral Studies
3300 W. Camelback Road
Phoenix, AZ 85017
Phone: 602-639-7804
Email: irb@gcu.edu

March 10, 2019

[redacted]

Dear Professor [redacted]

My name is Jennett M. Ingrassia, MSRS, RT (R), and I am a doctoral learner under the direction of Dr. Peggy Dupey in the College of Doctoral Studies at Grand Canyon University. I am conducting a research study titled, Radiologic Technology Students' Perceptions of the Clinical Learning Environment. The purpose of this correspondence is to seek your permission for the recruitment of second-year radiologic technology students at Essex County College for participation in this study.

As you know, the clinical setting is one of the primary components of radiologic technology students' education as it advances and cultivates their skills to develop proficiency. Clinical instructors and practitioners significantly influence student learning in the clinical learning environment. However, researchers have identified gaps in the literature concerning the clinical instructor's knowledge, skills, and training, as well as the manner in which the staff radiologic technologist is used as a resource by students. My study aims to examine how second-year radiologic technology students in New Jersey and New York perceive their ability to learn based on the ability of clinical instructors and practitioners (staff radiologic technologists) to educate and provide feedback. The research questions that will guide this study are as follows:

1. How do students perceive their ability to learn from the clinical instructors through targeted practice and effective feedback?

2. How do students perceive their ability to learn from practitioners (staff radiologic technologists) through targeted practice and effective Feedback?

Initially, participants will be invited to complete an online questionnaire that should take no more than 30 minutes to complete. All that is required from your institution is access to students' email addresses for me to send them the link to the study. My study will have Institutional Review Board (IRB) approval from Grand Canyon University.

The second data source will be in the form of face-to-face semi-structured interviews. Selection of participants for the interviews will be based, first, on a positive response on the questionnaire indicating their willingness to participate in an interview. From that group, participants will then be selected based on their responses on the questionnaire. To ensure confidentiality and privacy, I ask for access to a private space for the interviews which should take no more than 60 minutes. For your convenience, I have enclosed a sample site authorization letter, inclusive of all information needed, as well as, a copy of the research proposal.

In closing, I am hopeful that the results of this study will enhance the body of knowledge derived from prior studies concerning effective clinical learning. These findings could conceivably benefit students by improving the facilitation of student learning to contribute to an increasingly successful clinical educational experience for radiologic technology students.

Thank you for your consideration of participation for this much-needed research.

Sincerely,

Jennett M. Ingrassia, MSRS, RT(R)

Appendix G.

Expert Panel Review Documents

Expert Panel Reviewer 1

Hi Jennett,
Great to hear from you. Please find a copy of the questionnaire with my edits. In addition, it may be helpful to state in the document or in your instructions during the interviews that you are transitioning from talking about the clinical environment, to the clinical instructor, to the staff radiographer so that those transitions are clear to the participant. Otherwise just a cleanup and a couple of question edits. Overall, I think it captures the important elements of a student's clinical education. Please let me know if you need more.
Thanks
jnj
[redacted]

Jennett Ingrassia
Data Collection Instruments

Instrument #1: Questionnaire
Part 1: Demographics

1. What is your age?
   - 20 – 25
   - 26 – 30
   - 31 – 35
   - 35 – 40
   - 40 – 45
   - 46 – 50
   - 50 +

[redacted] Do not overlap. This should continue as 36-40, 41 to 45, 46-50; 51+

2. Gender:
   - Male
   - Female
   - Prefer not to answer

3. What educational institution are you attending?

4. Year in Program?
   - First
   - Second

5. Which ethnicity/race best describes you (Please choose only one)
   - American Indian or Alaskan Native
   - Asian / Pacific Islander
   - Black or African American

Hispanic
White / Caucasian
Other (please specify)

Part 2: Open Ended Questions

1. Considering your time in the clinical environment, what are some of the most memorable moments you've experienced, and why?

2. In terms of learning, what experiences in your assigned clinical rotation site were **most** effective, and why?

3. In terms of learning, what experiences in your assigned clinical rotation site were **least** effective, and why?

Instrument #2: Interview

1. Do you feel like you are part of the team at your clinical site?

2. Do you feel ignored at your clinical site?

3. Do you feel that you are given sufficient opportunities for practice at your clinical site?

4. Describe the **best** interaction, in terms of learning and feedback, you have had with **clinical instructors** and why.

5. Describe the **worst** interaction, in terms of learning and feedback, you have had with **clinical instructors** and why.

6. In terms of both interpersonal skills and demeanor as well as teaching ability, what characteristics do you **most** appreciate in a **clinical instructor** and why?

7. In terms of both interpersonal skills and demeanor as well as teaching ability, what characteristics do you **least** appreciate in a **clinical instructor** and why?

8. Think about **clinical instructors** who you learn **best** from. What attributes do they possess that make you feel that way?

9. Think about the **clinical instructors** who you **learn** least from. What attributes do they possess that make you feel that way?

10. Do you feel as if you are being given sufficient feedback from the **clinical instructors**?

11. Describe the **best** interaction, in terms of learning and feedback, you have had with **staff radiographers (practitioners)** and why.

12. Describe the **worst** interaction, in terms of learning and feedback, you have had with a **staff radiographer (practitioner)** and why.

13. Thinking about **staff radiographers (practitioners)**, what type of technologists do you feel that you learn from the best/most, and what actions do they take that make you feel like you are learning?

14. Thinking about **staff radiographers (practitioners)** that you learn from the least, what is it about them that makes you feel that way?

15. Do you feel like you are being given sufficient feedback from **the staff radiographer (practitioner)**?

JJ [redacted]
The first part seems to ask about personality and professionalism and the second about teaching. I would separate teaching from this.

JJ [redacted]
Same as above, separate teaching.

Questionnaire

April 5 .2019

Dear Jennett,

I have reviewed both the Questionnaire and Interview questions and found them to be a comprehensive list inclusive of all areas of radiological clinical education.

I appreciate the opportunity to review this material and look forward to the results of this research.

Sincerely,

Jennett,

After reviewing both the questionnaire and interview questions I feel that you addressed all relevant areas of the clinical education of the radiologic technology student.

Best of luck with your research and I look forward to the results.

[redacted]
Professor Emeritus
Radiography

Appendix H.

Additional Site Authorization Recruitment

Proposal for IRB Review Inbox x

[redacted]

Sat, Apr 20, 4:54 PM (7 days ago)

to me

Hello Ms. Ingrassia,

I wanted to confirm that I am in receipt of your proposal to conduct research using students from the County College of Morris (CCM) Radiography Technology Program. I will submit your proposal to the college's Institutional Review Board (IRB), and provide you with the decision of the CCM IRB within the next 20 days.

If you have any questions between now and when the IRB makes its determination, please do let me know.

Appendix I.

E-Mail Correspondence with SurveyMonkey

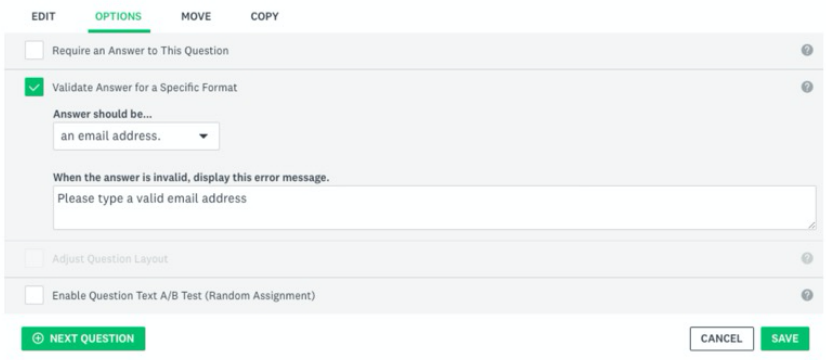
Hi Jennett,

Thanks for taking the time to get in touch. Damian here and I'm hoping I can help today.

You can do this on the free (Basic) plan by including a second question below asking the following:

"If you agreed to participate in a follow-up interview, please include your email address here:"

This can be a Single Textbox question where you can make sure the answer included is in an email format. This can be included in the question Options (shown below)



On a paid plan, this can be done more fluidly with Skip Logic or Advanced Branching, where you can show or hide the follow-up question asking for an email address, depending on the answer given about the interview.

For more information, please take a look at the following article: Skip Logic

I hope this helps! Please let me know if you have any other questions.

Warm regards,

Appendix J.

Codes to Categories

Description of Codes to Categories: RQ1

Categories	Codes	# of Interview Occurrences	# of Questionnaire Occurrences
Learning from the CI	LCI1-Challenges & guides	26	0
	LCI2-Doesn't just explain but demonstrates	14	0
	LCI3-Not available or paying attention to student	12	0
	LCI4-Gap between classroom teaching & CI teaching	6	0
	LCI4-CI explains but does not demonstrate	6	0
	LCI5-CI is knowledgeable	6	0
Feedback from CI	CIF1-Getting enough	21	0
	CIF2-Little or none	18	0
CI Positive Interpersonal Skills	CIPIS1-Comfort level	8	0
	CIPIS2-Demonstrates tough love	8	0
	CIPIS3-Approachable & available	5	0
	CIPIS4-Caring	4	0
	CIPIS5-Motivates	4	0
	CIPIS6-Patient	3	0
	CIPIS7-Induced confidence	0	1
CI Negative Interpersonal Skills	CINIS1-Rude & Intimidating	10	0
	CINIS2-Not CI's top priority	8	0
	CINIS3-Not approachable & available	8	0
	CINIS4-Yells at students	3	2
	CINIS5-Disrespectful to students	2	2
	CINIS6-Unprofessional	2	0
Student Independence When Performing Procedures with CI	CIIP1-Able to practice independently	14	0
	CIIP2-Not able to practice independently	4	0

Description of Codes: RQ2

Categories	Codes	# of Interview Occurrences	# of Questionnaire Occurrences
Positive Learning from the Practitioner	PLP1-Willing to teach	13	4
	PLP2-Perform procedures together	9	4
	PLP3-Knowledgeable	8	0
	PLP4-Available	5	0
	PLP5-Motivates	0	2
Negative Learning from the Practitioner	NLP1-Won't allow students to practice procedures	9	4
	NLP2-Takes over if I make a mistake	0	6
	NLP3-Rushes student through practice	4	2
	NLP4-Not available	3	0
	NLP5-Unprofessional or Unethical	3	0
	NLP6-Not helpful	3	0
	NLP7-Gap between classroom and practice	3	0
	NLP8-Won't allow questions	0	2
	NLP9-Doesn't teach	0	2
Practitioner Feedback	PF1-Gives sufficient feedback	7	0
	PF2-Gives little or no feedback	5	0
Practitioner Positive Interpersonal Skills	PPIS1 -Understands students make mistakes	4	0
	PPIS2 -Welcoming personality	3	2
	PPIS3 -Willing to teach and helpful	0	4
Practitioner Negative Interpersonal Skills	PNIS1 -Yells at and disrespects students	6	2
	PNIS2 - No interest in students	4	0
	PNIS3 -Makes student feel incompetent	3	0
	PNIS4 - Unprofessional	2	2
	PNIS5 - Demeaning	0	2
	PNIS6 – Unavailable	2	0
Student Independence When Performing Procedures with Practitioner	PIP1- Able to practice independently	10	10
	PIP1- Not able to practice independently	3	0

Appendix K.

Survey Monkey Participant Questionnaire and Interview Log

Radiologic Technology Students' Perceptions of the Clinical Learning Environment
Survey Monkey Questionnaire and Interview Status
Appendix K

Participant #	State	Semesters Completed	Questionnaire Completed	Interview Request Response	Email	Site	Comments
1	NY	3	Yes	Yes **P10NY**	[redacted]	HCC	[redacted] (Video Conf.) **Interview Completed 12/18/19** **Transcription Sent 1/7/20** **Final Request Sent for Review 1/20/20**
2	NY	4+	No	---			
3	NY	4+	Yes	No			
4	NY	3	Yes	Yes **P9NY**	[redacted]	HCC	[redacted] **Interview Completed 12/16/19** **Transcription Sent 1/6/20** **Transcription Approved 1/21/20**
5	NY	4+	Yes	No			
6	NY	4+	Yes	No			
7	NY	3	Yes	No			
8	NY	3	Yes	No			
9	NY	3	Yes	No			
10	NY	3	Yes	No			
11	NY	4+	Yes	Yes **P12NY**	[redacted]	HCC	[redacted] (Voice Conf) **Interview Completed 1/8/20** **Transcription Sent 1/9/20** **Transcription Approved 1/12/20**
12	NY	2	No	---			
13	NY	3	No	---			
14	NY	3	Yes	Yes	[redacted]	HCC	Sent 11/21/19: Waiting for response. Resent 11/25/19. Resent 12/01/19. No response. Later date?
15	NY	4+	No	---			
16	NY	3	Yes	Yes **P8NY**	[redacted]	HCC	[redacted] **Interview Completed 12/16/19** **Transcription Sent 1/2/20** **Transcription Approved 1/21/20**
17	NY	3	Yes	No			
18	NY	4+	No	---			
19	NY	4+	Yes	No			
20	NY	4+	Yes	No			
21	NY	4+	No	---			
22	NY	3	Yes	No			
23	NJ	4+	No	---			
24	NJ	3	No	---			
25	NJ	4+	Yes	No			
26	NJ	4+	No	---			
27	NJ	4+	Yes	No			
28	NJ	4+	Yes	Yes **(P1NJ)**	[redacted]	CCM	[redacted] **Interview Completed 12/9/19** **Transcription Sent 12/28/19** **Transcription Approved 12/28/19**
29	NJ	4+	Yes	No			
30	NJ	4+	Yes	No			
31	NJ	4+	Yes (2/3)	No			
32	NJ	3	Yes	Yes	[redacted]		Sent 11/21/19: Waiting for response. Resent 11/25/19. Resent 12/01/19.
33	NJ	1	No	---			
34	NJ	4+	No	---			
35	NJ	4+	Yes	Yes **P11NJ**	[redacted]	ECC	[redacted] **Interview Completed 12/18/19** **Transcription Sent 1/7/20** **Transcription Approved 1/17/19**
36	NJ	4+	Yes	No			

37	NJ	4+	Yes	No			
Participant #	**State**	**Semesters Completed**	**Questionnaire Completed**	**Interview Request Response**	**Email**	**Site**	**Comments**
38	NJ	4+	Yes	Yes (P5NJ)	[redacted]	PCCC	[redacted] Interview Completed 12/12/19 Transcription Sent 12/30/19 Final Request Sent for Review 1/6/20
39	NJ	4+	Yes	No			
40	NJ	4+	Yes	Yes (P4NJ)	[redacted]	CCM	[redacted] Interview Completed 12/9/19 Transcription Sent 12/30/19 Final Request Sent 1/6/20 Transcription Approved 1/11/20
41	NJ	4+	No	---			
42	NJ	4+	Yes	No			
43	NJ	4+	Yes	Yes (P6NJ)	[redacted]	PCCC	[redacted] Interview Completed 12/12/19 Transcription Sent 12/30/19 Transcription Approved 1/1/20
44	NJ	4+	Yes	Yes (P7NJ)	[redacted]	PCCC	[redacted] Interview Completed 12/12/19 Transcription Sent 1/1/20 Final Request Sent for Review 1/8/20
45	NJ	4+	Yes	Yes (P2NJ)	[redacted]	CCM	[redacted] Interview Completed 12/12/19 Transcription Sent 12/28/19 Transcription Approved 1/6/20
---	NJ		Did not complete. Resent request 12/28/19	Yes (P3NJ)	[redacted]	CCM	[redacted] Interview Completed 12/12/19 Transcription Sent 12/28/19 Final Request Sent for Review 1/6/20

Appendix L.

Email to Potential Interview Participant

Gmail Jennett Ingrassia [redacted]@gmail.com>

Response to Your Willingness to be Interviewed Following your Completed Survey

1 message

Jennett Ingrassia [redacted]@gmail.com> Thu, Nov 21, 2019 at 4:45 PM
To: [redacted]@gmail.com

My name is Jennett Ingrassia, MSRS, RT (R) and I am writing to thank you for completing my survey, *Radiologic Technology Students' Perceptions of the Clinical Learning Environment* to helping me with my research. Furthermore, I would like to thank you for agreeing to participate in a follow-up interview. Let me, again, reassure you that any information that you supply will be totally confidential. At no time will your real name be used and I will be the only individual to be able to identify you with your responses.

I am in the process of arranging a time for your interview and will need some preliminary information from you. **Can you please respond to this email to provide me with your name and the name of the school in which you are enrolled?** Once I have that information, I will coordinate with your program director so that we may find, for you, a suitable and convenient time to meet. The interview should take no longer than one hour of your time.

Once again, thank you so very much for your participation. I am hopeful that the results of this study will enhance the body of knowledge derived from prior studies concerning effective clinical learning. These findings could conceivably benefit you and future radiologic technology students by improving the facilitation of student learning to contribute to an increasingly successful clinical educational experience for all radiologic technology students.

I look forward to hearing from you. Thank you and take care.
Sincerely,

Jennett M. Ingrassia, MSRS, RT(R)

Appendix M.

Open-Ended Questions Document Imported for Coding in MAXQDA

Questionnaire Open Ended Questions Responses
R_1

R_1: *How do students perceive their ability to learn from the **clinical instructors** through targeted practice and effective feedback?*

Question #1: **Considering your time in the clinical environment, what are some of the most memorable moments you have experienced, and why?**

Response(s):
- Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skills.

Question #2: **In terms of learning, what experiences in your assigned clinical rotation site were most effective, and why?**

Response(s):
- When my instructor asked me for image critique after competency tests and showed me how do a trauma patient.

Question #3: **In terms of learning, what experiences in your assigned clinical rotation site were least effective, and why?**

Response(s):
- I don't like being yelled at while I perform competency testing. I can't learn like that and it stresses me out.

- Being yelled at or handled disrespectfully/unfairly by clinical instructors

- The inconsistency with evaluations. I feel like the rubric guidelines, are not followed and seem to be up for interpretation.

Questionnaire Open Ended Questions Responses
R_2

R_2: *How do students perceive their ability to learn from the **practitioners** (staff radiologic technologist) through targeted practice and effective feedback?*

Question #1: **Considering your time in the clinical environment, what are some of the most memorable moments you have experienced, and why?**

Response(s):
- Learning from the technologists.

- The most memorable moments I've experienced were the moments where I bonded with other technologists even though it may not be completely clinical related.

- In my second year in the Radiography program, I have been treated well and most radiologic technologists have been very helpful.

- Most memorable I can say was when I worked with the best technologist, I have ever worked so far. She's kind and so helpful she showed me what it is to be a great tech. I will be forever grateful for her teaching. That's why we need more technologists that are willing to teach students the correct way.

- When you get to think for yourself and do an exam and then the tech tells you how well you did. It's very encouraging and motivates you to do better.

Question #2: **In terms of learning, what experiences in your assigned clinical rotation site were most effective, and why?**

Response(s):
- Being able to do each case by myself, with minimal help from the technologist.

- Practicing with a helpful technologist

- I enjoy learning in ICU, because there were some technologists that gave me tips and helpful advice on how to position a patient and place the cassette under the patient while they were unconscious

- When I make a mistake and the tech makes me think on how to fix it rather than take over. We are all imperfect, so even when I do get my license, I am bound to make a mistake and this is why I appreciate it more when techs make me think on how to correct my mistake to get a better image. When certain techs see my mistake and take over, I'm left without knowing how I could've done better for the next time.

- Hands on, rotation in different areas of the clinical site and working closely with the technologist with the opportunity of observation and then taking care of patients with supervision.

- When the technologist takes the time to break down the steps they are taking and explain it to me while I'm actually performing the exam. It allowed me to do it myself in the right way

- When you get to perform the exam and you get to decide how to position. When the tech talks with you and lets you do the work and gives you constructive criticism.

Question #3: In terms of learning, what experiences in your assigned clinical rotation site were least effective, and why?

Response(s):

- When the technologist training you are demeaning towards you and treat you like a child it deters you from learning because of your fear of making mistakes

- During my first semester, since I was just starting the program, I did encounter technologists who wouldn't take the time to explain equipment or their hospital protocols.

- Being yelled at or handled disrespectfully/unfairly by technologists.

- The interaction with some technologists was quiet sometimes. Some of them do not have pedagogical skills and are not tolerant when students make mistakes and their comments make you feel like you don't know anything.

- There are some technologists that bring their biases or bitterness to students such as myself. It is unnecessary because that is unprofessional and does not help in diagnostic imaging.

- When a technologist does everything and all you can do is watch. You try to grasp what you can but it's not as effective as if you're hands on with the patient.

- Sometimes when technologists rush things out it is hard for students to learn and understand why certain thing are done certain way.

- Going in the room with the technologist and them just doing the exam and treating you like you are their assistant, and rushing through the exam. This means that I can't watch what they are doing or get any hands-on practice.

- Not able to ask questions to the technologist.

- When the tech takes over and does not explain what is going on.

Appendix N.

Analytic Memos of Themes Across all Data Sources

Quotations Supporting Themes 1(RQ1) and 3(RQ2): *Students perceive the ability of the clinical instructor/practitioner to provide targeted practice and administer effective feedback as very impactful to the clinical education process.*

Data Source	Code	Quotations
Questionnaires	RQ1 Clinical instructor and provided feedback	Q12: Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skills.
	RQ2 Practitioner helpful and gives tips and advice	Q: Well, there's a couple of techs that have helped me out. But one in particular is really good at my current clinical site. Anything you ask him or ask him for any help or any assistance he tends to explain to you and then why they do it that way. And then he shows you so that you remember for next time. He never gets irritated with questions.
Interviews	RQ2 Practitioner provides little or no feedback	P6NJ: No. No, they don't. They're not really reviewing with you. It's like you take the image then on to the next one. Sometimes where they're by the computer and the image comes up right away, they tell you take the next one and you don't even get to see that image before you take the next one. - That doesn't happen with a lot of the other techs. All they basically say is good image…move on. Or they say, you messed up…just move it down a little bit. That's all I really get in terms of feedback from most techs.

Quotations Supporting Themes 2 (RQ1) and 4(RQ2): *Interpersonal skills of the clinical instructor/practitioner can greatly affect student learning in either a positive or negative manner*

Data Source	Code	Quotations
Questionnaires	RQ1 Yelled at by the clinical instructor	Q43: I don't like being yelled at while I perform competency testing. I can't learn like that and it stresses me out. Q26: Being yelled at or handled disrespectfully
Interviews	RQ2 Practitioner has no interest in students	P7NJ: I just feel like sometimes they just want to do the cases and not deal with students so they can just have easier work day. P6NJ: I think, being ignored. Like when then don't even care if I'm in the room.

Quotations Supporting Themes 3(RQ1) and 6(RQ2): *Students desire more opportunities for practice that can be performed independently with no interference from the clinical instructor/practitioner, yet followed by feedback.*

Data Source	Code	Quotations
Questionnaires	RQ2 Independent practice with the practitioner	Q45: When you get to perform the exam and you get to decide how to position. When the tech talks with you and lets you do the work and gives you constructive criticism. - When I make a mistake and the tech makes me think on how to fix it rather than take over
Interviews	RQ1 Being able to perform procedures independently with the clinical instructor	P11NJ: You can review the classroom information but there needs to be some practice. I don't learn from a clinical instructor that keeps on going over and over something but not actually getting any hands-on practice. In the clinical environment I need to practice. P10NY: It's best to let me do it and then when I am finished, come in and make any necessary corrections. That's what works best for me.

Appendix O.

Codebook

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
Learning from the Clinical Instructor	13	0	0	CIL1-Challenges & guides	CI encourages and talks student through the procedure.	*P4NJ: So, the clinical instructors that I like are the ones that make me think…the ones that kind of don't just say good job. And they talk to you…they challenge. They ask me these questions that I don't know the answers to a lot of the time. And they kind of help me get there without giving me the answer. So, they make sure I understand what they're saying before they walk away and go on to the next case.*
	7	0	0	CIL2-Doesn't just explain but demonstrates	CI demonstrates procedures to the student through simulation and use of equipment.	*Q12: Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skills.*
	8	0	0	CIL3-Not available or paying attention to student	CI does not put students' needs first.	*P4NJ: I think I get frustrated when I see them talking and gossiping and drinking coffee while we're out there doing exams. And I'm like, how*

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						does this look? What do you think about this? Like, I feel like it's their job to kind of evaluate the images that we're taking and be watching us not like a hawk. But, to be available to tell me what they think about my images.
	3	0	0	CIL4-Gap between classroom teaching & CI teaching	CI knows and uses proper procedures of positioning of exams equivalent to the theory taught in the classroom.	*P12NY: They question everything I am doing…like, why are you doing this…you are supposed to do it this way…stuff like that.*
	3	0	0	CIL4-CI explains but does not demonstrate	CI does not actually demonstrate procedures to the student through simulation and equipment use.	*P1NJ: They don't really demonstrate. I feel like in this business you need to see it.*
	3	0	0	CIL5-CI is knowledgeable	CI knows and uses proper procedures of positioning of exams equivalent to the theory taught in the classroom.	*P4NJ: I like it when they're knowledgeable and know what they're talking about. I feel like I've had maybe two clinical instructors that I've really given you kind of more than just a textbook answer on what's going on.*
Feedback from Clinical Instructor	21	0	0	CIF1-Getting enough	CI providing enough feedback to student in terms of performance	*P7NJ: They look at the images to see if there are ways that I can improve them. If I can make it better next time,*

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
					and evaluation of radiographic images.	*they teach us and expand on what we need to do so that we can give the radiologists what they need to see.*
	18	0	0	CIF2-Little or none	CI providing an insufficient amount or no feedback to student in terms of performance and evaluation of radiographic images.	*P5NJ: I would like them to look at those exams a little more. You know…pop in on me while I'm doing the exams…just to let me know I'm getting better and better.*
Positive Interpersonal Skills of the Clinical Instructor	8	0	0	CIPIS1-Comfort level	Student perceives a calming atmosphere with the CI which enhances learning.	*P1NJ: I didn't have that fear of I'd better get it on the first try. I was more relaxed and calm, knowing that she would let me fix it.*
	8	0	0	CIPIS2-Demonstrates tough love	CI is strict but student perceives this as a method of direction and guidance, hence teaching.	*P12NY: I like that are strict about certain things because I prefer structure.*
	5	0	0	CIPIS3-Approachable & available	CI is always welcoming and available for questions concerning procedures, assistance and feedback.	*P9NY: Communication, for me, the biggest thing. Having open communication where I can ask you any question as little as it can be or is as big as it can be.*
	4	0	0	CIPIS4-Caring	Student perceives an understanding clinical instructor who	*P9NY: They don't get mad if you keep asking the same questions. That's very*
	4	0	0	CIPIS5-Motivates		
	3	0	0	CIPIS6-Patient		

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
	0	1	1	CIPIS7-Induced confidence	has their best interest at hand.	*important…because we're students…we're going to keep asking the same questions.*
Negative Interpersonal Skills of the Clinical Instructor	10	0	0	CINIS1-Rude & Intimidating	CI does not treat student with respect.	*P1NJ: I mean I understand what I did wrong, but it was how she said it to me that made me feel horrible. Like, you know, like I don't belong here. I don't deserve to be here, just like that.*
	8	0	0	CINIS2-Not CI's top priority	CI does not put students' needs first.	*P7NJ: I feel like sometimes I can see them getting like aggravated or like annoyed that, you ask them a certain question when they're in conversation with somebody from the hospital that they know. And I feel like sometimes if their student is asking you a question or a student wants help doing something, I feel like that should be their number one priority rather than a conversation they had about going out to eat last week or going out for a drink or whatever, you know?*
	8	0	0	CINIS3-Not approachable & available	CI is not always available for questions concerning procedures,	*P11NJ: Sometimes they show up late. you can show up late. I want them to follow me and see what I am doing.*

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
					assistance and feedback.	
	3	2	0	CINIS4-Yells at students	CI does not treat student with respect.	*Q43: I don't like being yelled at while I perform competency testing. I can't learn like that and it stresses me out.*
	2	2	0	CINIS5-Disrespectful to students		
	2	0	0	CINIS6-Unprofessional		
Independence When Performing Procedures with CI	7	0	0	CIIP1-Able to practice independently	CI allows students to perform procedures by making their own decisions on how to proceed.	*P5NJ: She let me do everything. She never, like, interrupted me, never like tried to jump in and say, don't do it this way or no, you're doing this wrong. Not in that moment, but after the exam was completed.*
	2	0	0	CIIP2-Not able to practice independently	Students are not permitted, by the CI, to perform procedures making their own decisions on how to proceed.	*P10NY: The ones that say to me like, no…no you watch me. If you watch me you will know what to do. For me…no…I don't like that. It's best to let me do it and then when I am finished, come in and make any necessary corrections. That's what work best for me*
CI Role & Responsibility	0	0	1	CICD1-JRCERT Accreditation Standards	Accreditation agency that delineates the actual responsibilities and performance expectations of the CI.	*The clinical instructor provides students with clinical instruction and supervision.*

Clinical Instructor	# Int.	# Que.	# Doc.	CODE	Definition	Examples
	0	0	2	CICD2-Curriculum Documents	ASRT document outlining the manner in which clinical education is most successful.	*The clinical faculty is responsible for assuring that students become competent in procedures set forth by their respective programs.*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
Positive Learning from the Practitioner	13	4	0	PLP1-Wlling to teach	RT is willing to demonstrate procedures to students or instruct them during the course of performing a procedure.	*Q: Well, there's a couple of techs that have helped me out. But one in particular is really good at my current clinical site. Anything you ask him or ask him for any help or any assistance he tends to explain to you and then why they do it that way. And then he shows you so that you remember for next time. He never gets irritated with questions.*
	9	4	0	PLP2-Perform procedures together		
	8	0	0	PLP3-Knowledgeable	RT knows and uses proper procedures of positioning of exams equivalent to the theory taught in the classroom.	*P10NY: It is with a technologist who knows what they are doing and will explain everything to you. One that is open to helping students…(they) don't have to help us…one that cares about the students, cares*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						about the patients and still reading and learning.
	5	0	0	PLP4-Available	RT is always there to help and assist students.	*P5NY: So, this tech would always be around but he wouldn't be breathing on your neck. Some other techs do, but he would actually say no, do it this way instead, or you're doing this wrong. He would also say things like, I know you've passed this, but let me help you get better. He would always help me a lot when it came to that.*
	0	2	0	PLP5-Motivates	RT encourages students to perform procedures under their supervision.	*Q: The tech tells you how well you did. It's very encouraging and motivates you to do better.*
Negative Learning from the Practitioner	9	4	0	PNL1-Won't allow students to practice procedures	RT insists that students only observe them and is not willing to work with students on their positioning skills.	*P9NY: They would just say, sit there and don't touch anything. It's frustrating because I'm here. I could at least get you the patient and bring them into the room.*
	0	6	0	PNL2-Takes over if I make a mistake	During a procedure, the RT will take over the case completely w/o giving students the opportunity to correct mistakes.	*- When I make a mistake and the tech makes me think on how to fix it rather than take over*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
	4	2	0	PNL3-Rushes student through practice	RT lacks the patience needed toward students for them to practice and perfect their skills.	*P11NJ: when I have worked with technologists who tell me I am too slow. I have not yet mastered the procedure yet so I need to go at a slower speed. When I get pushed to go faster, then I make mistakes. I am trying to process and they're not giving me the time to process the information I need to do the case.*
	3	0	0	PNL4-Not available	RT is not always present if students need assistance.	*P6NJ: It is just the scenario where they're on their phone in a corner and they don't care about what you are doing. So then. I am like, I clipped the anatomy...Can I do this again…and not they're not paying attention.*
	3	0	0	PNL5-Unprofessional or Unethical	RT does respect the profession.	*P9NY: They don't like their job. They're just there to be there. They are just mean.*
	3	0	0	PNL6-Not helpful	RT does not want to bothered with teaching students.	*P9NY: I was assigned to a technologist that didn't want to help, I lost a lot of practice opportunities.*
	3	0	0	PNL7-Gap between classroom and practice	RT not aware of proper procedures of positioning of exams equivalent to the theory taught in the classroom.	P1NJ: Sometimes techs do things differently than what we are taught. For example, certain

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						teachers hound us about collimating. But then the other techs are telling me, open it, don't collimate so much because you might risk cutting something.
	0	2	0	PNL8-Won't allow questions	RT does not want to bothered with teaching students.	*P7NJ: They just did the whole thing as I just stood there. I feel like they have to understand that students need the opportunities to finish exams. I understand it could get slow (slow them down)…but that's just a part of the whole (learning) process.*
	0	2	0	PNL9-Doesn't teach		
Practitioner Feedback	7	0	0	PF1-Gives sufficient feedback	RT providing enough feedback to student in terms of performance and evaluation of radiographic images.	*P3NJ: I get feedback…but I think the best feedback is them telling me that I did an amazing job and I did it good. No repeats and I just feel good about myself. So, the techs give a lot of good feedback and feedback where it's needed.*
	5	0	0	PF2-Gives little or no feedback	RT providing an insufficient amount or no feedback to student in terms of performance and evaluation of radiographic images.	*P6NJ: No. No, they don't. They're not really reviewing with you. It's like you take the image then on to the next one. Sometimes where they're by the computer and the image comes up right away,*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						they tell you take the next one and you don't even get to see that image before you take the next one.
Practitioner Positive Interpersonal Skills	4	0	0	PPIS1 - Understands students make mistakes	RT has a total understanding of the clinical education process and what it means to the students' education.	*P8NJ: He has a really good personality. I think that's what it is. Very open and welcoming. He would say and here's your patient, not his patient, my patient. Then he would say now you do it, okay?*
	3	2	0	PPIS2 - Welcoming personality		
	0	4	0	PPIS3 -Willing to teach and helpful		
Practitioner Negative Interpersonal Skills	5	2	0	PNIS1 -Yells at students	RT does not treat student with respect.	*P8NY: Don't yell at me like from at the control panel when I'm in front of the patient. That's what broke me that first week. I didn't want to go back and it was sad because it was like he scarred me and I didn't want to go through that again.*
	4	2	0	PNIS2 - Disrespects students		
	4	0	0	PNIS3 - No interest in students	RT does not put students' needs first.	*P7NJ: I just feel like sometimes they just want to do the cases and not deal with students so they can just have easier work day*
	2	2	0	PNIS4 - Unprofessional	RT does not treat student with respect.	*P12NJ: I just felt like I was isolated as far as his interaction with me. Anytime I would make a mistake or wasn't sure about something, he*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						would be very condescending towards me or just put me down as far as my images. I felt like it was a personal jab towards me. It was very embarrassing. That's just unnecessary.
	2	0	0	PNIS5 – Unavailable	RT does not put students' needs first.	*P12NJ: An example would be, when maybe they're having a bad day and they hand me the requisition and they tell me to go get the patient and do the case. I sometimes have to remind them they have to be in the room because I just can't do it without supervision but they are just no, go just do it.*
Independence When Performing Procedures with Practitioner	10	10	3	PIP1- Able to practice independently	RT allows students to perform procedures by making their own decisions on how to proceed.	*Q45: When you get to perform the exam and you get to decide how to position. When the tech talks with you and lets you do the work and gives you constructive criticism.*
	3	0	0	PIP1- Not able to practice independently	Students are not permitted, by the RT, to perform procedures making their own decisions on how to proceed.	*P11NJ: You can review the classroom information but there needs to be some practice. I don't learn from a clinical instructor that keeps on*

Practitioner	# Int.	# Que.	# Doc.	CODE	Definition	Examples
						going over and over something but not actually getting any hands-on practice. In the clinical environment I need to practice.
Practitioner Role & Responsibility	0	0	1	PCD1-JRCERT Accreditation Standards	Accreditation agency that delineates the actual responsibilities and performance expectations of the RT.	*The clinical staff (practitioner) understands the clinical competency system, the requirements for clinical supervision and supports the educational process. They maintain current knowledge of program policies, procedures and student progress.*
	0	0	4	PCD2-Curriculum Documents	ASRT and NJ & NY licensing documents outlining the manner in which clinical education is most successful.	*DNJL: Assumes a more active role in clinical responsibilities.*

Appendix P.

Member Checking

RE: Interview Transcription Verification
1 message

[redacted] Sun, Jan 12, 2020 at 9:47 PM

Good evening. Everything looks the way it occurred during the interview. I'm glad to be a contribution in your research project. Happy New Year.

Sincerely,

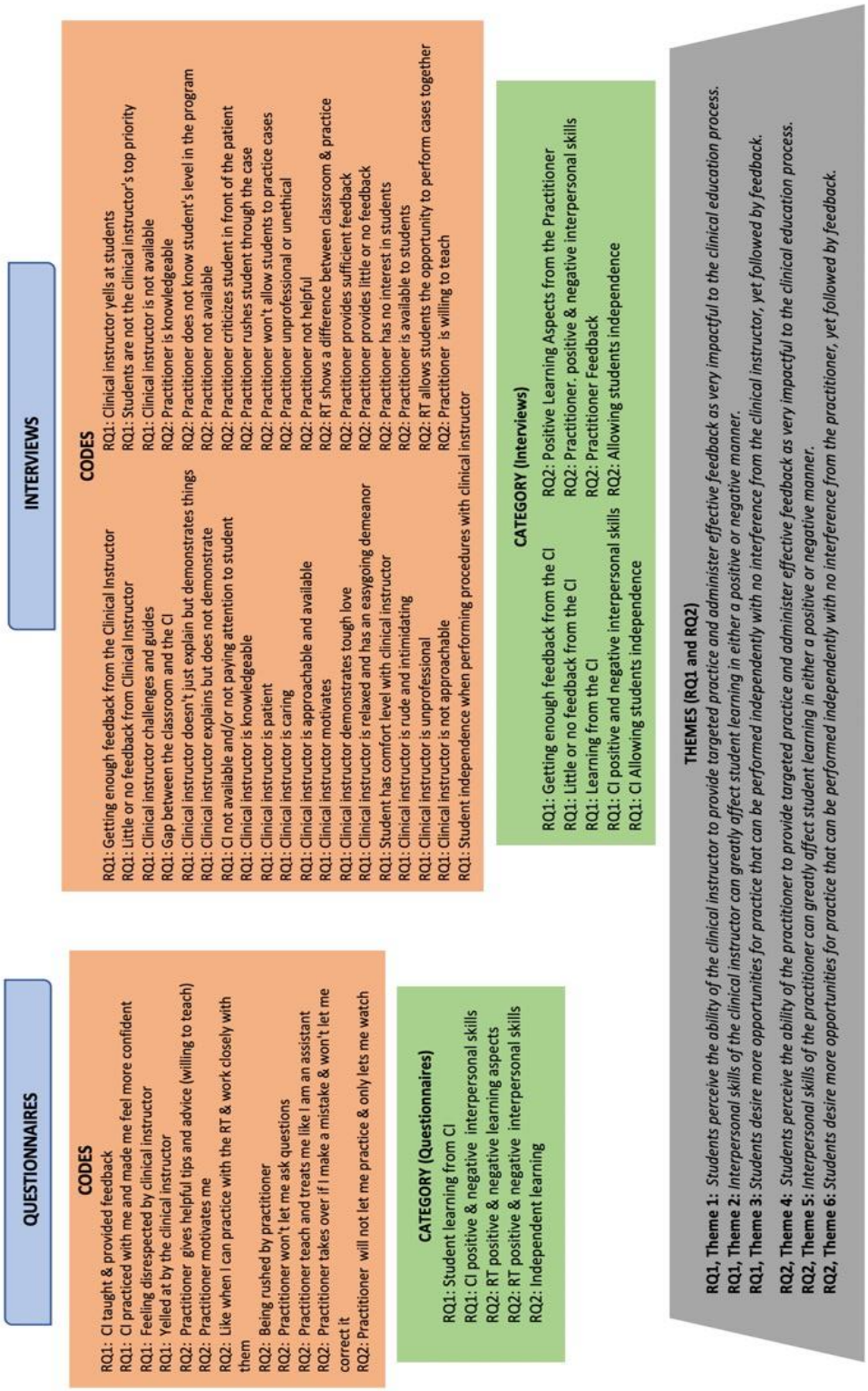
[redacted]

From: Jennett Ingrassia [redacted]
Sent: Thursday, January 09, 2020 6:08 PM
To: [redacted]
Subject: Interview Transcription Verification

H[redacted]
As promised, here is the transcript of our interview. Please take a few moments and look it over and let me know if it provides an accurate account of the interview. If there are any changes or deletions that you would like me to make, please do not hesitate to let me know.
I am looking forward to your response.
Take care and thank, again.
Happy New Year!
Jennett

Appendix Q.

Development of Codes to Categories to Themes



Appendix R.

Sample of Open-Ended Questionnaire Responses by Research Question

Questionnaire Responses to Open-ended Questions KEY: Research Question 1 Research Question 2 Unspecified		
Considering your time in the clinical environment, what are some of the most memorable moments you have experienced, and why?	**In terms of learning, what experiences in your assigned clinical rotation site were most effective, and why?**	**In terms of learning, what experiences in your assigned clinical rotation site were least effective, and why?**
Taking care of patients and being able to apply all knowledge and what I been learning at the classroom. Being part of the multidisciplinary team that participates in the evaluation of a patient for an accurate diagnosis.	**Hands on, rotation in different areas of the clinical site and working closely with the technologist with the opportunity of observation and then taking care of patients with supervision.**	N/a
In the last day in summer clinical, all of the technologists thanked us for all our help and appreciated our help.	How to deal with the patients because different patients need different things. We have to adjust our work to it. Making patients comfortable and trust what we do.	None
Bonding with certain technologists has helped me find certain skills that I can constantly use to be a good technologist	How to evaluate or asses a patient's condition, before taking further steps into taking images. This made my experience with the patient a lot easier.	
Having my **clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skills.**	**When the technologist takes the time to break down the steps they are taking and explain it to me while I'm actually performing the exam. It allowed me to do it myself in the right way**	**Going in the room with the technologist and them just doing the exam and treating you like you are their assistant, and rushing through the exam. This means that I can't watch what they are doing or get any hands-on practice.**
First clinical because my it was my first experience in the field.	**Encouragement.**	**Not able to ask questions to the technologist.**
One day I was in the trauma bay in one of my clinical sites. Our patient that came in with three gunshot wounds, one in the forehead, one in the shoulder and the other one in the hip. There was blood everywhere in that room. We took the X-rays on the chest and pelvis.	The rotation in the emergency department because you get to see everything and learn from it.	Operating room because as a student you don't get to do much.
The difficult case, that ones that are out of ordinary.	For most effective is when you are able to do a lot of cases. The repetition makes things more memorable.	**The least effective is when you are not allowed to practice. When I am just watching.**

Appendix S.

Development of Codes to Categories to Themes

Summaries with Coded Segments - Radiologic Technology Students' Perceptions of an Effective Clinical Learning Environment.mx18

Code	Coded segments
QUESTIONNAIRE: RQ1\THEME 1Q-RQ1 Learning & Feedback from the Clinical Instructor\CAT Q-RQ1: Student learning\CI practiced with me and made me feel more confident	Having my clinical instructor take the time to practice different positions that I wanted to work on with me and correct me or tell me if I have it positioned right. This just made me feel more confident in my skills. QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ1: 6 - 6 (0)
QUESTIONNAIRE: RQ1\THEME 1Q-RQ1 Learning & Feedback from the Clinical Instructor\CAT Q-RQ1: Student learning\CI taught & provided feedback	When my instructor asked me for image critique after competency tests and showed me how do a trauma patient. QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ1: 9 - 9 (0)
QUESTIONNAIRE: RQ1\THEME 2Q-RQ1 Clinical Instructor's Interpersonal Skills\CAT Q-RQ1: Clinical Instructors' Negative Interpersonal Skills\Feeling disrespected by clinical instructor	Being yelled at or handled disrespectfully/unfairly by clinical instructors QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ1: 13 - 13 (0)
QUESTIONNAIRE: RQ1\THEME 2Q-RQ1 Clinical Instructor's Interpersonal Skills\CAT Q-RQ1: Clinical Instructors' Negative Interpersonal Skills\Yelled at by CI during testing in front of patient	I don't like being yelled at while I perform competency testing. I can't learn like that and it stresses me out. QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ1: 12 - 12 (0)
QUESTIONNAIRE: RQ2\THEME 1Q-RQ2 Learning & Feedback from the Practitioner\CAT Q-RQ2: Positive Learning from the Practitioner\RT gives helpful tips and advice (willing to teach)	some technologists that gave me tips and helpful advice QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ2: 15 - 15 (0)
QUESTIONNAIRE: RQ2\THEME 1Q-RQ2 Learning & Feedback from the Practitioner\CAT Q-RQ2: Positive Learning from the Practitioner\Like it when RT teaches me one step at a time	When the technologist takes the time to break down the steps they are taking and explain it to me while I'm actually performing the exam. It allowed me to do it myself in the right way QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ2: 18 - 18 (0)
QUESTIONNAIRE: RQ2\THEME 1Q-RQ2 Learning & Feedback from the Practitioner\CAT Q-RQ2: Positive Learning from the Practitioner\RT feedback motivates me	the tech tells you how well you did. It's very encouraging and motivates you to do better. QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ2: 10 - 10 (0)
QUESTIONNAIRE: RQ2\THEME 1Q-RQ2 Learning & Feedback from the Practitioner\CAT Q-RQ2: Positive Learning from the Practitioner\Like when I can practice with the RT	Practicing with a helpful technologist QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ2: 14 - 14 (0)
QUESTIONNAIRE: RQ2\THEME 1Q-RQ2 Learning & Feedback from the Practitioner\CAT Q-RQ2: Positive Learning from the Practitioner\Working closely with the RT	working closely with the technologist with the opportunity of observation and then taking care of patients with supervision. QUESTIONNAIRE (SurveyMonkey) Transcripts\Questionnaire RQ2: 17 - 17 (0)
INTERVIEW: RQ2\THEME 1-I-RQ2 Learning & Feedback from the Practitioner\CAT I-RQ2: Negative Learning Aspects from the practitioner\Practitioner unprofessional or unethical	Then sometimes the technologists don't even care and they let you do it. I feel like I could repeat a billion times and they wouldn't care. INTERVIEW Transcripts RQ2\Int P7NJ RQ2: 23 - 23 (0)
	They don't like their job. They're just there to be there. They are just mean. INTERVIEW Transcripts RQ2\Int P9NY RQ2: 13 - 13 (0) For example, how they act with patients. Instead of giving them a blanket because they're cold, they just say were almost done more. If the patient has to use the restroom, they don't let them. I don't understand that… we can wait. The world's not going to end…give them a blanket…let them use the restroom. INTERVIEW Transcripts RQ2\Int P9NY RQ2: 15 - 15 (0)
INTERVIEW: RQ2\THEME 1-I-RQ2 Learning & Feedback from the Practitioner\CAT I-RQ2: Negative Learning Aspects from the practitioner\Practitioner not helpful	and say, here go do this. I would do it and then show him the images. That said he would just sit there pretty much. I mean, I wouldn't hear anything from him all day. He'd see a case there and let me do it. I liked that, you know, because I needed the practice to help me be better. As far as I could see, he didn't do much all day. INTERVIEW Transcripts RQ2\Int P1NJ RQ2: 9 - 9 (0)
	because I was assigned to a technologist that didn't want to help, I lost a lot of practice opportunities. I was one of those that was a little bit behind. I can't blame it on the technologist but maybe I should have been a little bit more assertive. I should have pushed a little bit harder because, you know, this profession is what I want to do. Because it's clinical, I should have been more assertive. INTERVIEW Transcripts RQ2\Int P9NY RQ2: 31 - 31 (0)
	One time I was in the pediatric intensive care unit...with the small babies. After we finished, I asked some questions about the technical aspects of the case, like why did he have to go back into the computer system and some questions about the equipment we used. I ask him like, why did you go back in the system and why do off the machine on this? He said, no, no, no, you don't have to know these things. INTERVIEW Transcripts RQ2\Int P10NY RQ2: 16 - 16 (0)
INTERVIEW: RQ2\THEME 1-I-RQ2 Learning & Feedback from the Practitioner\CAT I-RQ2: Negative Learning Aspects from the practitioner\Practitioner shows a difference between classroom & practice	Sometimes techs do things differently than what we are taught. For example, certain teachers hound us about collimating. But then the other techs are telling me, open it, don't collimate so much because you might risk cutting something. INTERVIEW Transcripts RQ2\Int P1NJ RQ2: 17 - 17 (0)
	When they just take over or if they just do the case different from what the book says, and they said once you become a tech, this is this is how it's done. INTERVIEW Transcripts RQ2\Int P2NJ RQ2: 21 - 21 (0)