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How the clinical settings of radiography programs affect learning perceptions

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University of Northern Iowa

HOW THE CLINICAL SETTINGS OF RADIOGRAPHY PROGRAMS AFFECT LEARNING PERCEPTIONS

A Dissertation

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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July 2007

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An Abstract of a Dissertation

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Approved:

_____

Dr. Lynn Nielsen, Chair

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University of Northern Iowa

July 2007

ABSTRACT

A main purpose of clinical education is to prepare practitioners who can deliver excellent skills and care vital to the health and safety of persons in their care and to society. Clinical education is an essential component for students pursuing careers as health care providers. The purpose of this study was to examine the place of clinical experiences in radiography programs and to describe how students and clinical instructors in three different radiography program models (bridging, external, and internal) perceived the learning experiences in clinical settings.

From the perspectives of students and clinical instructors the following questions were addressed:

1. What impact does learning in a clinical setting have on the professional preparation of radiographers?
2. Is there a difference in the way traditional and nontraditional students experience learning in a clinical setting?
3. Is there a difference in the way clinical instructors and students perceive learning in a clinical setting?

This study was exploratory and non-experimental. A qualitative approach was utilized. Through observations and interviews, data was collected. Participants in this study were selected from three different models of clinical education. Three students were selected from each of the three models. Two of the selected students were considered traditional students and one student was considered a nontraditional student from each of the three models described. The students were considered in their

educational institutions as level II or second-year students. One clinical instructor was selected from each of the three program models represented. These clinical instructors provided instruction, supervision, and evaluation of students while in the clinical setting. Through on-going data analysis emergent themes were identified. This study indicated that various aspects of the clinical environment affect the quality and perception of the students' learning experiences. These themes/categories were expressed across the three radiography program settings (bridging model, external model, and internal model): (a) learning opportunities and integration of knowledge, (b) trust and fairness, (c) attitudes and socialization to radiography clinical sites and (d) supervision, evaluation, and recognition.

This study provides rich descriptions of the perceptions of students and clinical instructors in the clinical setting. These descriptions suggested bridging the gap from theory to practice was accomplished through the students' experiential learning that actively engaged the subject matter as they participated in the clinical settings throughout their respective programs. Students from all three program models recognized a connection between what was taught in the classroom and applying that knowledge in clinical practice. Clinical experiences were perceived to be valuable in the learning process in the three program models. The importance of attitudes displayed and the sense of acceptance and belonging in the social culture climate within a clinical setting was stressed throughout the three program models. In a positive encouraging environment, the learning experience was greatly enhanced.

DEDICATION

This dissertation is dedicated to my loving and caring husband Glen. His faith in me made this journey possible. He gave me the support and encouragement to begin and to bring this project to completion. His continuous trust and confidence in me made it possible for me to accomplish this goal.

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CHAPTER 1

CONTEXT OF STUDY

A main purpose of clinical education is to prepare practitioners who can deliver excellent skills and care vital to the health and safety of persons in their care and to society. Clinical education provides opportunities for student learning at a hospital, clinic, or physician's office. Clinical education provides students with supervision, instruction, and evaluation by professionals in the field as students observe, participate, and apply skills and knowledge. Learning in the clinical environment depends on access and opportunity for experiences. Dewey (as cited in Archambault, 1964, p. 4) stated, "What then is education when we find actual satisfactory specimens of it in existence? In the first place, it is the process of development, of growth. And it is the *process* and not merely the result that is important."

A clinical component of education is essential for students pursuing careers as health care providers. Variables that have an impact on the clinical environment include various aspects of communication, curriculum theories, supervision, instruction, organizational models, social and cultural context, cultural diversity, planning, assessments, advances in technology, and ages of patients. "Clinical education continues to pose many challenges for educators, as more effective ways of facilitating students' learning and enhancing learning outcomes are sought" (Yates, Cunningham, Moyle & Wollin, 1997, p. 508). Clinical education provides an integral experience for students to apply, develop, and extend their knowledge and skills from their classroom and lab experiences. However, Yates et al. (1997) recognize that there are several challenges.

More effective methods to facilitate student learning and enhance learning outcomes are desired. Bok and Jameton state, "Over the years, discussions of education and training for allied health have commonly included a distinction between the teaching of theory and the teaching of clinical practice" (as cited in Bench, 1999, p. 179).

The literature supports that clinical experience for the preparation of professionals for radiography should consider or reflect a constructivist/integrated approach in both the curricular and instructional components of this preparation. "Learners are not blank slates. They construct their own understanding and this may or may not be consistent with what we are trying to get them to learn" (Prawat, 1989, p. 317). Clinical experiences provide radiography students the supervised opportunity to apply what is learned in the classroom. This supervised clinical experience is provided throughout their professional educational program of study. This process is designed to develop competent professionals in radiography. In the clinical environment radiography students need to be able to demonstrate competencies in a variety of situations, while encountering a variety of patients.

This study will seek to explore the students' and clinical instructors' perceptions related to skills, attitudes, values, and social interactions exhibited in the clinical settings. These attributes demonstrated in the clinical setting have an impact on the place of clinical education in radiography programs.

Diverse learning environments will be a constant challenge for educators since student learning styles are different, with various cultural influences. The challenge is in describing what the connections are between the classroom and clinic while identifying

the instructional characteristics in both environments that result in optimal learning, bridging theory to practice. "We now realize that it takes time to foster understanding, partly because students develop powerful ideas of their own that frequently interfere with what we want them to learn" (Prawat, 1989, p. 317). Utilizing a variety of environments can enhance the learning of students who participate in an active clinical experience. Usually an educator can see the proverbial light bulb turn on when the learner makes a connection. Marsh and Willis state from Fullan (2003, p. 186), "Connection with the wider environment is critical for success. (The best organizations learn externally as well as internally.)" Every experience the learner comes in contact with may have some impact on how they will process information and whether or not they will retain and store that knowledge or skill. Each patient the student cares for and images (takes a radiograph) is an unique individual. No two experiences or patients will be the same. The various cultural backgrounds of patients the students will encounter in the clinical areas will continue to increase as the patient population becomes more diverse.

> Experiences aren't truly yours until you think about them, analyze them, examine them, question them, reflect on them and finally understand them. The point, once again, is to use your experiences rather than being used by them, to be the designer, not the design, so that experiences empower rather than imprison. (Hackman & Johnson, 2004, p. 347)

Communication in the clinical environment is complex. Students need to be able to communicate effectively to benefit from their clinical experiences. Clinical education assignments place students in an environment where they will have to process and evaluate a variety of views and values, and where there are numerous practice methods available to achieve the necessary outcomes. As students participate at different clinical

sites, they will have to find ways to identify and join the organizational structure that is currently active. How students identify and involve themselves in clinical experiences may demonstrate that "identifying allows people to persuade and to be persuaded" (Cheney, 1983, p. 342).

Purpose of the Study

The purpose of this study was to examine the place of clinical experiences in radiography programs and to describe how students and clinical instructors in three different radiography program models (bridging, external, and internal) perceived the learning experiences in clinical settings.

Research Questions

Specifically this study seeks to address the following questions.

1. What impact does learning in a clinical setting have on the professional preparation of radiographers?
2. Is there a difference in the way traditional and nontraditional students experience learning in a clinical setting?
3. Is there a difference in the way clinical instructors and students perceive learning in a clinical setting?

Need for the Study

There is a need for research related to clinical experiences in radiography in order to continue to identify, develop, and improve clinical learning opportunities for radiography students. It is vital that graduates from radiography programs be prepared to provide competent and proficient skills, have an understanding of how to make

professional decisions, and know how to provide effective patient care. Literature supports that critical thinking and problem solving processes are essential, as students are required to construct new knowledge in the clinical environment through a variety of learning experiences. Rogers (1996, p. 95) states, "The learning involved relies upon the adaptation of knowledge and experience gained in other spheres of activity to the current issue."

Learning new methods and concepts through multiple roles and perspectives will help students build on previous experiences and knowledge. This allows students to be active in an authentic learning environment with experts in the field acting as role models. These role models foster support for the students as they collaborate to construct new experiences, solve, and learn from problems as they prepare to become professional radiographers.

Every learning opportunity is unique due to the variables involved, such as the learner, the mix of learners, time, and the environment. The teacher's role is not only to use instructional methods through which students are given the opportunity to reconstruct their experiences, but also to use the most appropriate techniques in evaluating students' experiences. Ferguson and Jinks (1994) relate several factors leading to discrepancies regarding what is taught in the classroom and in clinical settings. These factors include organization and sequencing of theory and practice in the curriculum, the role of tutors in clinical areas, teaching responsibilities of clinical staff, increasing pressures in higher education, and the affect of the hidden curriculum.

Radiography students spend hundreds of hours in clinical settings. Hospital-based programs can require 1,801-4,000 clinical hours. Academic programs can require 1,200-1,800 clinical hours (Van Valkenburg, Veale, Caldwell, Lampignano & Hairfield, 2000). The clinical settings in which students are placed affect their opportunities for learning. Learning in the clinical setting can be difficult due to the dynamic changes that occur in varying situations. This study will describe how knowledge, attitudes, communication, and critical thinking processes are influenced by the student's placement at a clinical site. Through this descriptive study, clinical activities and practices may be identified to enhance learning in the clinical setting.

Learning in the clinical environment occurs within a complex social context (Windsor, 1987). Merriam (1988, p. 32) argues, "The case study offers a means of investigating complex social units consisting of multiple variables of potential importance in understanding the phenomenon." Each clinical setting is specific and unique in its organizational structure and processes. Not all experiences that students have in clinical settings provide for future growth. Sometimes there are inappropriate role models. Students may learn and repeat behaviors that are not optimal. As a result, unlearning and re-learning may need to take place. The clinical setting has essential implications because it affects equity, caring, values, communication processes, personal and professional outcomes, and accountability. This study will explore how the following elements of content knowledge, relationships, communications, and approach to instruction exhibited in the clinical setting influence students' and clinical instructors' perceptions of their learning experience.

Limitations of the Study

The limitations of this study include a small sampling of students and clinical instructors. The study was limited to radiography programs in the Midwestern United States. Participation in this study was voluntary. Generalization of results is limited.

Definition of Relevant Terms

For understanding and consistency of relevant terms important to this study, the following definitions are defined for clarification:

Bridging model: The theory is taught in an educational institution and the financial and administrative responsibilities are separated from the clinical institution.

External model: The teaching of theory is *divorced* from the clinical setting. All of the students' theory instruction is at the college or university and the clinical education is provided by other health care service providers and is instructed by the staff of those provider institutions (Bench, 1999).

Internal model: Teaching of theory and clinical instruction is conducted within the same institution. The hospital or clinic has an internal education department that provides both theory and clinical education (Bench, 1999).

Level II student: A radiography student enrolled in the second year of study within the program. These students have successfully completed a first year within the program.

Nontraditional student: A student who enrolls in the radiography program and is at least 25 years of age.

RT: Radiologic Technologist, "medical imaging professional who uses x-rays to produce diagnostic images" (Gurley & Callaway, 2006, p. 4).

Second-year student: A radiography student enrolled in the second year of study within the program. These students have successfully completed a first year within the program.

Traditional student: A student who entered the radiography program directly after high school or between the ages of 18 and 24.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Clinical experiences are vital in the learning process for students pursuing careers as health care providers. There is an ongoing interdisciplinary discussion to identify the essential skills, knowledge, and understanding necessary for student learning in the clinical environment. Education takes place in everything we do. "If education is life, all life has, from the outset, a scientific aspect, an aspect of art and culture, and an aspect of communication....The progress is not in the succession of studies, but in the development of new attitudes towards, and new interest in, experience" (Dewey as cited in Archambault, 1964, p. 434).

Prawat (1989) said there are three attributes important to teaching for understanding. First, instruction should be focused and coherent. Instruction is based on a teacher being able to communicate a central set of ideas or concepts. Second, utilize an interactive style of negotiation among all parties in the learning process. This involves the social nature of the learning process. Third, is analysis/diagnosis, which reveals how students are learning through continuous assessment. These attributes are essential as radiography students strive for excellence in the clinical environment.

Historical Context

The traditional approach to clinical education started with the apprenticeship practice model. Nursing education hospital schools provided students their instruction to become professional nurses until the 1960's. Apprenticeship practice is an effective

method as perceived by the profession, however hospitals began to establish nursing schools to reduce costs and to ensure a labor force (Taylor & Care, 1999). Universities and colleges changed the course of study to an emphasis upon the theoretical component of nursing as opposed to a model wherein a student nurse was considered part of the hospital staff (Taylor & Care, 1999).

X-rays were discovered in 1895 and radiology education began. Clinical radiology education focused on the apprenticeship approach with Marie Curie training herself as an x-ray technician and providing training to French and American soldiers. Physicians who experimented with x-rays trained x-ray technicians on an as-needed basis. When more formal education was desired a few hospital based programs provided training (Joint Review Committee on Education in Radiologic Technology, 2003). The first hospital-based programs provided little course work and thousands of clinical hours for the students to complete, either in a one-year or a two-year program. As technology increased so did the need for more formal classroom instruction along with clinical experience.

In 1918 The Cardinal Principles of Secondary Education report said that vocational specialization was impacting family life, according to Marsh and Willis (2003). During that time the national certification test for radiographers, called The Registry, "was created to introduce a higher degree of technical expertise and ethical standards into an occupation still searching for professional status. The Registry adopted testing guidelines for registering x-ray technicians in 1923" (ASRT History, n.d., p. 1). Marsh and Willis (2003) recount that during the 1940s and 1950s after the cold war

began, the nation moved toward a more traditional approach to education. The U.S. Army established the Army School of Roentgenology at the University of Tennessee in 1942, which utilized the John Gaston Hospital in Memphis to provide clinical experiences (Gurley & Callaway, 1996). During this time the emphasis was to teach subject-centered curricula. In 1952 the American Society of X-ray Technicians (ASXT) wrote the first standardized radiography curriculum (Olmstead, 2003). "In 1940 there were 90 accredited schools for x- ray technicians in the United States and by 1946 that number had swelled to 130 – a 45% increase in just six years" (ASRT History, n.d., p. 1).

In response to the curriculum requiring an emphasis on formal education and accreditation standards, "in 1964 the technicians' national society changed its name to the American Society of Radiologic Technologists (ASRT) to reinforce a semantic distinction between technician – a term that the society believed implied a worker with minimal on-the-job training – and technologist, a highly skilled, well-educated professional" (ASRT History, n.d., p. 1). Currently there are several educational paths for students to choose in radiology sciences. There are the hospital-based programs, which require 1,801-4,000 clinical hours, or academic programs, which require 1,200-1,800 clinical hours (Van Valkenburg et al., 2000). As radiology education continues to develop, it is important to recognize the impact of selecting and implementing a particular curriculum theory. Marsh and Willis (2003, p. 102) indicate, "the interest is primarily on creating theory that identifies and solves practical problems of schooling."

Description and Evaluation of Common Approaches

The predominant curriculum theory used within a program will have an impact on learning and behaviors in the clinical environment. Marsh and Willis (2003) described three types of curriculum theories to consider: the prescriptive, descriptive and critical-exploratory. Ralph Tyler represents the prescriptive approach, its attributes include a curriculum based on four concepts: selecting objectives, selecting learning experiences, organizing learning experiences, and evaluating. He contended that addressing these items in a systematic order would allow for answers to later questions. Tyler describes three sources of knowledge: learners, contemporary society, and subject specialists. Tyler's method involves utilizing the educational philosophy and psychology of learning to develop objectives for the curriculum.

There is some uncertainty in Tyler's approach with regard to how to select objectives and how to handle some of the obtained data. There seems to be a gap in relating the planned curriculum to the enacted and experienced curriculum. Since the ends are selected first in this approach there is less flexibility to carry out the enacted curriculum (Marsh & Willis, 2003). Tyler's approach limits learning that may occur in the clinical environment. The main focus in this approach appears to be on the objectives and the instructor and not on the learner. However, learning is not typically an event but a process. When students and patients are involved there are many factors affecting life events and learning because learning does not happen in a vacuum. The clinical environment is not predictable and preset course objectives may limit other learning opportunities that are required in order for the student to be successful in a particular

situation. Each situation may require a different approach because each patient is unique, various background factors to be recognized.

Walker's approach is deliberative, and identifies with the descriptive theorizers. In Walker's philosophy all participants engage in the development of a curriculum, so everyone understands the purposes and complexities of the processes. He identified a three-step approach: platform, deliberation, and design. He termed this his *naturalistic model.* The platform step allows for everyone to discuss perceptions or beliefs. The deliberation step is where facts are identified to provide for the *means* to reach the *end.* The design step is when action can occur from decisions made in the previous steps (Marsh & Willis, 2003).

This deliberative approach may not identify all the *means* to reach the *end* within the clinical environment. There are multiple sources of data to be recognized for every learning situation. When *everyone* discusses their perceptions or beliefs in the platform part of this process, who will represent the various patients' cultures, age groups, or social backgrounds in the clinical environment? Each experience a student encounters in the clinical environment can connect with a previous experience to provide the necessary scaffolding to help in that student's current learning. This approach recognizes that each situation is unique. The problems that students encounter in the clinical environment require that each case be considered independently. Students need to interact with the environment, which is important for successful understanding and application.

Eisner's approach is considered an artistic approach and identifies with the critical-exploratory theorizers. Eisner's view is that the seven parts developing a

curriculum can be examined in any order. The seven parts include: goals and their priorities, content of the curriculum, types of learning opportunities, organization of learning opportunities, organization of content areas, mode of presentation and mode of response, and types of evaluation procedures. He maintains there are many ways in which individuals create meaning and a variety of ways to display, respond, and evaluate views and values. Specific objectives do not always have to be set before an activity. General terms can allow for development within in the curriculum. Eisner included three basic sources to consider in developing curriculum: the individual, society, and subject matter. He stresses that evaluation should be active throughout the process and not be the final step in the process (Marsh & Willis, 2003). These processes for developing a curriculum are most beneficial when there is a connection with the real world. Learning in the clinical environment can benefit from this curricular approach to enable students to apply their knowledge in a variety of situations.

All three curriculum theories would be beneficial to draw upon within different stages of the clinical experience. Students need to know what is expected of them. There are specified objectives that must be accomplished to maintain accreditation standards. Novice students would require a more prescriptive approach especially in terms of patient care and student safety. Tyler furnishes a rational and logical approach to the behavioral tasks to be measured. Walker's deliberation step would be a valuable tool to utilize because there are many perceptions and beliefs involved in the clinical experience. Walker provides helpful ideas for the complex process of developing curriculum and meeting needs during the clinical experience. Eisner's approach is useful since clinical

education is an art and science brought together to meet the students' interest, societal needs, and subject matter. Clinical practice requires purposeful outcomes and flexibility for all individuals involved.

Integration and Expectations of Traditional and Nontraditional Students

The category of college students age 25 years and older has grown from 4 million in 1980 to more than 6 million in 2000. Nontraditional students currently make up 40% of the total U.S. undergraduate population (National Center for Education Statistics, 1997; as noted in U.S. Census Bureau, 2001). Schuetze and Slowey (2002) identified that higher education has expanded in modern industrial societies to include a more heterogeneous student population than in the past. This expanded student population is more diverse with regard to social and economic status, cultural and family background, previous education, motivation, gender, age, and current and future occupation.

Radiography programs tend to have a mixture of traditional and non-traditional students. These programs typically do not offer opportunities for students to attend part-time. Klein, Scott and Clark (2001) suggest that traditional and nontraditional students may be conceptualized according to their needs and preferences for learning opportunities. Students considered traditional might also have the same needs or consideration as adult nontraditional students when these traditional students have a more distant permanent residence. Radiography programs are typically two-year programs. These programs require several hours of didactic (classroom) study accompanied by a high number of contact clinical hours. Clinical hours can vary from 1,000 to 3,500 hours within the two years, depending upon the program's curriculum. These requirements

reduce the opportunity for students in these programs to attend part-time. In many situations these students may be considered part-time but due to the high number of clinical hours required these students are in clinical settings for more hours than are full-time students attending other educational programs. The majority of classes and clinical assignments that radiography students are required to attend are only offered during the day. Clinical schedules vary. Students can be scheduled as early as 7:00 a.m. and as late as 10:00 p.m. There are occasional weekend rotations as well. It can be extremely difficult for a radiography student to maintain a full-time or even a part-time job while enrolled in a two-year radiography program.

Toynton (2005) suggested an interdisciplinary approach to provide mature students with life-long learning skills. Interdisciplinary educational experiences can assist the mature student to integrate their own life experiences into their current discipline of study. Students in radiography programs ought to be able to pull from their prior knowledge base as they participate at their clinical settings, labs and classes.

Nontraditional and traditional students perceived effective teaching differently. Personality and interaction behaviors were more important for nontraditional students, according to Toynton (2005). These students indicated wanting practical applications to real problems, and instructors who were enthusiastic and loved their subject. Behaviors to enhance grades were determined to be more important to the traditional students, indicating they wanted reviews before an exam, instructors to be available outside the classroom, and instructors who moved throughout the classroom (Keller, Mattie, Vodanovich & Piotrowski, 1991). Toynton (2005, p. 115) concluded, "The greater the

freedom given to the learner to adapt and interpret the taught material through their own understandings, the greater the learning is likely to be."

Landrum, McAdams and Hood (2000) found that a difference existed between traditional and nontraditional students in terms of motivational factors. Traditional students up to 24 years of age indicated they were motivated extrinsically: through approval by their friends, parents and professors. Nontraditional students, age 25 years and older, indicated they were motivated intrinsically: through trying their best, understanding the subject, learning something new, and learning practical skills that they can use. Lively (1997) noted that older students were inclined to be more focused and had a favorable effect on younger students in their classes. They can enhance the quality of instruction. Also, nontraditional students were positive role models as they demonstrated more dedication to complete their education.

Significant differences between traditional and nontraditional students have been identified. Landrum et al. (2000, p. 91) stated, "Nontraditional students report having more children, a higher grade point average (GPA), more satisfaction with college, more enjoyment of school and learning, more agreement with grades reflecting actual learning, and more agreement with professors caring about learning." Klein et al. (2001) contended it was important to consider whether the students will be community-centered or campus-centered:

> Campus-centered students reside in University housing, in quarters supervised ...most likely to be from another community. They tend to participate in traditional undergraduate activities...and take more classes/credit hours per term than others. Community-centered students live with their families or in their own homes. They are married, have children and /or have (or seek) full-time employment, and do not participate significantly in traditional undergraduate

> activities. They may carry a 'full load' of courses, but tend to take fewer courses credit hours. (p. 47-49)

Lively (1997) argued that mature students seek, "to meet business demands, to upgrade their skills, to advance their careers, to complete a degree, to establish or maintain contact with another culture for business or personal reasons, or to gain personal enrichment" (p. 33). Smith and Sugarman (1984) found that nontraditional students were more satisfied with registration processes, the location of the school, and attended more daytime classes than traditional students. Results showed that traditional students tended to attend schools full-time, enrolled for more hours, and had higher high school grade point averages.

Financial assistance such as tuition reimbursement from current employers tended to be a contributing factor for nontraditional students in their decision to continue their education (Piscik, Amerson & Lubawy, 1993). Johnston and Thomas indicated these factors influenced academic performance and the likelihood that a student would remain in higher education after their first year: age, academic preparedness, attendance, academic experience, hours of paid employment, institutional expectations, hours of academic study, academic and social match, family pressures and/or support, university support, attendance and successful match of their program of study (as cited in Laing, Chao & Robinson, 2005). Rhodes and Nevill (2004) found that satisfaction for both traditional and nontraditional students involved issues that are internal and external to the university. These included teaching and learning, debt and money worries, workload, and support.

Educational institutions have often viewed nontraditional students negatively because they do not fit well into the traditional educational framework. "Thus, the boundaries tended to be drawn around all those who had not entered directly from secondary school, were not from the dominant social group in terms of gender, socio-economic status, or ethnic background, or were not studying in a full-time, classroom based mode" (Schuetze & Slowey, 2002, p. 313). Traditional students entering higher education typically had a family background consisting of previous perceptions and expectations of higher education (Laing et al., 2005). Dill and Henley (1998) found a significant difference between traditional and nontraditional students in their perceptions of stressors. Traditional students were more concerned about school performance, peer events, and social activities. Nontraditional students were concerned about responsibilities in the home. These students reported that they enjoyed going to classes and doing homework more than traditional students. Traditional and nontraditional students in higher education are perceived as two different groups. However, with the rising trend of nontraditional students enrolling in higher education the distinction between the two groups may become blurred (Schuetze & Slowey, 2002).

Constructivist Clinical Preparation for Radiographers in the Real World

It is essential that students develop the ability to communicate in various social and cultural clinical environments. There are numerous methods to modify instruction for various learning environments. "The Constructivism theory may be one viable lens for viewing teaching and learning in health education" (Ubbes, Black, & Ausherman, 1999, p. 67). "Learners who participate in both individual and collaborative processes

can construct and reconstruct meanings about their health and educational status better than either process alone." (p. 67).

Instructors should acquire a wide repertoire of approaches, methods, and strategies to connect and communicate with their students. Students need diverse, intricate, and irregular examples to be able to fully perceive novel problems and solutions. "Our ability to draw on previous knowledge in new situations is also very much influenced by how it is organized" (Prawat, 1989, p. 318). Engebretson & Littleton (2001) present a constructivist-based model that includes social values and beliefs to accommodate the health care system and the social context. This model's assumptions include:

1. Health care occurs in a social context. Thus, the general culture and the cultural heritages of the person interacting in any health care process influence any health care encounter.
2. Self –determination is a foundation for health care interaction. This recognizes the agency of the client in any encounter.
3. Health care is an interactive process requiring the participation of both client and health care provider.
4. Both client and provider bring expert knowledge to the interaction. (p. 224)

Communication in the clinical environment requires the participation of several stakeholders. Currently, the following components are deemed necessary for most clinical education experiences. Clinical education requires clinical sites that may consist of hospitals, clinics or doctor offices where students can apply theory to practice. Clinical instructors, faculty, preceptors, mentors, and physicians supervise and instruct the students. Students are provided with rules and guidelines to facilitate their novice learning as they proceed to become experienced health care providers. The numerous stakeholders involved ought to realize, as Reid states,

> Just as the contradictions of the ambiguous meanings of "learning community" disappear when we move from the realm of the theoretic to the realm of the "practical," so, too, do other contradictions, such as that between individual aspirations and societal constraints. Only under conditions like these can visionary impulses be seen as imperatives for action, and Schwab's concern is not for the articulation of ideals, but for their pursuit, which can come about only through action. We begin to see that his espousal of "the practical," far from being a sell-out to a pragmatic, problem-centered approach to curriculum problems, can represent a principled choice of a philosophic conception of the relationship of theory to practice that enables curriculum making to become the responsibility of a "moral community." (2001, p. 37)

According to Engebretson and Littleton (2001) the constructivist paradigm is valuable since it takes into account differences in human perspective and makes available a method to understand and study constructed meanings and assumptions. King (1995, p. 16) explained:

> When we are engaged in peer interaction, we discover that our own perceptions, facts, assumptions, values, and general understandings of the material differ to a greater or lesser extent from those of others. When confronted with these conceptual discrepancies, we want to reconcile the conflicts. To do so, we must negotiate understanding and meaning. And this negotiation, this co-construction of meaning, occurs through explaining concepts and defending our own view to each other.

According to Campbell, Larrivee, Field, Day and Reutter (1994), the first major factor influencing students' learning in the clinical setting was support from clinical instructors. The second was peer support. Cobb (1998) suggested a key principle of constructivism: is learners resolving dissimilarities and reaching a shared understanding, thus allowing for their thinking to be progressively restructured. The process of learning how to formulate questions and pose problems can provide just as much instruction for the learner as knowing the answers (Fernandez-Balboa, 1993).

The constructivist's position is that knowledge must be constructed by the learner for and by him/her self (Blais, 1988). The clinical learning environment is a complex social context. Clinical practice is a time of transition for students to synthesize knowledge and practice skills acquired during clinical practice in a working situation (Chan, 2002). Each individual will construct their particular view of the world as they see it in order to maintain control within their environment (Von Glaserfeld, 1989).

Constructivists propose that students construct knowledge to make sense of their own practical understanding of their experiences. Individuals react within their environment in response to their perceptions of it (Blais, 1988). Piaget (1968) explained the process of equilibration, which is the self-regulating process of individuals adapting to their environment. If the individual is unable to understand the phenomena occurring then the person will try to be assimilated or to accommodate to the environment or situation. Assimilation requires less change of the person due to their existing conceptual knowledge. With accommodation, the person is unable to explain their observations according to their present understanding, this state of not knowing can lead to new cognitive construction. The constructivist view is that knowledge is individually created through experiences. Students' motivation for learning may be enhanced if they perceive it as relevant to their life (Jardine, 1998).

Individuals develop in relation to their social and physical environment. Hence, learning comes from experience and since experience is continuous so is learning. Almost everything a person has learned is constantly being relearned (Rogers, 1996).

According to Peters (2000, p. 166), "Constructivism values sociocultural influences in the learning process and endorses the building of knowledge on previous learning, as opposed to the dismissal of that knowledge often seen in traditional formal learning settings." Effective practitioners in fields such as medicine or engineering will respond to new problems via strategies which are based on previous experience (Lovell, 1980). Md Anisur Rahman stated, "Knowledge cannot be transferred-it can be memorised for mechanical application, but learning is always an act of self-search and discovery. In this search and discovery, one may be stimulated and assisted but cannot be taught" (as cited in Rogers, 1996, p. 105).

Clinical Educational Models

The organizational model, in which students participate in the clinical environment, produces communication processes unique to that model. The organizational model will impact how students may need to communicate and identify with their clinical setting. Bench (1999) describes three different models of clinical education that ought to be considered in planning. The first model is an external program model in which the teaching of theory is *divorced* from the clinical setting. All of the students' theory teaching is at a college or university and the clinical education is provided by other health service providers and instructed by the staff of those providers. This model allows educational issues to be kept distinct from clinical services issues. Disadvantages in this model include the difficulty of making theory relevant to practice, formal accreditation and accountability processes, and costs of clinical education to the health services.

The next model is an internal program model in which teaching of theory and clinical instruction is conducted within the same institution. This model usually involves a hospital or clinic with an internal education department that provides both theory and clinical education. An advantage of this model is the continuity between teaching theory and teaching clinical. However, there are several disadvantages. Educational issues can complicate clinical issues. It is expensive for the clinical institution. It may encourage narrow-minded apprentice-style training. There are challenges involving accreditation and accountability issues (Bench, 1999).

The third model is the bridging program model in which theory is taught in an educational institution and the financial and administrative responsibilities are separated from the clinical institution. In this example arrangements are made so that the theory teacher will also teach clinical and some clinicians will also teach theory subjects. Usually this is accomplished through honorary appointments. This model recognizes and preserves the specific distinctions between clinical services and education. Difficulties involving accountability are resolved through the use of honorary appointments. Clinical and educational accreditation issues are kept separate (Bench, 1999).

Changes in the health care delivery system demand innovative educational approaches resulting in a radiologic technologist graduate with a more extensive knowledge base as well as more sophisticated technical abilities. One approach to relieve the time and curriculum pressure is for institutions with two-year programs to develop articulation agreements with four-year institutions. Articulation deals with the transfer of students' credits and classes from a two-year program to a four-year college or university

perhaps leading to a baccalaureate degree. The ideal transfer of credits into a baccalaureate program should be accomplished with a minimal loss of credits or duplication of courses. The Kentucky Allied Health Project (KAHP) provided a way for radiological sciences programs in Kentucky to develop articulation programs (Council on Higher Education, 1982). Pre-professional courses in mathematics and sciences would need to be increased. These students would need more variety and more classes completed in mathematics and science to enter these higher-level radiological technology programs.

Financial cost containment is eased with the articulation method. Some of the best students in radiologic sciences simply cannot afford the four-year degree. If four-year programs became mandatory, some low-cost or tuition-free hospital-based programs would be eliminated (Hostetler, 1992). The certificate radiologic technology hospital-based programs are the least expensive method to become a registered technologist (Council on Higher Education, 1982).

Tarpley, Tarpley and Morris (1992) completed a study of Mississippi students and found a significant variance between students who planned to attend community or junior colleges and students who planned to attend other colleges based on their American College Testing (ACT) assessments. Students accepted into radiologic technology programs needed to obtain a minimum ACT score of 18. These scores were typical of students entering college-based programs. Tarpley et al. (1992) found that students with an ACT composite score averaging 16.94 tended to select a two-year community or junior college. They also showed that community and junior college students differed

from other college students in the following characteristics. These students expected to attain lower levels of post-secondary education, lived closer to home while attending college, attended a college with a smaller student enrollment, had lower first year college GPAs, and paid lower tuition. The student population differed in having a higher percentage of white students, older students, and female students.

Recognizing which program model is being utilized for students to acquire education and clinical experience, the student will need to accommodate or assimilate to each unique organizational environment. Each clinical setting will operate with certain types of organizational communication processes specific to that clinical setting which will affect the health care professionals that participate in the students' learning experiences. Krone, Jablin, and Putnam (1987) articulate four conceptual perspectives toward organizational communication. First, the mechanistic perspective emphasizes the channel and transmission of the message. It is perceived as a transmission process in a linear association between communicators. Communications are connected in a *chainlike* relationship, which suggests that communication breakdowns can occur easily when a barrier obstructs a message's transmission and reception. This perspective identifies communication as *materialistic*, which implies a message as a concrete substance with spatial and physical properties.

Second, the psychological perspective focuses on how characteristics of individuals affect their communication. The attitudes, cognitions and perceptions of individuals affect how an individual will filter and process their information. Receiver-

orientation is of greater emphasis within this perspective than a sender-transmission focus as in the mechanistic perspective.

Third, the interpretive symbolic perspective is the most humanistic of the four perspectives discussed. Behavior in this perspective is developed through social interaction. It is contextual in that change occurs in relation to changes in the social environment. Cultural circumstances have an influence on how information is processed and interpreted. Brown (1963, p. 3) articulates that culture normally "refers to all the accepted and patterned ways of behavior of a given people. It is a body of common understanding...the sum total and the organization or arrangement of all the group's ways of thinking, feeling and acting".

Fourth, the systems interaction perspective (Krone et al., 1987) attends to external behaviors. The emphasis is on tracking patterns of repetitious behaviors to determine what behaviors are likely to reoccur or become eliminated. Birdwhistell points out, "an individual doesn't do communication, he becomes a part of communication" (as cited in Jensen, 2003, p. 6). Considering all four perspectives on communication, none is more worthy than another. The communication process makes use of each one to enhance communications within an organization (Krone et al., 1987).

When students participate at a clinical setting they become part of that organizational model. It is important to set ground rules and to have specific facilitators to enhance the clinical process. A good planning procedure will result in fewer roadblocks later in the implementation process. With many different viewpoints and professionals actively engaged in designing a program for student learning the potential

for problems in the implementation phase will be lessened. Joint ownership and vested interest are two important elements that will develop and motivate collaboration. Student involvement and responsibility will affect student identification with that clinical site. Cheney states:

> Identification with organizations or anything else-is an active process by which individuals link themselves to elements in the social scene. Identifications are important for what they do for us: they aid us in making sense of our experience, in organizing our thoughts, in achieving decisions, and in anchoring the self. (1983, p. 342)

Theory-Practice Gap

The planning process in clinical education ought to be inclusive and allow for flexibility. McCaugherty (1991) contends that the theory-practice problems were revealed through reports of inadequate ward supervision. It became evident that schools and wards were heading in different directions. Where does this theory-practice gap originate? Does the gap emerge from the educational system or from the ward where students practice, or from both? According to Fennimore and Tinzmann (1990), "thinking curricular fulfills a dual agenda by integrating content and process. Thinking curricular weds process and content, a union that typifies real-world situations; that is, students are taught content through processes encountered in the real world" (p. 1-2). Clinical education experiences place students in real practice settings with professional responsibilities to be acted upon as they participate and learn.

Clinical experiences provide students with opportunities to develop their new knowledge from the didactic base and to perform psychomotor skills in real patient care situations. Frost (1996) argues that problem-based learning is an appropriate alternative

method for educating professionals. This innovative approach appears to be more suitable for bridging the gap between theory and practice. Problem-based learning is more likely to prepare health care professionals to adapt to the changing needs of society. Meyer (2005) describes how a novice student perceives clinical reality:

> Instead of the academic ideal in which they have so much invested, they face a contrasting clinical reality they do not understand and cannot avoid. To the clinically immature students, academic ideal and clinical reality are incongruent, or dissonant. Instead of rules and exceptions being mutually exclusive-back and white- there is a complex interplay between them-shades of grey. Instead of congruence "or else," there is congruence "maybe, it depends." The students now begin to question what to believe, the academic ideal or the clinical reality. (p.77)

Thinking curriculum rationale allows students to develop an in-depth knowledge of concepts and processes, empowering them to approach complex tasks with a comprehension comparable to that of experts in their field (Fennimore & Tinzmann, 1990). Problem-based learning methodologies show the interrelated aspects of theory and practice that support theoretical knowledge, development of reasoning skills, and self-directed learning strategies (Barrows, 1985).

Karuhije (1997) suggests there are specific challenges and conflicts that are specific for teaching, regarding the classroom and the clinical environment as two different worlds. Berman (1988, p. 10) states, "Students were sometimes caught between the curriculum of the college nursing department and the procedures and methods of the staff nurses." Excessive use of lecturing or instruction can create a passive role for the learner. This can weaken the learners' ability to think for themselves and lead to inadequate problem-solving strategies (Blais, 1988). Inquiry-based instruction allows the students to become responsible for their own learning. Students are the ones to ask and

answer their own questions in order to actively address their own lack of understanding, specific gaps in knowledge, or misconceptions (King, 1995). Since there are numerous situations that require problem solving and critical thinking methods to obtain quality images, it is essential that these strategies be developed in the classroom and in the clinical environment. Theories taught in the classroom may or may not be consistent with application to clinical practice. Greenwood (1993, p. 1185) contends, "problem identification, therefore, depends upon the practitioner's ability to make sense of the situation, that is, to construct the problem from the problematic situation."

Chan (2002) identified several factors within the clinical environment that affected the quality of students' learning. A supportive clinical learning environment was essential. Other factors included quality of student preparation, characteristics of the faculty and clinical staff, peer support, the variety of clinical opportunities, and the extent of participation by students. Berman (1988) named four dilemmas that emerged for novice students in the clinical setting. First, they have a fragile view of themselves regarding a professional self-image. Second, students felt uncomfortable coping with age difference when caring for patients. Third, students did not know their role when interacting with other professionals and patients. Fourth, students expressed feelings of powerlessness and incompetence due to rapid rotations within the clinical setting. Lee, Spickerman, and Eason (1988) believed that students learning with resource persons such as staff preceptors received unique invaluable experiences. "These interactions provide a variety of learning opportunities sufficient for undergraduate students to develop beginning leadership skills, while also narrowing the education-practice gap" (p. 333).

As students become engaged in the real world context of learning, they will be introduced to and participate in the organizational culture of a clinical environment.

Clinical Education and Organizational Culture Impact

Organizational culture can be viewed from a variety of perspectives. Charles Conrad's (1994) definition is as follows:

> Cultures are communicative creations. They emerge through communication, are maintained through communication, and change through the communicative acts of their members. Simultaneously, communication is a cultural creation. Person's perceptions of the cultures in which they live (both their overall culture and their organizational cultures) form the situations that guide and constrain their communication. (p.31)

As students interact at the clinical settings they should assimilate to the cultural climate in that clinical environment. Montgomery and DeCaro explain, "behavior analysts have carefully studied the relationship between individual behavior and the environment. They have found that many seemingly inexplicable acts have their origin, not in the psyche, but in the environment" (2001, p. 6).

Clinical experiences can be a source of anxiety and a stressful environment for the novice learner (Kushnir, 1986; Windsor, 1987). This is because the clinical environment is a culture of its own. Fineman (1996) suggests that within the medical environment emotions are frequently perceived as dysfunctional and do not provide for reliable coherent assessments. Lupton (1994) contends that health care providers are taught to use a *professional detachment* in order to remain expressively unemotional, to deal with cases not people. The culture within the clinical settings will greatly determine students' success in a learning experience (Hart & Rotem, 1994). Elliot Eisner warns against viewing learning as a strictly personal process:

> To say that meaning is always a personal construction is not to marginalize the importance of the social and the cultural. After all, democracy itself recognizes that human development is a social affair; we feed off the contributions of others; indeed we learn most from those who are least like ourselves. (Henderson & Hawthorne, 2000, p. iv)

Thinking curriculum builds towards a holistic approach by having students steadily apply "self-regulation and meaningful learning" (Fennimore & Tinzmann, 1990, p. 4). "Knowing how experience and academic skills interact may help inform clinical education programs and formulate ways of assessing students' progress" (Botti & Reeve, 2003, p. 39). Fennimore and Tinzmann further say the use of this methodology is to "encourage students to clarify their purposes in performing a task, to assess what they already know and to predict what is to be learned" (1990, p. 4). Every application, teaching style, and learning style has opportunities to make learning more efficient, effective and valuable. However, care must always be taken in the planning stages for each clinical experience while considering each learner's needs. It is always a challenge for teachers to bring the artistry and science of teaching together and to know as a teacher how best to reach ones students. Assessment for improvement by both students and teachers will help to make each experience as rewarding as possible.

Authentic education, here defined as practical or clinical education, in contrast with academic education, places the student in an environment where they must use critical thinking skills. The student should realize how the application of their academic knowledge may be implemented properly. The connection between theory, laboratory and clinical application can be enhanced with good role models such as mentors, preceptors, or clinical instructors. This connection reinforces both academic and clinical

learning. Academic learning provides the knowledge and clinical learning provides opportunities for students to apply that knowledge and gain valuable experience.

Patient and student relationships are diverse and at times can produce unique challenges. Engebretson and Littleton (2001, p. 227) state, "cultural competence is developed through exposure to other ways of thinking and behaving and through personal cultural awareness." The cultural competence process occurs when the health professional and patient engage in a process of cultural negotiation from their particular expert understandings. Cultural construction is knowledge of reality as it is constructed from selective observations and interpretations within cultural models. The reality and social processes are therefore culturally formed based on shared values (Guba & Lincoln, 1994).

Hart and Rotem (1994) identified six areas that students recognized as the best and worst experiences in their clinical education: autonomy and recognition, job satisfaction, role clarity, quality of supervision, peer support, and opportunities for learning. Students emphasized the importance of positive relationships in these six areas in connection with learning. Cheney stated, "organizational identification has been linked either theoretically or empirically to each of a variety of work attitudes, behaviors and outcomes including motivation, job satisfaction, job performance, individual decision making, role orientation and conflict, employee interaction, and length of service" (1983, p. 343). Strategies that effectively support students while reducing anxiety and improving confidence or facilitating students to cope with the culture of the clinical environment may improve clinical learning (Yates et al., 1997).

Clinical Education and Diversity

Windsor (1987) contends that clinical practice instruction imparts more challenges than classroom instruction. There is less control over the learning and social environment in clinical practice. Teachers have responsibilities to monitor both students' and patients' needs. Students in the clinical environment also need to communicate and interact with a variety of patients. Communicating with individuals from a different culture who speak another language, are not feeling well, are injured, are emotionally upset or in severe pain, places students in situations where they may experience additional barriers when attempting to communicate, provide patient care or complete a radiographic procedure.

As society becomes more diverse, students in the clinical environment will require more skills to interact and communicate effectively. It is not unusual to encounter different cultures or religions which can form barriers between the health care professional and the patient which can make imaging (acquiring radiographs on patients) difficult (Boughton, 2002a). Morhardt states, "It's all about developing a relationship, being sensitive to the needs of others and recognizing that they may have a different understanding of the issues than you do. That's the challenge for all of us in the white community-the majority-to accept that not everybody sees the world the same way we do" (Blecher, 2002, p. 36).

Boughton (2002a) provides many examples as to why radiographers need to exhibit sensitivity when tending to and communicating with patients from various cultures. One illustration he shared relates to imaging patients from a Jewish or Muslim

culture. Touching a woman to position her for the exam or having her remove clothing, such as her headdress, is regarded as taboo. The rising diversity of the patient population calls for health care providers to customize health care practice to adapt to these different cultures. This is referred to as *cultural competency* (Blecher, 2002). "Culturally competent health care is medical treatment built on the premise of respecting individuals and their cultural differences and focuses on strategies to build trust between the patient and the provider" (Blecher, 2002, p. 36).

Students' awareness of these differences may reveal why some patients refuse exams and do not perceive them as beneficial. Processing information from that perspective allows students to communicate better in their patient care about the benefits and risks related to the exam or procedure. According to Diekema, knowledge empowers health care professionals to provide care to an increasingly diverse patient population. Obtaining knowledge of cultural and religious beliefs will provide information for recognizing when requests or communications are usual or the norm for that individual's belief. Sources that could provide this knowledge include family, friends, chaplains, or social workers (Boughton, 2002a). Diekema states that "unusual beliefs that fall outside known belief systems should prompt more in-depth discussion to ensure they are rational" (Boughton, p. 23).

Biological variations are becoming better understood as research shows that people are different according to their race. Many health care providers require more knowledge of the variations that do exist such as susceptibility to disease, nutritional

preference, deficiencies and genetics (Davidhizar, Dowd & Giger, 1997). However, Singham (1995, p. 273) states:

> Attempts to define races on the basis that certain genes occur with differing frequencies in the members of different races have foundered because of the arbitrariness of the process of choosing those genes. Certainly, one can select genes that have different frequencies for the different "races," but any relatively closed community will have selected genes that occur with a different frequency from the general human population. So there is no clean biological definition of race that selects out only those groups historically perceived as different races. Race is best understood as a social construct. We identify ourselves and other people by the family and community that produces us. Biology has very little to do with it.

Continued communication through education and research will assist health care professionals as well as students to gain further insight into specific cultural requirements and environmental influences that affect individuals and their care.

How students communicate with diverse patients will depend on many factors and conditions, such as their personal experiences, education, role models, and the clinical setting's organizational environment. Krishnan states, "cultural competency is the responsibility of the entire organization. Health care is a team effort... everyone ought to allow patients to communicate what their concerns are rather than having a one-way communication" (Blecher, 2002, p. 37).

Authentic pedagogy is evident when students are performing their skills with, and revealing their attitudes to, mentors or experts in their field. According to Keefe and Jenkins (1997), several principles should be involved in active instructional practice: use students' prior knowledge, reject rote learning for higher-order thinking, encourage active making of meaning, express willingness for collaboration, and exhibit cooperation and commitment to a goal. Keefe and Jenkins (1997) break academic achievement into three

parts: construction to produce rather than reproduce knowledge, disciplined inquiry to use prior knowledge, and the value of knowledge beyond the educational setting. Authentic cognitive apprenticeships require real tasks, involve contextualized practice, and feature expert performance.

Clinical education ought to include a combination of experiences. This will allow students to be exposed to a variety of clinical teachers, which can introduce diverse clinical approaches or methods in various clinical settings. These clinical experiences also increase opportunities for students to interact with a diverse patient population (Bench, 1999). For instance, utilizing a variety and a combination of clinical appointments for students is one method for them to gain knowledge and experience in communicating and imaging pediatric patients.

Some imaging centers or radiology departments are more environmentally designed for pediatric patients. They may have drawings on the walls, games available, puppets, stickers and youth-size furniture that is especially intended for young children. Age appropriate communication is required as students interact with pediatric patients. Knight states, "If children know what to expect, it reduces their nervousness and crying" (Boughton, 2002b, p. 15). There are several methods used to communicate and interact with children. These may include showing a video to the child before the exam or having a practice session for the exam. During this time the child can see and touch the equipment and ask questions before the scheduled exam. Boughton explains that *age-appropriate imaging* is helpful in the communication process.

Imaging children of suspected or actual child abuse is another area for students to learn specific imaging and communication skills. Waldron (2000) brings to light the great effort that takes place within oneself (*intrapersonal communication*) in coping with a disturbing predicament and the actions that result from that introspection. Lonergan states, "imaging is the mainstay of evaluation of child physical abuse in the surviving child" (Hogan, 2003, p. 19). Speaking at eye level and maintaining one's emotions even when it may be obvious that a child has been abused is necessary in order to help with the investigation (Hogan). A calm and comforting approach provides for better communication. It is essential that the communication process remains blameless as students provide the child with care. It is also necessary that students use that same blameless approach and communication towards whoever has brought that child into the health care setting for treatment. Whipple explains:

> You have to treat these kids with incredible levels of kindness—something a lot of them aren't used to. You just have to be strong and gentle for them. We're the very first to know if the child has been abused when we see films showing a bunch of old healing fractures. Then you have to turn around and give that child back. That's the most heart-wrenching part. You hope you're not giving them back to the abuser. But you can't assume this person is actually the abuser. This could be an equally abused person in a really bad situation-may be the only responsible person in the bunch. You can't say anything derogatory about their parents or the kid will clam up and never tell you anything. Radiographers (RT) should avoid asking the child leading questions, which could compromise an investigation. However, if a child volunteers information, the tech should write it down verbatim and pass the information along to the physician. (Hogan, 2003, p. 22)

Physicians will talk with parents "at the family's level" as Moore explains. "[I]n a crisis, it's really difficult to hear everything a physician or educator is explaining. Combine that with the new medical language that's being conveyed and it can be

overwhelming for anyone" (Schaffner, 2003, p. 23). The medical information needs to be presented in comprehensible language. Where the child is in the diagnostic process will affect the level of communication necessary. More extensive explanation may be necessary early in the diagnostic process (Schaffner).

Authentic pedagogy, which is congruent with the constructivist paradigm, is best utilized throughout student radiographers' learning experiences in their various rotations. When the students take the knowledge learned in classes and labs and begin their clinical rotations, this is real world application. As students learn from numerous experiences and identify those successful experiences they may gain enough courage to try new and different skills.

Clinical Education and Technology

Students who understand learning to be in their best interest are motivated to learn. To create a motivational environment, the total clinical environment must be a place where students see themselves as capable and competent, to learn with a nonthreatening atmosphere and opportunities for open-ended questions. Students want to see the connection between the curriculum and the real world. Motivation in the clinical environment can be enhanced by individual instruction, accommodating student learning styles, advisement for each student to develop a sense of community, achieving and working toward a common goal, and choices for students to make in the curriculum and instructional activities (Keefe & Jenkins, 1997).

In the clinical environment students must learn to use several different types of processes, utilizing a variety of technologies. Advancements in information systems

technology are bringing about drastic changes in the practice of radiology. Honeyman believes, "access to the right information in a timely manner is crucial to patient care and it is easy to project that in the future it will be considered the standard of care" (1999, p. 218). Te'eni, Sagie, Schwartz, Zaidman, and Amichai-Hamburger (2001) contend that computer-mediated communications are becoming primary processes throughout organizations. Generally the cognitive aspects of computer-mediated communication processes are considered more significant than the social aspects. Fritzsche states, "we need technology plus personal interaction and communication" (Kuhar, 2003, p. 9). Te'eni et al. (2001) explain that specific strategies can help to bring a balance between the cognitive and social aspects of communication when utilizing computer-mediated processes. They recommend three strategies that may be beneficial to assist in computer-mediated communication. First is the contextualization strategy, which approaches communication from a cognitive perspective. Its purpose is to convey the specific context of the message. Second, the affectivity strategy is an approach that arranges for the message to convey and distinguish the moods, emotions, and feelings of the sender. Involvement strategy is a combination of the first two strategies. It is concerned with the receivers' viewpoint as the sender includes an expression of attitude along with cognitive content.

The purpose of technology is to enhance efficiency and patient care within the clinical environment. Kuhar asserts, "as radiology continues to push to the forefront of medicine – transforming from a diagnostic role to a driving force in understanding the life biology of disease processes – communication becomes key" (2003, p. 9). Fritzsche

states, "four major areas of communication in radiology that are in need of improvement: with the patient, with colleagues (including the referring physician), with medical students, and with the general public" (Kuhar, p. 9). Students will need the skills to be able to navigate the various technological communications systems to effectively care, image, and communicate in their clinical environments:

> In most academic radiology departments, there can be at least five separate information systems in daily use, a clinical picture archiving and communication system (PACS), a hospital information system (HIS), a radiology information system (RIS), a voice-recognition dictation system, and an electronic teaching/research file system. Many times, these systems are distinct, separate systems with little or no communication among them. The lack of integration leads to duplicate data entry tasks, inconsistencies, and inadequate functionality. (Honeyman, 1999, p. 218)

The ability of PACS to provide improvements in clinical productivity and diagnoses by electronically capturing, storing, archiving and accessing digitized radiographs has revolutionized medical imaging and patient care. Typically, PACS has worked in isolation. Combining PACS with HIS and RIS has become the application foundation of the electronic medical record (EMR). To combine imaging and management data will benefit workflow and the delivery of significant information to and from various radiology workstations. This level of integration is available through Health Level 7 (HL7) and Digital Imaging and Communications in Medicine (DICOM; Stopford, 2003). Smith states:

> Real-time radiology is an extremely important concept. The time that we take to provide information needs to decrease very rapidly. The old cycle of 48 hours is no longer acceptable. Now, we need to provide the physician with real-time information about his patient. This facilitates better patient care, better patient throughput and ultimately, better patient satisfaction. (Stopford, 2003, p. 14)

There is a vast amount of skills and knowledge to be constructed by each student in their clinical process. New ideas, concepts and methods can come together in ways one could have thought possible, when students recognize that potential knowledge is unlimited.

Technological communications are growing rapidly; professionals in health care are engaged in a learning experience themselves. Students who enter routinely into such clinical environments will be required to learn how to utilize and communicate with new technologies. The many individuals involved in instructing students will also need to rise to their new challenge of learning, understanding and communicating to students these various new advancements and their application processes.

Summary

A challenge for clinical educators is to connect students' clinical experiences and coursework with student outcomes (Barnard & Dunn, 1994). Clinical education considers ideas for alternatives that should include "content on the issue of relationships, from intradisciplinary to interdisciplinary, with all the personal and political ramifications" (Packer 1994, p. 413). Fennimore and Tinzmann state, "by emphasizing the connection to their own experiences and attitudes, the guidelines, when implemented, would validate students' experiences and enable them to become competent 'knowledge workers' in the various disciplines" (1990, p. 15). As students participate at various clinical sites it is vital to realize the impact that a particular environment will have on each individual. Brandon argues that the environment is:

> a major transmitter of values. The principles by which it operates and the way it treats its employees, suppliers, and customers radiate out through the world like

> radio waves. It is an environment that can have a profound impact on souls. No one can remain unaffected by how he or she is treated...nor by the ethical behavior witnessed in associates and superiors. (as cited in Montgomery and Decaro, 2001, p. 2)

Clinical experiences require students to cope with a variety of difficult situations such as a "noncompliant patient, impatient physician or supervisor, nonprofessional staff member or an intensely emotional situation that deals with sadness, grief, anger, guilt, frustration, fear, anxiety, embarrassment, tenderness and joy" (Packer, 1994, p. 413). It could possibly be the first time a student may have to deal with bathing a patient or encountering a death (Packer).

Along with all the previous challenges presented in clinical education, rapidly changing technology is a driving force for change that educators and students need to recognize in radiology. Digital radiography and the use of teleradiology systems, such as PACS, that allow for instant access to view images are presently replacing conventional imaging methods (Henderson, 2003).

> Less than ten years ago, few radiologic technologists had reason to know about human genetics, genomic or molecular medicine. However, due to the increased importance of ultrasound, positron emission tomography (PET) and magnetic resonance (MR)-based molecular imaging techniques, genetics and other supporting sciences may be given a stronger emphasis in the radiologic technology curriculum. (Shagam, 2003, p. 195)

To facilitate complex clinical experiences, several strategies are being researched and evaluated, such as: peer mentorship programs, collaborative models, postpositivist methodology, cognitive apprenticeship, and preceptor programs. The curriculum for radiographers seems to be dependent upon several societal factors and issues. Over time the curriculum and instruction for radiographers continue to develop, change and be

modified as clinical experiences present more opportunities for the student to construct and apply knowledge in numerous situations. Economic factors are powerful forces for what and who will be guiding the educational processes for today and into the future.

To be accountable, teachers need to model, display, and interweave into daily events such characteristics as integrity, respect, self-regulation, caring, and acceptance. Individual views of acceptable behavior can be an important social issue. It is important to be consistent on a daily basis in the evaluation process relating to accountability issues. The curricular and instructional approach should allow for students' development throughout their clinical experiences. Communication and the culture of the learning environment are critical to allow for collaborative instruction and shared responsibility.

There are challenges and attributes for both students and educators, which are summed up by Fennimore and Tinzmann,

> By uniting process and content, students learn the strategies they need to acquire, produce, use and communicate knowledge. And, finally, by looking at the subject areas from multiple personal, cultural, and historical perspectives, students develop empathy for the experiences, feelings, and worldviews of others. (1990, p. 15)

CHAPTER 3

RESEARCH METHODOLOGY AND PROCEDURES

This study was exploratory and non-experimental. A qualitative case study approach was used. A descriptive approach to this study clarified the case studies and the emergent themes relating to the application of knowledge and social interactions in the clinical environment. Merriam (1988) states:

> What makes these case studies in *education* is their focus on questions, issues, and concerns broadly related to teaching and learning. The setting, delivery system, curriculum, student body, and theoretical orientation may vary widely, but the general arena of education remains central to these studies. (p. 27)

Through observation, individual and focus group interviews, data was collected. Focus group interviews were used with student participants and individual interviews were used with all participants. This qualitative study was conducted at three educational institutions within the Midwest not at the researcher's place of employment. Morse (1994, p. 222) states, "It is not wise for an investigator to conduct a qualitative study in a setting in which he or she is already employed and has a work role. The dual roles of investigator and employee are incompatible, and they may place the researcher in an untenable position."

Stake (2000, p. 436) states, "a case study may be simple or complex. It may be a child, or a classroom of children, or an incident such as a mobilization of professionals to study a childhood condition. It is one among others. In any given study, we will concentrate on the one." Due to the complexity of the social context within the clinical environment and the need for more research to be available regarding the process of clinical education for radiography students, this study used a case study approach.

Interviews with students and clinical instructors provided qualitative information to identify variables. The researcher used a semi-structured, open-ended interview format with nine students and three clinical instructors. The students who participated in this study were considered by their educational institutions to level II or second-year students. After the individual semi-structured interviews the researcher collected participant-observation data in the clinical setting. The researcher documented, through the use of field, notes detailed observations and descriptions of people, places, events, activities, objects, and conversations. Data analysis relied on the use of the constant comparative method. The constant comparative method allowed data to be categorized throughout the research process and continuously compared to new data identified.

Settings

Three different settings were used for the case study. According to Morse (1994), more than one setting ought to be studied "for the distinct purpose of comparing and contrasting the populations" (p. 222). The first model was an external model in which the teaching of theory is *divorced* from the clinical setting. All of the students' theory teaching was at the college or university and the clinical experience was provided by other health service providers and was instructed by their staff (Bench, 1999). The data collected for this model was acquired at a community college in the Midwest. Students at this educational institution receive an Associate of Applied Science (A.A.S.) degree upon completion of the radiography program. This community college enrolls more than 4,000 students each fall. The Higher Learning Commission of the North Central Association of Colleges and Schools accredited this community college. The Joint Review Committee

on Education in Radiologic Technology (JRCERT) also accredited the radiography program.

The next model was an internal model in which teaching of theory and clinical instruction was conducted within the same institution. This model usually involved a hospital or clinic with an internal education department, providing both theory and clinical education (Bench, 1999). The data collected for this model was acquired at a hospital-based program in the Midwest. Students at this educational institution receive a certificate upon completion of the radiography program. This educational institution was a two-year certificate program accredited by the JRCERT.

The third model was the bridging model in which the theory was taught in an educational institution and the financial and administrative responsibilities were separated from the clinical institution. In this example, arrangements were made so that the theory teacher also taught clinical and some clinicians also taught theory subjects (Bench, 1999). The data collected for this model was acquired at a private college in the Midwest. This educational institution offers a two-year Associate of Applied Science in Radiography degree (A.A.S.) degree upon completion of the radiography program. The radiography program was accredited by JRCERT.

Participants in the Study

Participants in this study were selected from three different programs representing the three different models of clinical education. Three students were selected from each of the three models as described. Their educational institutions considered students selected for this study to be level II or second-year students. From each of the three

models described, two of the selected students were considered traditional students and one was considered a nontraditional student.

One clinical instructor was selected from each of the three models described. These clinical instructors provided instruction, supervision, and evaluation of students while in the clinical setting. Utilizing purposeful sampling allowed, "selecting *information-rich cases* for study in depth. Information rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry" (Patton, 2002, p. 230).

Data Collection

Two primary forms of data collection were used: a two-part interview process with students and clinical instructors, and an observation. Semi-structured, open-ended-question interview guides were utilized with students (Appendix A) and with clinical instructors (Appendix B). Bogdan and Biklen (1998) advocate a semi-structured, open-ended interview guide to allow for multi-participant inquiry. This process provided for collection of qualitative data in order to discern characteristics of the experience from the perspectives of students and clinical instructors. Data was collected from second-year radiology students who had participated in the clinical setting for at least one year or longer. Merriam (1998, p. 1) states, "The qualitative, interpretive, or naturalistic research paradigm defines the methods and techniques most suitable for collecting and analyzing data. Qualitative inquiry, which focuses on meaning in context, requires a data collection instrument that is sensitive to underlying meaning when gathering and interpreting data."

Interview Questions

A supplementary demographic data record (Appendix C) was used to obtain data from the selected sample of twelve participants. Prior to starting each interview, each participant filled out the data record, which requested information regarding age, gender, race, educational preparation, and previous health care experience.

Interviews are a familiar approach for data collection in qualitative research. Fontana and Frey (2000) argue that interviewing can be more difficult than it seems. Ambiguity can emerge no matter how carefully the questions are developed, asked, and recorded. Yet despite these difficulties, the interview process is one of the most powerful approaches used to understand other human beings.

A semi-structured, open-ended interview outline was used as the principal strategy for the data collection (Appendix A and Appendix B). Gall, Borg, and Gall (1996) suggest constructing the questions in advance as a guide to assist in consistency for each interview session. This format enhanced the ability of the researcher to make comparisons between interviews. The interview guide was exploratory. Particular questions were organized in advance to allow for emergent themes and unforeseen responses during the interviews.

Questions were selected to avoid bias. The wording of each question was an attempt to present the participants with the opportunity to give their perceptions and beliefs. The interview guide addressed content knowledge, relationships, communication, and philosophy or approach to instruction. Each interview was audio recorded and transcribed for analysis of the data collected. Taping interviews allowed the

study a high degree of fidelity. According to Lincoln and Guba (1985), fidelity makes evident the researcher's endeavor to demonstrate the authenticity of data collected.

Observation

Participant observation is an alternative principal approach used by qualitative researchers to collect data. Observational data is beneficial as it allows for further all-inclusive descriptions of phenomena than would be possible by referring only to interview data. This alternative source of data collection verifies information from other sources or methods (Gall et al., 1996). The use of triangulation by collecting multiple data through interviewing and observation enhanced the validity of the case study findings (Gall et al., 1996).

Data were collected through detailed observations and documented as descriptions of people, interactions, places, events, activities, objects, and conversations. Field notes were detailed and concrete, including descriptive and reflective information to allow the researcher to identify themes and patterns (Gall et al., 1996). According to Strauss and Corbin, theoretical sampling is "sampling on the basis of the emerging concepts, with the aim being to explore the dimensional range or varied conditions along which the properties concepts vary" (as cited in Patton, 2002, p. 239). Gaining trust and establishing a rapport is essential. It was important for the researcher "to take the role of the respondents and attempt to see the situation from their viewpoint" (Fontana & Frey, 2000, p. 655). The researcher has experience as a student in a clinical environment, and has been involved in radiology for twenty years in various roles as a radiographer,

including, nuclear medicine, mammography, clinical instructor, faculty member, and program educational administrator.

The researcher's knowledge and background in radiology assisted in facilitating the data collection as "qualitative methods rely on the interactional, adaptive, and judgmental abilities of the human inquirer" (Greene, 1994, p. 538). The researcher understood clinical procedures, medical terminology, policies, and procedures in the clinical settings. The mere presence of the researcher in the clinical setting did affect to some degree the interactions which were observed. For instance, this comment by one of the technologists to a group of students during an observation at a clinical site, "hope you don't sit there the whole time since she is watching you" (referring to the researcher). Throughout the fieldwork, the researcher did "consider how who one is affects what one is able to observe, hear, and understand in the field and as an observer and analyst" (Patton, 2002, p. 299). The researcher wore appropriate dress in the clinical settings to "blend into the setting, becoming more or less a 'natural' part of the scene" (Bogdan & Biklen, 1998, p. 88).

Procedure

The researcher contacted the chairperson or director of each radiography program as described to obtain permission to conduct the study. The researcher inquired and gained access through administration prior to conducting interviews and observations. The researcher went to each radiography program to recruit participants and provided information to second-year students and clinical instructors asking for volunteers to participate in the study. The researcher presented and read a script to the students and to

the clinical instructors to explain the need for participants in this study. The researcher asked for volunteers and selected participants from the volunteers that met the criteria for this study.

An open invitation to student participants was given during a common class from the researcher. The researcher provided each student with a blank sheet of paper. Interested individuals were asked to volunteer and to place their name and age on the blank sheet of paper if they were willing to participate. The researcher collected the sheets of paper from each student. The researcher left the room and randomly selected two students who identified themselves in the traditional student age category and one student as a nontraditional student. The researcher notified the students who were selected to participate.

An open invitation to clinical instructor participants was given in a small group meeting. The researcher provided each clinical instructor with a blank sheet of paper. Interested individuals were asked to volunteer and to place their name on the blank sheet of paper if they were willing to participate. The researcher left the room and randomly selected one clinical instructor. The researcher notified the clinical instructor who was selected to participate.

Four participants were selected from each program that met the stated criteria. Student participants must be considered to be level II or second-year students. Two student participants selected were considered traditional and one student participant selected was a nontraditional student. Clinical instructor participants selected provided student supervision, instruction, and evaluation in the clinical setting.

All participants were asked to sign consents. The consent described the purpose of the study. Participants were asked to give written permission to allow audio recording of the interview sessions. Audio recording interviews provided a comprehensive verbal record, it was time efficient, as well as allowing the researcher the ability to analyze the data completely (Gall et al., 1996). Participants were informed that the tapes would be transcribed and notes used for categorizing their responses. The researcher explained that their responses would not be identified with their name, the name of their program or institution, peers, or instructors. Confidentiality was upheld.

Interviews were conducted at each program on site. Prior to each interview, participants completed the supplementary student or clinical instructor demographic data form (Appendix C & D). This additional information was used when analyzing to compare data collected from participants regarding program type, gender, or age. Each initial interview took approximately one hour. After the initial interview, the researcher conducted an observation at the participants' assigned clinical setting. After observing in the clinical setting, a focus group interview with the students from each educational institution was conducted. A semi-structured, open-ended interview guide was utilized (Appendix E). The focus group consisted of the same three students from each educational institution to ensure similar backgrounds and was structured as an interview, not to solve problems or make decisions (Patton, 2002). The focus group interviews enhanced data quality to include participants' interactions by seeking reactions to shared experiences and allowing assessment of shared and divergent views (Patton, 2002). Each focus group interview took approximately one hour.

Following the focus group interview, the researcher conducted smaller debriefing individual interviews when necessary for clarification or elaboration. Since, there was only one chance for a clinical setting observation, conducting the main interview prior to the observation allowed the researcher to become more aware of certain dynamics during the observation. The debriefing interview provided opportunity for elaboration and clarification. Utilizing multiple data sources was beneficial for greater understanding (Lincoln & Guba, 1985). If further explanations or details were deemed necessary following the interviews or observation, unstructured conversations via the phone or e-mail may be utilized. These follow-up calls may provide more examples or details necessary from the interviews or observation.

A date and time was set with each participant before the researcher conducted an observation at the clinical site. All of the participants were instructed that if they elected to do the interview and did not agree to the observation then the researcher would not pursue the observation data for that particular participant. All participants agreed to be observed in their clinical setting. The researcher documented through the use of field notes detailed observations and descriptions of people, interactions, places, events, activities, objects, and conversations.

The observations took place at each described program's clinical setting. If the program utilized more than one clinical setting the researcher conducted observations at the participant's current assigned clinical setting. Observations took place during the participants' scheduled clinical assignment time. Observations lasted approximately two to three hours.

Threats to Validity

A threat to the validity of this research study was if participants dropped out from the study or the program. Drop-outs could occur at any of the three programs. Based upon the *thick and rich* descriptions in this study, this will allow others to make a judgment decision to find meaning in similar situations.

Data Analysis

This descriptive case study required on-going analysis during data collection and a final analysis. Data analysis included the data collected from the transcripts of the audio-recorded interviews and the field notes from the observations. Through the on-going analysis, the researcher searched for emergent themes.

The Constant Comparative Data Analysis

The constant comparative method, a continual process of comparing classifications within and across categories and the revision of categories (Glaser & Strauss, 1967), was used in analysis and interpretation of the data. According to Patton (2002), theoretical sampling supports the constant comparative method of analysis. Through this process the researcher identified and categorized key issues and events in the data. These categories were revised as emergent themes were identified. "Theoretical sampling permits elucidation and refinement of the variations in, manifestations of, and meanings of a concept as it is found in the data gathered during fieldwork" (Patton, 2002, p. 239).

Data collection and analysis for this study was ongoing. Bogdan and Biklen (1998), refer to six steps in the constant comparative method to assist in theory development.

1. Begin collecting data.
2. Look for key issues, recurrent events, or activities in the data that become categories of focus.
3. Collect data that provide many incidents of the categories of focus, with an eye to seeing the diversity of the dimensions under the categories.
4. Write about the categories you are exploring, attempting to describe and account for all the incidents you have in your data while continually searching for new incidents.
5. Work with the data and emerging model to discover basic social processes and relationships.
6. Engage in sampling, coding, and writing as the analysis focuses on the core categories. (p. 67)

These steps were on going simultaneously as data analysis was continuously conducted and with additional data collection and continuous coding (Bogdan & Biklen, 1998).

Data collection began with the gathering of demographic data and the interviewing of students and clinical instructors (refer to Appendices A, B and C) once participants had volunteered and signed their consent forms. The interviews were audio recorded and transcribed word for word. Observational field notes from participant observations were compiled. These field notes comprised, as Bogdan and Biklen (1998) suggest, a description of what the researcher had experienced, seen, heard and reflected upon after the researcher had established relationships.

Data were collected from multiple sources. These sources included three different educational settings and interviews, which involved clinical instructors and traditional and nontraditional students. Clinical instructors from the three educational settings allowed for validation of data within the dimensions in the categories as did the

observation of participants following the interviews. Debriefing interviews when necessary were completed with participants, which allowed for the categories of focus to reveal any new dimensions. The researcher continuously compared items within each category for similarities and differences. For example, each student from each program revealed their perceptions regarding to how peers impacted their clinical experience. Students expressed differences in their responses. Most students stated that peers were a positive impact for their learning and this encouraged them to stay in the program. Some students saw peers as having a negative impact for them due to competition for exams, or not doing their part in assisting or participating in the clinical setting.

The researcher identified emergent themes, key words, or phrases to code and classify into categories of focus from each participant's response. Through interviews and observation, initial categories were continuously compared with previous events or activities to allow for different aspects and relationships to be revealed. The researcher identified in the interview guide these four categories to be explored: (a) content knowledge, (b) relationships, (c) communication, and (d) approach to or philosophy of instruction. The data was compared across categories. These categories were continuously redefined during the data collection and analysis process. Initial categories were constructed from the interview questions asked and observations in the clinical setting by the researcher. These initial categories included: (a) integration, (b) sense of community, (c) caring, (d) theory gap, (e) attitudes and socialization, (f) peers, (g) skills, (h) values, (i) learning, (j) recognition, and (k) trust. The continuous analysis process identified occurrences when data overlapped within these initial categories.

The researcher analyzed the identified categories and redefined and added categories as determined by new data acquired through the interviews and observations. Utilizing multiple perspectives from a variety of settings allowed the researcher to account for occurrences or patterns within the data reported while seeking new incidents to assign to the categories or which called for creation of new categories. The researcher continued to identify comparisons and discrepancies between the participant interviews and observation data utilizing reflective analysis. Gall et al. (1996) states, "reflective analysis is a process in which the researcher relies primarily on intuition and judgment in order to portray or evaluate the phenomena being studied" (p. 570). Prevalence and passion of responses were reflected on during the analysis of categories. Similar responses made by participants within each program and across programs were documented. Reponses that revealed a disagreement of viewpoints within each program and across programs were noted. Furthermore, it was noted when responses from participants demonstrated a distinction of passion in their voice or in their body language. Reflective analysis was suitable for thick descriptions as well as assisting in identifying constructs, themes, and patterns (Gall et al., 1996). Coded data were reviewed and evaluated by a qualitative researcher for the purpose of refinement in the categories and establishing confidence in the identified emergent themes. This reliability check process achieved a ninety percent match. Throughout the data collection and analysis, themes evolved and were theoretically supported by the literature. Definitions of the themes or categories evolved during this progression. Table 1 summarizes the definitions of the

themes. Key words and phrases were utilized when selecting and designating participants' responses to themes or categories.

Table 1

Definitions of Themes

Theme	Definition	Key Words	Sample Participant Response
Learning opportunities and integration of knowledge	Learning opportunities integrate classroom instruction with clinical experiences to form a base of knowledge. Learning opportunities can be formal or informal. Formal learning opportunities involve planned curriculum and clinical experiences. Informal learning opportunities arise spontaneously during observation of, and participation with, those already in practice. Learning opportunities include acquiring competencies and being acculturated into the profession. Integration of knowledge can be reflected in descriptive comments and discussions, and demonstrated through application of classroom knowledge in clinical experiences. Integration of knowledge or skills is related to students applying new knowledge or making connections based on prior learning experiences.	teach, hands-on, role model, watch, observe, learning experiences, review, showed us, on task, downtime, busy, trauma, patients, challenging, intense, learned, confident, game plan, changing, competent, prepared, anxious, number of people, competitive people, practice, mistakes	"I think that with us it gives us time to do it in class and then relate it to clinic. The combination of the two helps out a lot more to help you to remember everything." "How to get your job done but to get it done with finesse." "Learn a lot by being in the clinic and watching how certain things workout...seeing is believing that kind of situation sometimes."

(table continues)

Theme	Definition	Key Words	Sample Participant Response
Trust and Fairness	Being treated differently defines the parameters of fairness. Students establish trust with their faculty and clinical supervisors and peers based on being "treated fairly". Trust and fairness reflect in comments and discussions that are open and confident. Student interactions are more effective when they trust that they will be listened to and understood, and responses to them reflect fairness.	compare, trustworthy, tattle tale, doing their share, friendly face, grudge, grading lenient, consult, fair, unfair, trust	"If the tech doesn't like you then they're going to treat you differently." "Sometimes they're some that just have a grudge. If you do something they don't like they're not liking you for the rest of the two years and unfortunately that impacts."
Attitudes and socialization to radiography clinical sites	Attitudes and socialization in radiography clinical sites were examined in relation to interactions displayed by individuals within the clinical setting. Positive and negative attitudes and relationships are associated with feelings of acceptance. The success of their socialization affects the ability of students to assimilate to the clinical setting.	moody, grumpy, cringe, positive attitude, negative attitude, bickering, judge you, disrespect, punished, relationship, taken advantage of, scared to say, complaining, resistance, body language, run smoothly, nice, nagging techs, demeaned, intimidating, personality, personalities, tension, picking on, guard up, down talk, joking, totem pole, below them	"We began our clinical experience if you did something that they didn't think was right and they took over an exam that was very intimidating. Especially, if it didn't feel like it was done in a appropriate way or if you felt like they demeaned you in front of a patient."

(table continues)

Theme	Definition	Key Words	Sample Participant Response
Supervision, evaluation, and recognition	Supervision and evaluation are descriptions of any discussion, expression or process of written or verbal feedback between individuals or between groups. Recognition can consist of appropriate positive reinforcement of behaviors. This includes expressions of appreciation and motivating comments.	explain, constructive feedback, performance, valued, thankful, guidance, praise, be right there, encouraging, help, correct it, showing you, confidence builders, really good job, respect, appreciate	"I like to feel like I did a god job if I taken an image that was particularly difficult and it turns out well than that's encouraging. So that feedbacks is part of making it a good day." "Actually you know thanking us for doing a good job...that really makes me want to strive even harder to do even better."

The researcher continuously collected and analyzed the data until saturation was realized. Saturation was achieved as categories became well defined and the researcher realized the scope of examples used and the themes that emerged were grounded in the data (Lincoln & Guba, 1985). No new categories of data emerged once through the process of using and analyzing the semi-structured individual interviews, observations, focus group interviews, and debriefing interviews. The researcher provided descriptions and interpretations of audio taped interviews, social interactions and relationships.

The categories emerged and evolved to identify themes. The data was considered separately in order to categorize into the four themes that emerged. Occasionally parts of the data appeared to overlap and contained attributes of more than one theme. Assessment of key words and the context of the interaction that was embedded in specific

content directed the decision to place the data within a theme. For example, a student said, "I think I learned from following example and doing it myself and being corrected. As I learned the process, I learn by doing." This discussion included the key word "corrected" which might associate it with the identified theme of supervision, evaluation, and recognition. However, the context of the interview and the key words of "learned" (more than once), "follow example," and "doing it myself," indicated this data should be identified with the theme of learning opportunities and integration of knowledge.

The identified themes were compared among the three program models to demonstrate the impact of learning in a clinical setting on the professional preparation of radiographers. The researcher compared comments and observations from traditional and nontraditional students across the three program models. Comments and observations from clinical instructors across the three program models also were compared to demonstrate differences in the way clinical instructors and students perceived learning in a clinical setting.

Establishing Trustworthiness

The constant comparative method was used in data collection, analysis and interpretation, "trustworthy materials are subjected to the constant comparative method...comparing incidents applicable to categories, integrating categories and their properties" (Denzin, 1994, p. 508). Guba and Lincoln (1994) advocate the following four criteria for establishing the trustworthiness of a qualitative study: credibility, dependability, transferability, and conformability.

Credibility. Lincoln and Guba (1985) described several techniques for demonstrating credibility. This study used triangulation, multiple sources and methods, for the researcher's acquisition of data. Several participants from different settings were interviewed. Following the interviews, the participants were observed in their clinical settings. Following the observation, focus group interviews with the student participants were conducted and a debriefing interview for participants was conducted when necessary for clarification or elaboration.

Member checking, during interviews and after interviews was completed and found to be a useful technique. Member checking, "imply that the 'whom' is that set of respondents who have acted as data sources... since *they* provided the construction of which the investigator's findings and interpretations are reconstructions, it is *they* who must find reconstruction credible" (Lincoln & Guba, 1985, p. 328). During the interviews and after each interview, the researcher summarized what was heard, or played back the audio recording and inquired from each participant clarification of misconstructions.

Peer debriefing was used to assist the researcher in refinement and discussion of the emergent themes and categories evolved from the data. A nursing professor who was an associate dean with a doctoral degree in education assisted in this process. She had experience in qualitative research methods. Revisions were made based on her professional expertise.

Dependability and confirmability. The use of an audit trail in this study assisted in establishing dependability and confirmability. Dependability is demonstrated through

credibility of the findings. According to Lincoln and Guba, (1985) there is no dependability without credibility. An audit trail provided additional efforts to demonstrate dependability.

Confirmability was established using the technique of an audit trail (Lincoln & Guba, 1985). An audit trail documents the case study process. An audit trail was used to provide evidence and illustrate the thought processes that supported the findings. The audit trail in this study included raw data of audio recording interviews and written field notes. Data reduction and analysis products consisted of the research questions, the audiotapes and their transcriptions, write-ups of field notes, and observations. Data analysis and synthesis of products identified emergent themes and coded them into categories during the process of coding and categorizing field notes and interviews, thus providing category descriptions, findings, and the final report. Process notes involved the procedures, strategies, and rationale to complete the final report and relate it to the literature (Lincoln & Guba, 1985).

Transferability. Transferability refers to the degree to which the findings of this study can be transferred to another situation. Transferability, as stated by Lincoln and Guba (1985, p. 316), "the naturalist...he or she can provide only the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility." Based upon *thick and rich* descriptions in the study, others may make a judgment decision to find meaning in similar situations.

Protection of Human Rights

The Human Participants Review Application was submitted to the Institutional Review Board (IRB) at the University of Northern Iowa. Participation in the study was voluntary and participants were free to withdraw at any time during the study. Participants were provided with a written informed consent, which explained the purpose, their involvement and duration of the study. Potential risks of participants' involvement in this study were no more than minimal. The identifiable risk was the inconvenience and or obligation of time related to participating. Anonymity and confidentiality were made certain and all data are to be destroyed at the conclusion the study. Published results of the research were edited to make certain that no participant or institution could be recognized on an individual basis.

CHAPTER 4

DESCRIPTION AND ANALYSIS OF FINDINGS

The purpose of this study was to examine the place of clinical experiences in radiography programs and to describe how students and clinical instructors in three different radiography program models (bridging, external, and internal) perceived the learning experiences in clinical settings. This chapter will analyze and present the data, which were attained from individual semi-structured interviews, observations, and student focus group interviews conducted during the course of the study. The focus group interviews consisted of three students from each different radiography program. All interviews were audio taped and transcribed by the researcher. This process allowed for identification of key issues and categorization of data. The constant comparative method of continuous categorizing and re-categorizing of data provided a rich and thick description of the study.

The study consisted of data attained from six second-year traditional students, three second-year non-traditional students, and three clinical instructors. The participants from the three different radiography programs included two traditional second-year students, one non-traditional second-year student, and one clinical instructor. The participants will be referred to by pseudonyms. Data are presented relating to the pseudonyms and are also used for any reference in which the name of a student, clinical instructor, or radiographer was used.

An overview of the demographics of the participants, students and clinical instructors, and a description of their respective programs are presented. In relation to the

research questions and the semi-structured interview guide, categories were identified through which themes emerged. Data attained throughout the semi-structured interviews, observations, and focus group interviews clustered in these four themes/categories:

1. Learning Opportunities and Integration of Knowledge
2. Trust and Fairness
3. Attitudes and Socialization to Radiography Clinical Sites
4. Supervision, Evaluation, and Recognition

These themes/categories are expressed across three radiography program settings: bridging model, external model, and internal model. The following information describes the findings from each radiography program.

Bridging Model

The data collected from this model was acquired at a Midwestern state private college. The theory was taught in an educational institution and the financial and administrative responsibilities were separated from the clinical institution. Provisions were made so that the theory teacher also provided clinical instruction and some clinicians also taught theory subjects. This private college recognized and maintained specific distinctions between clinical services and education. Clinical and educational accreditation issues were kept separate (Bench, 1999).

Students attending this educational institution received an Associate of Applied Science (A.A.S.) degree upon completion from this radiography program. This private college enrolled approximately 200 students each year. Each year this radiography program admitted fourteen students and had a current enrollment of nine second-year

students. The Higher Learning Commission of the North Central Association of Colleges and Schools accredited the college. The Joint Review Committee on Education in Radiologic Technology also accredited the program. For clinical settings, this program mainly used three hospitals that were linked to the college as part of their organizational structure.

Participant Demographics

Student participants were three second-year students and one clinical instructor. The gender and race of the three students were two white males and one white female. Their ages were 21, 22, and 38. The nontraditional student (38 years old) was a single white female student, the 21-year-old was a single white male student, and a 22-year-old was a married male student. Each of these students reported having prior educational preparation beyond high school before entering this radiography program. The 21-year-old student, who will be referred to as Tim, had one year of prerequisite courses at a community college. The 22-year-old student, who will be referred to as Kyle, completed some general education courses at a community college. The 38-year-old student, who will be referred to as Linda, completed coursework at a community college.

The gender, age, and race of the clinical instructor was a white married 30-year-old female. Her prior educational experience included a B.A. degree, clinical instructor workshops, and being a preceptor for the program. She had nine years of experience in radiology, six years as a clinical instructor, and approximately four years of teaching in the classroom. Her responsibilities included teaching and providing clinical instruction. She taught classes, procedures, patient care, coordinated and instructed in the laboratory,

and performed student advising, provided community education, and served as chair of a college committee. She will be referred to as the clinical instructor.

Bridging Program Emergent Themes

Student and clinical instructor participants were interviewed regarding clinical experiences and how it affected their learning perceptions. The semi-structured individual in-depth interviews were conducted with students and the clinical instructor. Focus group interviews were conducted with the student participants. Several themes emerged from the semi-structured individual in-depth interviews, observation, and a focus group interview. These themes consist of: (a) learning opportunities and integration of knowledge, (b) trust and fairness, (c) attitudes and socialization to radiography clinical sites, and (d) supervision, evaluation, and recognition.

Learning Opportunities and Integration of Knowledge

Definition. Learning opportunities integrate classroom instruction with clinical experiences to form a base of knowledge. Learning opportunities can be formal or informal. Formal learning opportunities involve planned curriculum and clinical experiences. Informal learning opportunities arise spontaneously during observation of, and participation with, those already in practice. Learning opportunities include acquiring competencies and being acculturated into the profession. Integration of knowledge can be reflected in descriptive comments and discussions, and demonstrated through application of classroom knowledge in clinical experiences. Integration of knowledge or skills is related to students applying new knowledge or making connections based on prior learning experiences.

Significance of learning opportunities. Learning opportunities were reported as being important to the students. Students perceived that in the classroom they would learn the standard method for doing a procedure and this standard may or may not be applied in the same fashion in the clinical environment because of a variety of situations. Kyle indicated, "Far as learning was just going into the classroom and taking what we learned there and trying to put it into a clinical area so that works out pretty nicely." Learning in the classroom and then applying that knowledge in the clinical setting was identified to be significant and beneficial for him in the process of learning radiography. He realized that practicing on other students was helpful in learning specific positioning skills. However, patients were not always healthy and as easy to position for a particular exam. The clinical setting allowed opportunities for students to bring their knowledge and apply it in clinical settings as they encountered different patients and exams. Kyle explained:

> So we got all that classroom experience.... What exactly you know how and where to put the CR the angles and stuff and then clinic came about and you just had to try to put that to the test of what you learned, which really helped out being in clinic 'cause it helped 'cause when you're doing it with a student I mean you get positioning down but the student is in walking condition. They're very healthy and you know they're not stumbling about or anything's wrong with them. They don't have a broken leg. They're not in pain. So you really don't get to experience that. So when you get to go to clinic, we kind of put in what we learn there and mix it up with how the patient's doing.... Every person is going to be different but if you can learn different pathologies and different things like that.

Learning expectations and integration of knowledge was greatly affected by the type of injuries or illness presented by the patients and by the number of patients. Students said they felt that "dull moments nothing to do," "downtime" or "when it's dead

in the department" was adverse to their learning in the clinical environment. There was some downtime observed by the researcher in the clinical setting for two of these students. There were several students in the clinical setting and a few were busy in procedure rooms performing exams. Kyle was focusing on homework and stated, "Too many students today and not enough exams." Tim was busy filing in the film file room. Linda was preparing to bring a patient in for an exam. During slow times in the clinical setting the students went into a room to practice with other students using each other as patients. As Linda was performing a procedure with a patient, Kyle and Tim were in another exam room practicing extremity work. There were first year and second year students in the room. The second year students were showing the first year students how to obtain difficult views on a traumatized elbow. Kyle demonstrated on a student as he explained to the first year students how he completed a traumatized elbow exam if a patient could not be positioned for the routine views. Also, if there were no exams going on the students and clinical instructor took the opportunity to role-play and review exams that were infrequently ordered. When the clinical instructor completed assisting Linda with her exam, the clinical instructor went and prompted Kyle and Tim to come into an exam room to complete simulations of exams on each other.

Integration of theory and practice. Students attempted to integrate their knowledge and skills from the classroom into the clinical environment. Practicing procedures in the lab was helpful but not realistic. Patients were not always as easy to position and take care of as a lab partner. For instance Linda explained, "In class you can talk about everything, but then when you get there and really see that real patients, that's

was really a big thing. When we practice in lab we practice with our lab partner to do everything and they know just where to move for ya. They're small and then you get all these patients of different sizes and they really are hurting. It's a little bit harder. It's different." Tim commented, "Ideally in procedures we learn how to take x-rays the way you know the book says is the ideal way but not everything is goanna be you know just everybody's a little different. So I mean until you see that image you don't really know how it's going to turn out." For example, during the observation Linda was with the clinical instructor and they were performing a thoracic spine procedure. Linda was attempting to set a breathing technique for the thoracic spine per the normal standard method of performing a lateral thoracic spine procedure. The clinical instructor told her to set the technique not using the usual breathing technique. Linda inquired as to why she shouldn't use the usual breathing technique. The clinical instructor explained there were problems with the new techniques for the new computed radiography system. They both adjusted to the technical variation and continued with the procedure.

Students made meaningful connections between classroom learning and application of knowledge in the clinical environment. Students stressed the value in their clinical experiences of "the hands on experiences" and being involved in "challenging exams." Kyle pointed out, "If I weren't there I would not have a clue to what to do, you know. Just the class work just wouldn't be enough. Mixing it up between the classroom and clinic works really well....It is kind of hard going to clinic for twenty-seven hours a week plus trying to do everything else in your life but it's definitely worth it. It prepares you a lot better for getting a job." Students expressed what they liked most about their

educational program and how they related connections between their classroom knowledge and their clinical experiences. The focus group discussions provided the following two examples:

> (Kyle:) I think the teachers do a real nice job making sure that we're understanding everything. And they understand it very well themselves and it makes it a lot easier to teach us if you know what you're talking about. (Linda) And I think they do a good job of teaching you in the classroom and then preparing you for clinic as much as you can. (Kyle) Exactly I think the material is really well interpreted into clinic. (Researcher probing question) Is there a good connection there? (Kyle) Yeah, good interactions from the classroom to clinic good transition. Since they work in clinic with us, more the first year, but it makes it a lot easier to learn. 'Cause they're there to help us out.

Connections between the classroom and clinical experiences were described and brought up several times in the focus group. The students said they appreciated both the classroom and clinical experiences and emphasized the distinctive importance of having both learning opportunities to help with integration and application of new and existing knowledge.

> (Tim) Every class helps but it helps you to understand everything that we learn in here. Not everything is clear to me when I hear it but when I see it that sheds some light on it. (Kyle) It's true. (Linda) Yeah you have to get in there and do it in the clinic to get it. (Kyle) 'Cause you know in the summer we came in here you know we were bombarded with this is how you do a chest x-ray, this is how you do an abdomen an IVU and things like that. Then we thought, hey I know how to do this chest x-ray you know pretty simple but then you get into clinic and you're like, oh my god. (Tim) Everybody, everybody is different size. (Kyle) Yeah it's all about experience (Tim) Can't tell you how many times I've cut the costrophrenic angles off on guys that were like this big. (Kyle) Yeah, just crazy stuff. (Linda) It would be hard to imagine just having classroom not really having a clinical and graduating and know what you're doing. I think it seems pretty crazy to me. (Kyle) I think it'd still be hard a little hard the other way you know if you're just simply doing clinic with no classroom work just 'cause yeah you're doing it but it seems like we got it pretty nice correlation. So gives us the opportunity to put what we learned into clinic.

Better integration with bridging model. These students felt their program had a better connection for learning and integration of knowledge than certificate programs (internal model) because of the quality of their learning structured between classroom and clinical experiences. Tim indicated, "The procedures, we would kind of be lost a little bit, I think, you know, as opposed to doing like a, just simply like a hospital based program or something like that. I think that with us it gives us time to do it in class and then relate it to clinic. The combination of the two helps out a lot more to help you to remember everything." Kyle reaffirmed, "There's just so much information...to learn. ...Definitely with having clinic it helps to relate all that stuff so you can put that information somewhere instead of just storing it up in your mind."

Procedure comfort level. Students noted they were very comfortable with routine exams due to the repetition of those experiences. The trauma experiences students engaged in were perceived to enhance learning opportunities and the ability to assimilate new and existing knowledge while in the clinical environment. Kyle noted what interested him most in clinical, "Trauma. Probably trauma just cause it's very, more difficult. I like to figure things out...You have to think more and angle around the patient because the patient may not be able to move very well. They're in a lot of pain so you got to try and take care of them while they're in pain."

Areas where students were uncomfortable were related to exams that were not ordered, very often as students commented due to the fact that, "CT has taken over several general procedures." Exams that were not ordered often, multiple exams, going to surgery, or exams that required students to use equipment they were not familiar with

created a more stressful situation for these students. Linda commented, "Well for instances when we go to surgery that makes me a little uneasy. I mean the equipment is different. You don't do a lot of rotations through there and it's a stressful environment in surgery sometimes."

Opportunities for interaction. Students found clinical experiences allowed them the learning opportunities for interacting with different types of patients. As Linda remarked, "I would be a little nervous because this would be a real person and they're sick." The range of patients' behaviors and health status allowed students to gain knowledge and gain more confidence to assist them in their approach to different situations. In the clinical setting Linda demonstrated confidence as she interacted with her patients. She took patients' histories, talked with them during the time she was performing their exams, and she effectively answered their questions and kept them informed through their procedure. Linda showed caring behaviors as she kept her patients covered and warm during the procedures. For example, in a focus group discussion students expressed why patient interactions made the greatest impact for them in the clinical experience,

> (Tim) Just meeting different types of people, for me at least. Just learned how to deal with different types of people. Not everybody is exactly the same. You might get some mean people or you might get some nice people. So you know a variety of people so it's nice and at the end of the day it makes you feel nice you know cause you helped. (Kyle) Kind of similar to that is, you know, you meet all these different people but you get to see all the different things that they're going through, which kind of better helps you understand what, you know, what people have to go through all the time. I'm not always sick all the time so when I get people coming in all the time that are really sick and need us to help them out then it kind of makes you feel a little bit better that you are helping out. (Tim) It definitely helps you relate to people cause you know to learn about it in the classroom is another thing but to see if first hand in clinic it's something

> completely different. (Linda) Yeah, what they said. Well, it makes you appreciate, you know, your health. (Kyle) Yeah, I have all four appendages. That makes me feel good. But it helps to see what other people have to deal with.

Tim, Linda, and Kyle continued with the following vignette to reflect in detail the importance and the effect of the variety and types of learning opportunities offered due to the degree of each patient's health status or severity of their injury. These patients, whom students encountered in the clinical environment, allowed for individual learning through a personal connection and a realization of the importance of their own health status:

> (Tim) Yeah, I did, we did a CT on a guy the other day who had like went through a bunch of chemo and stuff and it turned out that he had a growth in his brain which I had when I was four so I could definitely relate to that. It's not a good feeling to see that but it's going to happen. (Linda) Yeah, I had a twenty-nine year old today having a chest x-ray she's having surgery for stomach cancer. And I thought twenty-nine! They're getting by and I mean you just don't know how they do it but. (Tim) I had a twenty-nine quadriplegic which I mean I'm twenty-one so that's not much older than me. So that really makes you appreciate. (Kyle) There was another lady that came into CT... And she ended up just having a baby I think pretty much newborn basically but she was coming into CT to get a biopsy on a growth on her sacrum I think or something like that. That was cancerous pretty much so I don't think they expected her to live more than a year. But she just had a baby and just kind of made me think that I just had a baby and you know what if something happened to me or my wife. You know it wouldn't be that good so. I just kind of related then. That was probably really the first sad case I had to deal with. Her husband was in there the whole time with her and she was in a lot of pain cause it hurts to get a biopsy especially in the sacrum. This helped me to think about it a little bit more.

Students wanted independence while doing their procedures, especially when they were second-year students. Being able to work more on their own, they were able to use their critical thinking skills to comprehend situations and enhance their learning. As a second-year student, Kyle wanted instruction that did not dictate each step to facilitate his learning in the clinical environment. He felt he learned best by:

> Being by myself. I like to figure things out. I mean, like, if I go into a knee exam and I haven't done a knee for a while but I know how to do a knee, sometimes I just like to figure it out. Because I know how to do it, it just might take a second. If there's a tech staring at you, you know telling you every step, oh, do this, do this, do this, you're not going to figure anything out on your own. And grant it, you might mess up which is unfortunate for the patient to have to repeat but you're going to learn a lot better and your repeats will drop. 'Cause you're going to be like me. I'm never going to do that again. That took forever. I like being myself kind of facilitates how well I do, I think.

Influence of peers on learning. Students viewed their peers as helpful and assisted in their learning when integrating new or different knowledge or skills. Students indicated that it helped to have peers present, as they were learning and doing exams because, as Tim said, "We share our experiences and whatnot and, you know, somebody might do something that I never thought of before. But we're always looking for the best way to do things." Kyle revealed how peers could be more accessible and approachable than technologists:

> You know, it could be good or bad...they definitely impact your clinical experience. And sometimes working with another student helps you to learn more, I think, because techs are not always willing to review with you or go over with you. And if there's two students you know one of you, you're both trying to figure it out so if one of you kind of forgets something the other one might remember it and it kind of, it seems like you learn a little bit more because you're figuring it out on your own.

Linking theory to practice-clinical instructor. Staff technologists and clinical instructors provided instruction for these students during their clinical experience. Instruction by the clinical instructor in the clinical environment was demonstrated during the observation. The clinical instructor facilitated instruction by clarification, linking theory to practice and guiding students to make connections. She asked the students leading questions in a very encouraging and calm manner: "So what can we do" or "What

do you think about your image and collimation?" The clinical instructor gave instruction to Linda as they worked together on a patient for a thoracic spine exam. Linda prepared the room and went to get the patient undressed and took their medical history for this specific exam. While Linda was with the patient a representative from the new computed radiography system came to the clinical instructor and informed her there were problems with that room and they would need to move to another. When Linda came back into the room to wait for the patient to get undressed the clinical instructor informed Linda they would have to move. Linda replied, after getting everything all set up in this room, "Shoot! I like this room." They informed the patient her exam would be a little while longer before they could start, as they had to move to another room and wait for it to come open. Linda performed the exam with confidence with only intermitted instruction from the clinical instructor. After each position was completed the clinical instructor guided Linda in the processing of the images since the computed radiography system was new to this clinical site.

Significance of patients for learning-clinical instructor. The clinical instructor realized the students' learning opportunities and integration of knowledge was definitely impacted in the clinical sites by the number and types of injuries that patients presented. The clinical instructor clarified that if the clinical setting had a lack of patients this could be detrimental to students' learning in the clinical environment:

> Patients are the most; they need to have the exams that they need to learn. Because they can do, they can simulate it on another students or instructor until the cows come home. But it's not ever going to be like doing it on a real patient. And so, basically, if they're having the exams that they need, they're learning and as they're doing them they're becoming more confident and comfortable.

When there was a lack of patients in the clinical setting the clinical instructor engaged students in active learning. She created learning opportunities and other means for students to integrate knowledge especially on skills that were least likely to be available in the clinical setting. In the clinical setting the clinical instructor had Kyle perform a skull series on Tim. Skull series was selected because it was not a frequent procedure. As Kyle was setting up for a Town view the clinical instructor quizzed Kyle. She asked, "Are all skulls views done at 40 inches?" He hesitated and the clinical instructor said, "Yeah." As Kyle proceeded to perform the skull series, the clinical instructor gave him positive feedback throughout the procedure, "I think that looks wonderful." She went on to explain specifics to him on how well he did and asked leading questions about the central ray angles, "Okay what does this show us?" Kyle responded with correct answers. The clinical instructor reviewed details with regards to marking films, collimation, and radiation protection, and quizzed the student on the setting of technique factors.

Trust and Fairness

Definition. Being treated differently defines the parameters of fairness. Students establish trust with their faculty and clinical supervisors and peers based on being "treated fairly". Trust and fairness reflect in comments and discussions that are open and confident. Student interactions are more effective when they trust that they will be listened to and understood, and responses to them reflect fairness.

Approachable clinical instructors and staff. The students perceived trust and fairness to be influential in the clinical environment for learning. Approachable clinical

instructors and staff were a positive experience for Tim in the clinical environment, "Whenever I have a problem I feel like I can always go to them and they'll listen, and you know, not judge me." Students felt they were all treated fairly and were trusted by individuals in the program. Tim stated, "The program has really balanced with how they treat their students."

Students usually perceived the clinical instructor as someone they could count on to be fair and trustworthy as a "friendly face" or "just have a little special bond." Kyle described desirable characteristics of the clinical instructors that he admired, "They're real friendly so I feel that I can go and talk to them about something....They're willing to work with you about figuring things out that way. Basically being friendly is a good one...and it's good just to be able to go and talk to them." When Tim had a difficult choice or problem, he emphasized, "I usually talk to an instructor. You know it's just and they're really nice too and really open with things. You can always come to them when you have a problem."

Significance of learning styles-clinical instructor. While the students did not identify specific areas of concern relating to issues of trust and fairness, the clinical instructor noticed students in the clinical environment were not always treated fairly. Some technologists apparently held grudges toward some of the students. Some students, depending upon how technologists viewed them being involved in the clinical setting, would receive more positive attention than another student. The clinical instructor explains:

> In the clinical setting I try to treat all the students fairly. However in the clinical setting some of the techs aren't very understanding and I feel that sometimes they

> treat some students with more priority and give them more attention. Then they treat other students differently. Like I was talking about before, the more shy student compared to the aggressive student, they're going to be giving more exams to the more aggressive student than to the more shy student. Or sometimes there are some that just have a grudge. If you do something they don't like they're not liking you for the rest of the two years and unfortunately that impacts. So what we try to do is watch it. If it's really disrupting their clinical experience then we try to change it and get them to a different area. Or then, like myself, I would go over to that campus and work with them instead of them having to work with that tech. Things like that. But unfortunately we can't control everybody's perceptions and how they treat the students. I guess if it got really bad we could, if it was consistently and probably in the past we've done this before, taken it to the radiology manager addressing the problem. We don't really have any authority to do anything to that tech.

This approach for moving students into different areas if they experienced difficulties with certain technologists appeared to be beneficial, as students did not express many concerns in this area. The clinical instructor being proactive and talking with management appeared to be an appropriate and successful method to reduce potential controversies in the clinical site.

Attitudes and Socialization to Radiography Clinical Sites

Definition. Attitudes and socialization in radiography clinical sites were examined in relation to interactions displayed by individuals within the clinical setting. Positive and negative attitudes and relationships are associated with feelings of acceptance. The success of their socialization affects the ability of students to assimilate to the clinical setting.

Effects of pressure in the clinical setting. The importance of attitudes displayed and a sense of acceptance and belonging were stressed throughout the interviews and observation. Kyle reported that technologists placed added pressure on students for no sensible reason in the clinical setting when they experienced bad days. This pressure

increased if the day was busy and the technologists become more anxious, thus causing more mistakes and requiring more time for repeat procedures. Kyle described how these behaviors affected his learning and performance when interacting with patients:

> Students get a lot of, what's the word, they get a lot of pressure from the other techs for no reason. Like you know, techs freak out on students for no reason. They might have a bad day cause something didn't go right and they take it out on the students and that kind of hinders our ability to learn. 'Cause then we're mad and we're goanna go in there on an exam and probably try to fake being nice to a patient and mess up on the exam, possibly repeat, make us look even worse around people and then so. I would like everyone to be a little more calm with things cause I like to. I'm calm and relaxed about things but even if it's busy you don't have to franticly run about. You can just be calm and take care of it, you know. 'Cause there's nothing you can do if you're busy except just work through it the best you can and if you get frantic it seems like you make mistakes. So just a little less pressure from the other techs.

Tim had his favorite clinical sites because of how they treated students. He felt they treated students with respect, "Yeah, everybody is very respectful, very mindful of what you're doing. Never been yelled at.... I do have my favorites but they're all pretty nice. I like the one in B. It's my favorite. Everybody is just always in a good mood and it's really laid back over there. Whereas, at W, you know you have a lot of ER, which you do, at B., but everybody is just really laid back and I don't know why that is. Must be something in the air." Kyle also noticed differences in attitudes from the technologists at the same clinical sites as Tim in reference to that site's specific patient population:

> Attitudes of the workers. You know people working trauma and ER have a little different attitude about things and people that are just dealing with patients that walk and talk and come on in. It seems like when you deal with trauma patients you kind of have of have to have a weird sense of humor so you don't take all that baggage home with you everyday of how these people are all the time. So that could draw on you how sick some of these people are so that's kind of what I noticed of people that work in trauma.

Enhanced attitudes from linked clinical settings. Depending upon which clinical setting students were assigned they described differences of attitudes and behaviors demonstrated from staff, clinical instructors, doctors, and patients. In this clinical setting at the hospital affiliated with the college, the researcher observed positive attitudes. When a technologist approached a couple of students to do an exam, she asked, "Would one of you ladies like to do an exam?" The atmosphere was calm and not too stressful. People seemed to be talking in a friendly manner. Everyone appeared to be very professional. There was no clowning around. Everyone was respectful to each other. Hospitals that were connected or linked to the college in the organizational structure appeared to be more accepting of students in their clinical setting. For instance, Linda states:

> Some places you feel more like they want you there than others in a way. If they kind of just go and do the exam and not really include you or tell you what they're doing or explain things to you it's like they go do it themselves they don't want to mess with ya, I suppose. I haven't seen that to be a big thing but I've noticed it a little bit. It wouldn't be any of the hospitals (connected to the college), it would be more of the out, the other ones, I suppose, the clinic or something like that.

Striving for a sense of acceptance and belonging. Students felt an inequity about their title as student, which Tim stated, "You know just that label, student, means you don't know a whole lot." Differences of attitudes and behaviors were not only related to specific clinical settings but to assigned shifts. These students compared how technologists accepted students as individuals during their assigned day or evening shift. On the second shift rotation there was a variety of exams available with less people working and students felt more comfortable to participate. Kyle illustrated in detail the positive attributes of being assigned to a second shift rotation:

> As a student I kind of feel half-way alienated, I guess, just because, you know, people refer to you as a student. You know, even as a second year when you're doing a lot better and you can do things on your own, you're still this student. And if you're standing around while five other techs are standing around you're goanna get yelled at even though there's nothing going on. I feel comfortable at certain places you know. I don't care too much for being in the department during the day shift. I really like second shift. It's real fun and the trauma comes in. I feel real comfortable there and I feel part of it on second shift but not on first shift. The second shift techs are a lot more laid back. They kind of have the perception of what I have as far as smoothness and patient flow. There's usually only four or maybe five techs on the second shift but their flow can come in a lot more than on the day shift cause they get a lot of ER coming in, different trauma and stuff, plus a few outpatients and dealing with the evening inpatients. And there's only a few of them and yet things still go really smooth and they usually only use two rooms half the time. If they're busy, they are obliviously busy but they don't freak out on one another because they're busy. They work really well together and everything flows smoothly and that's kind of how I want it to be. So I feel a lot more comfortable there. They let you participate a lot more even doing exams on, by your own, if you're competent. You're just a little more individual there. But, as an individual you feel more part of it. The first shift it doesn't seem like that. There's so many people there so sometimes you get left out because, you know, there's may be only a few patients, but since there's, like, twelve people, people are, like, getting in the rooms and if you're not running into the room you know you get in trouble. There's just too much going, on people getting too upset, over-frantic with things if it gets busy or if something happens. It seems there's too much drama on the first shift in x-ray.

Learning to be successful in the clinical environment required effective social interactions between students, technologists, clinical instructors, and patients. Occasionally relationships seemed to be intimidating in various situations in the clinical environment when patients had to wait to have an image repeated or if physicians felt the students were taking too much time in a surgery case. Tim did not feel intimidated in the clinical environment very often, however he described when some relationships by staff, physicians and patients were intimidating:

> I try to avoid a couple of people 'cause they are kind of cranky. You don't want to say the wrong thing. Physicians, yeah, there is more intimidation there just because you know when you're in surgery you know their time is money and

> they'll let you know. Patients, no, no, not really. Once in a while you'll get somebody who a wants to get out, wants to get out, wants to get out and you have to do a couple of repeats and they'll get cranky with ya or you can see people's moods change. You know, they'll be real nice when they come in. You snap a few pictures and it's like, oh, we have to do that one over again and they'll get cranky with you. But for the most part there is no intimidation with patients. They're all pretty nice.

Social interactions at times were frustrating between students and technologists. Students appeared to believe they were considered to be beneath the technologists even when students were trying to make the technologists' job easier. Kyle commented, "I think dealing with other techs has been most frustrating because as a student it seems like you, kind of are at the bottom underground of the totem pole, you know. Regardless if you're there to learn and you're actually helping the techs out by making their job a little bit easier." Difficulties and frustrations arose when students would need to rotate to various clinical sites. The students may have been away from one clinical site for some time while learning at a different clinical site or assigned to a special rotation. Then when the students were assigned again to a previous clinical site, the technologist did not always relate to the students' questions or their need for a review in a positive manner. Students did, however, acknowledge how stressful this situation was for them and mentioned a possible reason for why some technologists at times were annoyed with students because perhaps they wanted to work by themselves. The focus group discussed their frustrations with the technologists in the clinical environment:

> (Linda) Yeah, I agree, just dealing with the techs, sometimes you can't win. Sometimes they're way to in your business trying to do everything. Sometimes if you ask first how, I don't know, they're like, you should know that. Sometimes it goes both ways. (Kyle) Yeah, we learn it in class but when you try to put it into clinic and you're moving around to other clinic sites you're not always in the department so things can flip out a little bit. You just need a little shot to come

> back and asking a tech can be, could be, very helpful. Could be, like, hey you know, what's the routine for this again? I just got back from three other hospital areas that do a different routine, you know. So you're just verifying, but they're, like, you should know that. Well, I don't know that. That's why I'm asking you the question. So that's probably one of the more stressful parts, or makes it a little more difficult. Not all techs, you know, but some of them, you know. (Linda) I suppose we can be a little annoying. I mean, if you're just there trying to do your job and then, sometimes they might want to do an exam without being bothered by us. They don't get a lot of time off from us students. I try to understand. (Kyle) The thing that I think about is more like a, yeah, if they want to go in and do an exam by themselves and I just want to do this but, it just seems like a lot of times that this is a teaching hospital they should understand that. You know, we're students and they're working at a teaching hospital so they need to deal with students in a little bit better manner. But, yeah, if they want to do their job and do something by themselves then whatever. But to me, any help. I'm never too proud to accept a little help.

Importance of building positive peer connections. Attitudes and the ability to interact with peers in the clinical setting were essential in the clinical environment to facilitate learning and decrease stressful situations. Building up successful peer connections assisted students in dealing with stressful situations and being able to navigate certain exams between them to lessen conflict and competition for exams. During the observation these attributes were demonstrated in the clinical setting. Kyle and Tim shared learning experiences in the clinical setting as they were reviewing images on the computed radiography monitor. They were discussing pathology assignments while reviewing these images. Kyle also was giving Tim some advice on the Cardiac Catheterization Lab rotation because Tim was scheduled next week for this rotation and Kyle had just finished the Cardiac Catheterization Lab rotation. Peers in the radiography program are together in a cohort for two years and spend a lot of time in the same class and clinical assignments. For example, the focus group explains the importance of maintaining positive peer connections:

> (Kyle) Yeah, definitely, if I have trouble with Tim or someone like that working at the same site, you know it's going to be a little awkward a little difficult, and not as enjoyable, I guess. It won't help facilitate any learning cause you'd be, like, man, is Tim looking at me weird. So it could hinder your learning if you're focusing on something like that. So I think it is important. (Tim) Exactly. I mean, it's always good to get along with who you are working with, like Kyle was saying. (Kyle) I think one of the biggest things is that we're together for two years. So if you start off on the wrong foot you've got a long ways ahead of you. (Linda) Try to help each other out. Not, like, compete, you know. I've seen other classes. We all need to get our exams and want the same things, so you have to, okay, you take that one and I'll take this one. (Kyle) Yeah, compromise. Yeah, if you need a c-spine and there are two c-spines that day, you don't need to put your name on both of them. I'm doing both of them, no. I can do one and Linda can do the other one or something like that. You know, mix it up a little bit. Helping each other out, you know...what you, going to do, you're going to help that person get one or are you going to be real stingy and get that comp or something like that. (Linda) It's nice to have an ally in the department too. Another student, they understand some of the things that we're dealing with.

Implications of the social culture climate. Overall, students realized the powerful effects of attitudes upon their ability to socialize into the culture climate of the clinical environment. These attitudes and behaviors imparted a positive or negative effect upon the students' potential for learning in the clinical setting. Students' abilities to recognize positive or negative interactions and their responses were essential to obtaining successful inclusion into the clinical environment. For example, the following two quotes from students expressed the impact attitudes made upon them. Linda commented, "If you're not having a good experience then you're not going to learn." And Kyle noted, "Any time that attitudes are towards each other, you know, are comfortable and nice, it really facilitates better learning."

Importance of effective interpersonal relationships-clinical instructor. The clinical instructor reported differences from each clinical setting as to how individuals interacted with and regarded the students. She felt strongly that certain attitudes and

behaviors from the technologists influenced how comfortable she felt. She believed that this affected the students' learning in the clinical environment. She felt that technologists perceived students who were not as aggressive in performing exams as not learning. The clinical instructor felt it would be beneficial if the technologists would take the time to get to know the students better, make them feel welcome, and understand how each student learns. Learning was enhanced when students felt less apprehensive in their environment or clinical setting. The clinical instructor stated:

> Overall I feel very comfortable.... It's just more like the people's attitudes that work there and they're really kind of depressing. I mean, our new instructor, when she started and she like went to the W. campus, techs aren't as friendly or as student-friendly as our 7th street ones are. She noticed it right away when she went over the first day she was, like, wow, those techs are something else, aren't they? I mean when they're down and complaining about everything, you know, they're the ones that just want the students to be doing every single patient and when they're not doing every single patient then that's not a learning experience for them. When in all actuality, they are learning other things and they're not very student-friendly with the more shy and not very aggressive students. Because they don't get to know the students a little bit and know that, that's them and that they're not intentionally being not aggressive doing every single thing that walks through the door. And sometimes that kind of, and you get kind of resistance with that cause they're like complaining to me and I know the students and it's kind of like, if you would just take time to see. But mostly, mostly I feel very welcome in the department. And actually that helps a million times if you feel really welcome in the department and if your students feel welcome in the department then their education and your process of giving the education is going to be a lot better because you're not trying to have to deal with that and the techs, things like that.

The clinical instructor emphasized the importance of effective interpersonal relationships with students and individuals in the clinical setting. "I try to make them feel as comfortable as possible and try to allay their fears some so that they can get the best experience as possible." The clinical instructor had to have exceptional interpersonal skills to be able to deal with students and technologists. A positive learning environment

could be attained through effective social interactions between students, staff radiographers and clinical instructors. Periodically, a technologist had a problem or a negative attitude with another technologist and may have conveyed those negative behaviors while students were present as they worked and interacted with each other in the clinical setting:

> Sometimes there are techs, you know, that will vent in the department and some techs will talk bad about other techs or sometimes, umm, I don't think the students really hear it too much, but sometimes they will talk about other students or different things and that makes me cringe. Even talking bad about other techs because, with the students in their clinical experiences, it can kind of put a shadow on their clinical experiences.

Attitudes reflected by performance-clinical instructor. The clinical instructor noted how students displayed positive and negative attitudes while in the clinical setting. The clinical instructor was able to determine if the student was just shy or not having a positive clinical experience because she would get to know her students. The students' behaviors revealed their attitudes as they participated in the clinical setting. In certain situations, having a technologist or a clinical instructor that was being sensitive and understanding was important to accomplish a positive outcome. Positive or negative behaviors or attitudes displayed by individuals influenced the students' ability to perform and learn in the clinical environment. The clinical instructor stated:

> If they're (the students) just not wanting to do anything then they're not having a positive attitude. And usually I know the student to know that it's not that they're shy or something is bothering them or something like that. And then the positive attitude: they're, it's kind of corny to say, but they're basically shining, you know enjoying the clinical experience and the way that they're talking and the way that they're interacting with people.

Supervision, Evaluation, and Recognition

Definition. Supervision and evaluation are descriptions of any discussion, expression or process of written or verbal feedback between individuals or between groups. Recognition can consist of appropriate positive reinforcement of behaviors. This includes expressions of appreciation and motivating comments.

Enhance self-sufficiency with indirect supervision. These participants discussed the positive and negative attributes involving supervision, evaluation, and recognition. When mistakes occurred students appreciated patience and understanding from those who were supervising them. Tim admired clinical instructors that were able to, "Just to be patient, you know, not to get upset when, when you do something wrong. Just very attentive." Linda commented, "When they are helpful but they let you, you know, do things on your own when you're ready. Understanding that they know what they are doing as far as the technique and what works well with the patient too, and genuinely care about what you're doing." Being able to work in the radiography rooms without having a technologist or clinical instructor watching right over them or "huddle over you" allowed students the ability to critically think through situations knowing the technologist or clinical instructor was right outside the doorway if needed.

Students preferred to have the clinical instructor or staff technologists stand outside the room while they were performing procedures, especially as second-year students. They felt this allowed them more independence, yet they knew and were aware that, if needed, assistance was right behind them. This approach to supervision was

important to lessen nervousness and second-guessing of oneself for students while performing procedures as portrayed in the following two examples. Kyle explains:

> I like to be in the room by myself and the tech maybe just right outside. If a tech's watching you, you're kind of, what are they looking at, what are they messing with, you know, or stuff like that. You're always second-guessing yourself I think, when a tech's there. So if they're just right there, just out of sight, I guess. Out of sight out of mind. If I can't figure this out then I call them in. But after you go through it all in your own head and there's still something not right then maybe ask them.

Tim had similar experiences, "We have a tech in the room with us and some techs will huddle over you while you position the patient and everything. That's kind of nerve wracking. At T. P. (another clinical site) one of the things that I like is that they'll just kind of hang out in the doorway and not make you too nervous when you're doing things like that."

Staff technologists and clinical instructors provided supervision and evaluation for these students during their clinical experience. During supervision students placed an emphasis on being able to do the exam independently, but wanted feedback from the technologists on their experiences that would help and guide them through a procedure. Linda explained, "When they take the time to share their experiences and when they give you a little hint on how to do an exam and again, let you do it yourself if you're ready and kind of guide you through it. Share what they know and again, with patient care, I like it when they work well with the patients." The focus group shared how intrusive it felt when under supervision from some technologists, "(Kyle) I didn't like when that tech stared at me during the entire exam without moving their eyes away from me. So it helps you to maybe think, when I'm helping a student out I'll be a little more alert in helping

them out. (Tim) Not hunch over them. (Kyle) Yeah just help them out when they feel they need it."

Successes and barriers in the evaluation process. Students wanted and expected frequent, honest feedback about their performance. Most of the time students experienced feedback that was timely and helpful. Technologists completed written evaluations on these students weekly. Students handed out evaluations to technologists of their choosing that they worked with during that week. Twice a semester the students received a written composite of all the evaluations that were completed. Not all students thought this process was the best way to get frequent honest feedback. Kyle thought, "I don't think that they're always accurately portrayed. Some people write through them and give you all good ones... we get all of our evaluations back, what different techs have said about us, whether it be good or bad. And then we sit down with our advisor and go over it. Definitely do get feedback, maybe not as often as I would hope." Tim, however, found this process to be beneficial:

> We have weekly evals that we hand out to somebody that we've worked with through the week and they'll put down, you know, I mean, that grades our performance and our appearance, promptness, things like that. And there is an area on the back where they can comment. We do get to see what they wrote. But it won't say their name by it.... It's cool cause they can, you know, say, needs to work on this or whatever, you know, needs to review this or that. So it's kind of nice. It's open podium and still remain anonymous I guess. Although you can guess who's writing what. So look for somebody that was nice that you worked with.

Students realized the instructors' and technologists' approach and amount of feedback depended upon the student's ability and knowledge. Instructors gave students extra support in new situations and reviewed with students just before they would attempt

to perform a competency (test on a procedure) on a patient. The students found that when clinical settings became very busy this did not allow for the optimal flow of feedback to the students. Kyle described:

> If an instructor comes in there, generally they'll work with you if it's, like, your first time being in that specific room, and they'll kind of go over with you the exams. If there's one that you want to comp on they'll, kind of, go over everything with you make sure that you know what you're doing. And if they feel that you're not really competent in any of those they'll say, maybe do as much as you can on this one and we'll see how it goes. They definitely work well with you in that way. As far as techs go, some of them do the same thing, go over exams with you really well and just, kind of, help you out that way, make sure that you know what you're doing.

Linda agreed with Kyle that when the clinical settings become hectic, "I mean, sometimes it gets kind of busy and you want to know how did that go and what I could do different. And a lot of times the staff will tell you, which is nice. The clinical instructors always do. But sometimes it gets kind of busy and you don't get all the feedback that would be helpful."

Impact of recognition and motivation. Recognition or lack of recognition was present in the clinical environment involving staff, clinical instructors, patients and students. Verbal feedback included "good job" or "you need to work on" from technologists or clinical instructors. Students appreciated and were motivated when they received recognition from patients in the clinical environment. One of Kyle's best clinical days involved gratitude, which he received from a patient, "She thanked us very much for taking care of her the best we can. And it just kind of stood out a little bit just cause a she, I don't know, it kind showed that I was helping her and she was really

thankful that we helped her out and she was really pleased with everything.... It just make my day just thinking that we actually do something for the people."

Significance of feeling valued. Recognition was essential for students in the bridging program model and they emphasized feeling more recognition if they were perceived to make a valuable contribution within the clinical setting. Students felt valued in the clinical environment depending upon their perception of their ability to contribute in the clinical setting. Being able to contribute in the clinical setting depended upon the amount and quality of knowledge shared by the students, how many people were at the clinical site and the number of patient procedures. Linda indicated, "Sometimes they feel like we're in the way students just in the way, too many of us. But a lot of times you're like, you feel like you're really doing something, helping them too, not just being a hindrance." Kyle said he felt he was more valued when assigned to second shift and less valued when assigned to a special rotation. Kyle compared his feelings of being valued differently on different shifts:

> The second shift I do. Sometimes on first most often I do. I feel more like I'm valued if I'm capable of doing a lot more. If there's so many more people it seems like your value is less. Just because there's less you can do. Unless you're, like, fighting people to get into an exam and that just causes drama so I don't want to be that type of person that steals an exam from a student or from another student that might need it and stuff. Most time I feel valued but if there's too many people there, no, I don't feel like I do much at all. Cath lab rotation I felt a little less valued because there was less that I could do. It all kind of builds up, too if there's more that I can do I feel like I'm more valuable. Even with all the knowledge we have so far, you know, there's so many people there's nothing to do.

Tim explained, "You know, there's days where people can be crabby. You know, you don't feel like they value you there, but I think in retrospect they always do."

Supervision and inquiry based feedback-clinical instructor. The clinical instructor when observed in the clinical setting did not go into the exam rooms as often with the second year students as she did with the first year students. She told the second year students, "I am going to stand back so you can practice. If you need me I'll be right here." This approach to supervision was important to students to lessen nervousness and second-guessing of themselves while performing procedures.

The clinical instructor realized that when the clinical settings were full of activity this did not allow for optimal feedback to the students. The clinical instructor commented, "Sometimes I don't always take that time and fully discuss everything with them after the procedure because then we have to rush on to the next procedure. And sometimes that makes me disappointed because I didn't get to stop and step back and we didn't get to talk about it so that they fully understand it."

The clinical instructor's approach and manner of feedback depended upon the student's ability and knowledge. She provided students more support in new situations. The clinical instructor recognized the importance in her role of providing feedback and that this was essential for students to gain a good clinical experience. "My role as a clinical instructor is to guide the students in the clinical area ... make sure they're doing it the right way and give them comments and suggestions. Make sure they're learning what they need to learn, getting a good clinical experience."

The researcher observed the clinical instructor giving students frequent feedback in the clinical setting. The clinical instructor coached as she helped students work through procedures. For example, she helped Linda with a patient's order that involved

multiple exams. The patient was to have a cervical spine, thoracic spine, and lumbar spine exam. The clinical instructor talked with Linda before starting the exams about how best to approach the patient and the best way to prioritize each position to be taken. Linda proceeded with the exam and the clinical instructor stood back to let her think through each position. Even though Linda took a little more time, the clinical instructor did not take over the procedure. After Linda positioned the patient for each projection the clinical instructor did check her positioning and technique settings before exposing the patient to radiation. As the clinical instructor checked her technique settings, she asked Linda, "Need to go down a bit?" Linda responded and the clinical instructor said, "Technique is good. I'm going to accept this." After each position was completed the clinical instructor asked Linda, "What did you learn from this position?" The clinical instructor continued to give Linda immediate feedback after each position was completed. At times during the procedure the clinical instructor gave Linda some instructional hints. During this procedure a couple of new first years were observing and the clinical instructor was also explaining to them some details of the exam, which they have not yet learned in the classroom.

Importance of recognition-clinical instructor. The clinical instructor reflected on the rewards of her additional responsibility as a clinical instructor. She said she felt valued by her colleagues and students, which she perceived to be the best type of reward or recognition. She did not receive any formal rewards for her role as a clinical instructor except for positive comments during annual evaluation by her supervisor.

External Model

The data collected from this model was acquired in a Midwestern state community college. The teaching of theory was *divorced* from the clinical setting. All the students' theory teaching was at the community college while the clinical education experience was provided by other health service providers and was instructed by the staff at those clinical settings (Bench, 1999). The clinical instructors at this educational institution that provided students with instruction, supervision, and evaluation at the clinical settings are referred to as clinical advisors.

Students at this educational institution received an Associate of Applied Science (A.A.S.) degree upon completion of the radiography program. This community college enrolled more than 4,000 students each fall. The radiography program had a current enrollment of seventeen second-year students. The Higher Learning Commission of the North Central Association of Colleges and Schools accredited the college. The Joint Review Committee on Education in Radiologic Technology also accredited the program. This program used several clinical settings. Students rotated to several different clinical settings within their two-year program of study.

Participant Demographics

Student participants were three second-year students and one clinical instructor. The gender and race of the three students were white and female. Their ages were 22, 24, and 31. The non-traditional student (31 years old) was married and the other two students were single. Each of these students reported having prior educational preparation beyond high school before entering this radiography program. The 22-year-

old student will be referred to as Mary, who had an AAS degree. The 24-year-old student will be referred to as Nancy, who had completed some general education. The 31-year-old student will be referred to as Jackie, who had completed one year at another community college.

The gender, age, and race of the clinical instructor was a married white 46-year-old female. Her prior educational experience included five years of technologist experience prior to becoming a clinical instructor. She had ten years of experience in radiology and five years as a clinical instructor. Her responsibilities for teaching were providing clinical instruction and student advising. She taught only in the clinical setting and she will be referred to as the clinical instructor.

External Program Emergent Themes

Student and clinical instructor (at this also referred to as a clinical advisor) participants were interviewed regarding clinical experiences and how it affected their learning perceptions. The semi-structured individual in-depth interviews were conducted with students and a clinical instructor. A focus group interview was conducted only with the student participants. Several themes emerged from the semi-structured individual in-depth interviews, observation, and the focus group interview. These themes consist of: (a) learning opportunities and integration of knowledge, (b) trust and fairness, (c) attitudes and socialization to radiography clinical sites, and (d) supervision, evaluation, and recognition.

Learning Opportunities and Integration of Knowledge

Definition. Learning opportunities integrate classroom instruction with clinical experiences to form a base of knowledge. Learning opportunities can be formal or informal. Formal learning opportunities involve planned curriculum and clinical experiences. Informal learning opportunities arise spontaneously during observation of, and participation with, those already in practice. Learning opportunities include acquiring competencies and being acculturated into the profession. Integration of knowledge can be reflected in descriptive comments and discussions, and demonstrated through application of classroom knowledge in clinical experiences. Integration of knowledge or skills is related to students applying new knowledge or making connections based on prior learning experiences.

Integration of theory to practice. Students in the external program models perceived learning opportunities and integration of knowledge to be important. Students noted that in the classroom they would learn the prevailing methods for performing procedures. The application of these methods learned required numerous approaches depending upon the situation. Students strived to integrate knowledge and skills from the classroom into application in the clinical environment as they reviewed and discussed radiographs with the clinical instructor. In the external program model, teachers, clinical instructors, peers, and staff technologists made learning opportunities and integration of knowledge in the clinical settings possible.

Mary said she gained knowledge of radiography through various individuals during her clinical experiences, "You learn from your teachers and you ask questions and

you learn from your peers and the techs." During the observation by the researcher, learning and integrating knowledge was demonstrated in the clinical setting when Nancy and Mary were reviewing their radiographs and preparing to assist on portable chest exams. A technologist was reviewing a fractured hand radiograph with Mary and instructing her on how to magnify certain areas of the image for better detail. Nancy was viewing portable chest images with a technologist on the computed radiography monitor. They were discussing the images and Nancy said, "She bumped up the technique to four" and the clinical instructor replied, "It looks okay for the radiologist." Nancy continued on to make sure the entire image receptors were cleared and ready for the next exams as they were preparing to go perform two more portable chest exams. Nancy prepared the equipment and the clinical instructor was on the phone discussing the portable requisitions relating to patient and doctor protocols.

As the students in the external program models progressed from first year to their second year their knowledge and skills were blended between the classroom and experiential learning in the clinical environment. Understanding the information in class was beneficial. Combining it with experiences for application in the clinical environment allowed students the resources and time for concepts to become clear and for demonstration to be performed. Students became aware of how situations and circumstances may vary in procedures due to a variety of factors including technical issues, patients, and the students' current level of knowledge. Clinical experiences in the external program model allowed students the ability to use their knowledge to construct

new concepts for an increased level of understanding. Nancy told about her experience in the clinical environment:

> Really, like, we did our first, our very first class, that I had I got the whole, idea of what it was about. And then to actually learn it and understand what you're doing was all in clinic to me. I mean, you can learn it on paper and see it but when you actually go in and use all that information that you just gathered, and put it to use, it starts to come to you. Even after my first year, I still come back to clinic and be like, oh man, I just don't know and then just one day it just came to me. I don't know. I can't really explain it. Like the whole KVP and MAS it's like all of a sudden, oh! I understand it now, you know. So, it was probably towards the end of my first year. So yeah, it was difficult in class and clinical.

Mary shared a similar observation from her student perspective on how overwhelming and scary learning could be in the clinical environment because as a student you don't know what to expect.

> It's hard. You can only practice so much on patients before you get a real handle on at the hospital and figure out what's going on and what exactly happens and its scary at first. Oh, it is just overwhelming. You don't know what to expect and how to handle things and what's going to come up. You know each time they call out an x-ray you're like, oh my gosh! What is it going to be? They call it out and at first you're not sure how the patient's going to be. If they're going to be hooked up to all these tubes and wiring or if they're going to come down and be a walky talky patient. You just don't know.

Bridging the gap between theory and practice. There were some connections between what was learned in the classroom in procedures class and applying that knowledge in the clinical environment. However, in the external program model the students described a greater division between how the clinical environment was supposed to function and how they actually experienced it. Students found learning and integrating their knowledge to be more complex and difficult as they experienced reality in the clinical environment. During the focus group interview the students provided the following dialogue relating to the connections and lack of correlation between classroom

instruction and their clinical experiences. Students said they did not feel they were totally prepared to face many of the situations they encountered in the clinical environment:

> (Jackie) It's related, you know, as in the positioning and stuff like that. In stuff that we've learned. Like I said in my interview it's that we don't, nobody sets you up for what you're going to experience. I think that they disconnect in a way, in that way and they connect, they connect, you know, in what you learn in class you use in clinic. (Nancy) Reality wise, they don't fill you in on problems that may occur. They could give examples of past situations maybe. (Jackie) How they worked through them. (Nancy) They just kind of throw you in there, like everything is going to be perfect almost and it's not. (Researcher probing question) You see them teaching the ideal world and then you get to the real world? (Nancy) I wouldn't necessarily say more the ideal even. They kind of put clinic to be, you know, fun. You know, really good learning experience and you're going to have a great time and you're all going to love it. And then we come here and it's like, are you serious? It's the truth. It's like the exact opposite. You walk around on eggshells all day and feel like you didn't do this right. (Mary) I would say as far as learning you get the basic background. And then they teach you, but it's classroom, you can't, I mean clinic is hands on. You get a more real actual aspect of what's going to happen and how to do things.

All student participants in the external program models believed that procedures class was absolutely necessary prior to and during their clinical experience. Procedures class sets the foundation for students to have a beginning reference point for them to apply their knowledge. Nancy explained:

> To actually go in and work in your clinic area and try to be on your own you have to have Procedures. I mean, that's a big part. I mean, you can do without the imaging, physics and whatnot, but you have to have Procedures to actually be able to, you know, to position a patient and take an exposure. And then taking your exposure is all, what all that means. You find that out in physics and imaging and stuff but that's not what you're thinking about when you're actually doing it. All Procedures, I think, big time deal.

Students in the external program model appeared to struggle more with differences between what was taught in class and what was taught at the clinical site than students in

the bridging program model. Mary stated, "For procedures you have to adapt to how different techs do things." Students stressed how knowledge or skills in procedures class were applied in the same or different methods at the clinical sites. Technologists have their own method of doing procedures that are effective for them. Some technologists did not appreciate other ways to perform exams, leaving it up to the students to modify how they performed a procedure depending upon which technologist they happened to be working with in a particular situation. For instance Nancy explained:

> Everybody is different. Everybody. So you will learn how to do, like, a hand, and it just happened to me the other day. Our clinical advisor teaches, you know, to do you AP, oblique and you're lateral. Some people do their obliques like this and others do it like this. And if you do it like this, certain people really frown upon it. So, you kind of have to remember who likes what, you know, and do it that way. Regardless of how you want to do it, because it's not right, you know what I mean. And so that's way different. What you learn usually, it's pretty much a starting point. So, if you learned how to do it this way you're going to have to learn to do it eighteen different ways because that's how many different people are going to work with you. And then the doctors don't like it that way or something gets in the way.

Jackie further described that trying to apply her knowledge was a gamble to fit within the method or approach for each position depending upon each individual's preference.

> Oh procedures! For procedures you have to adapt to how different techs do things. Some people position differently and so every time you go into clinic you have to know what kind of procedure you are working with so that you know to do it like they do it. When you learn at the procedures time the basics on how to position but when you get in the clinic everybody has their own way of getting a good forearm or wrist or something and they want to try to have you do it that way but basically to do it. So it is kind of a gamble on how to apply those things.

Opportunities for interaction. Again students expressed the importance of having classroom content prior to or in conjunction with clinical experiences. Students were displeased they had missed some class time in patient care class due to difficulties with

the classroom teacher getting behind and not being able to cover some of the content. Similar with the students in the bridging program model, learning how to interact with different problems that patients presented when they came into the clinical site was at times very stressful for students in the external program model. The students indicated the clinical environment provided them knowledge and skills for "learning how to deal with people." Mary emphasized in the clinical setting, "you learn how to treat people. You learn how to handle patients." The clinical environment provided several different patient care situations for students to observe and participate in to formulate new understandings of how best to care for their patients. For Mary the greatest impact in the clinical environment was, "Just the different patients that come in and how to handle them, and just the experiences that the different problems that people have. I think that it can open my eyes and give me a bigger perspective on things." Technologists were powerful role models in the clinical setting for students in this external program model. Nancy described the impact that two different technologists in the clinical setting had on her relating to learning patient care:

> I have watched a couple of the technologists down there and there's a lady who is so strong on patient care and it just blows my mind. Like, I can see myself or anybody else get so frustrated with if a patient is doing certain things or, you know, uncontrollable, or what not, and she's just so down to earth.... But, this person, she's got a good head on her shoulders. She keeps herself so calm in certain situations it just blows my mind. And then there's another lady that's just the exact opposite. I couldn't see myself going that far. In, like, handling your patients, if your patient can't do this, you know, forcing them to do this, and stuff like that. And it's kind of like, I can't believe you just did that. And there's been numerous times that people have said something to this person and I guess nothing is going to get done about it. I mean, that's out of my control.

Significance of learning opportunities. During the observation the researcher observed Nancy and the clinical instructor sharing a learning opportunity performing a portable chest exam together. Nancy demonstrated her abilities to integrate her positioning and patient care skills. As they left to do the portable exams, Nancy drove the portable unit and they talked about personal issues on the way to the patient's room. They were laughing and enjoying each other's conversation. Once at the patient's room the clinical instructor went to double check the orders before going into the room. Nancy went ahead and put on gloves as she was talking to the patient and introduced herself and told the patient why and what she was going to do. The clinical instructor entered the patient's room and introduced herself to the patient and also told the patient what they were going to do. Nancy manipulated the portable unit as the clinical instructor provided guidance on how best to place the portable machine. Both the student and clinical instructor worked together to perform the procedure. The clinical instructor was communicating with the patient and with the student throughout the procedure.

This patient for the portable chest exam was very large and required the clinical instructor and Nancy to work very hard together to place the image receptor behind the patient's back. As they moved the patient they were careful to ensure that the patient was as comfortable as possible. Both clinical instructor and student worked well together with positioning the patient. The clinical instructor decided on the technique to use for this patient. Nancy gave the patient breathing instructions and exposed the patient to radiation. The clinical instructor maneuvered the portable unit out of the room. Both assisted the patient to remove the image receptor. The procedure went smoothly. Both

worked well together and communications were effective to help the patient and get the procedure done. Nancy and the clinical instructor washed their hands immediately upon finishing this procedure for this patient.

Procedure comfort level. As evident in the bridging program model several students in the external program model indicated they were very comfortable with routine exams due to the repetition of those experiences. Areas where students were uncomfortable were related to exams that were not ordered very often, exams that did not come in very often, big multiple exams, or exams that required students to use equipment they were not as familiar with, which created more stressful situations.

Influence of peers on learning. Peers were a significant resource for learning and building up the students' confidence in both the bridging and external program models. Students relied upon their peers to assist in their learning and integrating new or different knowledge or skills. Students indicated that it helped to have peers with them, as they were learning and performing exams. Peers provided a helpful hint especially if a student was having an off day. Students said they felt more at ease approaching their peers with questions. Peers have shared what they learned from an experience with a student who may not have had that specific opportunity yet. Mary indicated, "We call on other students because we feel more comfortable with asking them questions." Nancy noted:

> Sometimes you'll be having just one of those off days and you have that other person behind you. Sometimes it's helpful to be like, don't forget to do this or don't forget to do that. Or maybe just put in a little bit of insight and be like, maybe you should just rotate him up just a little bit more or something like that. Yeah, very helpful, and two heads are always better than one.

Mary further explained that peers are extremely helpful with learning in the clinical setting because, "They see different ways to do things or they can help you with exams or just, it's like, if you can talk to them about experiences. If, like, you're stuck on something they can, like, inform you, like, if it is something different, you know. If it is something that they got to see that you didn't get to see."

Desirable characteristics of clinical instructors and radiographers. Students realized the variety of methods and resources that were required in order for them to participate and practice in the clinical environment. The students described desirable qualities or characteristics of clinical instructors and radiographers, which facilitated their learning and ability to apply their knowledge in the clinical environment. Nancy admired many of the technologists and what they had to offer her while learning in the clinical environment, especially setting technique, which seemed to be the most challenging aspect for Nancy to apply. She appreciated that each technologist had their own specific piece of knowledge to share since there were various situations she encountered and had to navigate to become a technologist. Nancy explains:

> I do admire the different ways to do things, like different positioning skills. Every single tech down there has something different, you know. It's cool to learn every single way because then you have that many more ways to show somebody else when you're that technologist showing a student. I really admire that every single one of them can sit down and tell you a technique for anything. And it's like I don't know when I'm going to get to that point or if I'm ever going to get to that point. I don't know. You know, their patient care skills. I admire that. Some of them are just outstanding in that. They'll put on gloves and they'll touch whatever spot that you probably wouldn't like to or they'll clean up any mess without running their mouth about it or calling housekeeping and having them come do it or something like that.

When students thought the technologists and clinical instructors enjoyed their jobs they appeared to be more approachable and willing to take the time to teach and assist students. Mary commented, "I would say that they would have to love their job, have to love what they are doing, to be able to teach it and be good at it. They would need to be approachable if you had anything, questions. They have to be knowledgeable, know what they are doing, be active, and participating in the exams."

Linking theory to practice-clinical instructor. The clinical instructor attempted to facilitate the students' learning opportunities and integration of new knowledge and concepts as they progressed throughout the program. The clinical experience could be overwhelming for new students as they were learning and trying to make connections from previous learning experiences. The clinical instructor realized how unfamiliar these concepts were to students entering the clinical environment, "Especially with the freshman, you know everything comes second nature to us now when you're in it for awhile. You have to think in terms of, oh my gosh, you know, this is all new to them. You have to learn to be patient."

The clinical instructor when observed in the clinical setting was very adept at communicating with the patient and the students throughout the procedures they performed together. This process allowed the clinical instructor to instruct and guide the students and present herself as a positive role model. The clinical instructor decided on the technique to use for many of the procedures. Students in the external program model emphasized their uncertainty when it came to setting technique. Setting technique was

one area where the clinical instructor did not encourage student involvement, as often she made technique settings decisions without the students' participation.

Desirable characteristics of students-clinical instructor. The clinical instructor described desirable qualities or characteristics of students for making each opportunity into a learning experience. Students who could maximize their learning opportunities by showing up on time to their clinical settings, and who did not hesitate to ask questions in a professional manner portrayed desirable student characteristics. When students made mistakes the clinical instructor wanted them to learn from each encounter and not to avoid certain procedures because of a bad experience. The clinical instructor admired these students' attributes in the clinical environment:

> A really good student would be someone that's very conscientious about being to work on time, knows what's going on in his or her room, isn't afraid to ask questions. Of course, professionalism is good. Sense of humor is good to a degree. And, of course, you know, if they are in a situation, hopefully they can make mistakes but hopefully at least they know what they are doing and they learn from their mistakes.

Trust and Fairness

Definition. Being treated differently defines the parameters of fairness. Students establish trust with their faculty and clinical supervisors and peers based on being "treated fairly". Trust and fairness reflect in comments and discussions that are open and confident. Student interactions are more effective when they trust that they will be listened to and understood, and responses to them reflect fairness.

Difficulties in building trusting and fair relationships. In the external program model the students perceived trust and fairness to be an area of special concern in the clinical environment for learning. In comparison students in the bridging program model

provided more positive comments relating to issues regarding trust and fairness. Students in this external program model did not usually perceive the technologists, clinical instructor or college instructors as persons they could count on to be fair and trusting. Students did not always know who they felt they could trust in the clinical environment. Jackie desired and needed clinical instructors that were approachable, trustworthy and nonjudgmental for her to feel comfortable in taking problems to them. Jackie conveyed:

> A clinical instructor is someone that you should be able to go to if you have problems that you trust, someone that is professional, that won't judge you, that will like all the students, and if you have problems will take it to the teachers or the clinical head and take care of it for you and give you feedback. I just think that person you should be able to trust and will help you learn more positioning or if you have more questions on stuff be able to help you.

Students perceived that most of the time they were treated fairly but unfairness was displayed from the technologists due to a lack of teamwork. Students thought too much of the responsibility of preparing patients for every exam fell on the students. Mary tended to think that students were mostly treated fairly, "Pretty well, yes, treated fairly. Sometimes, like, there will be several exams... and something is called out and they'll expect all the students to go and pick that up, instead of being more of a teamwork kind of thing. They don't usually go up and get it by themselves. But it depends, some techs do."

When students had a difficult choice or problem they did bring issues to their instructors or clinical instructors. However, students emphasized that this communication seemed to exacerbate the situation. Students then had to deal with the constant questioning at the clinical sites relating to those specific problems. This in turn made students feel they could not trust someone to handle certain problems if they still

had to participate at that clinical setting. Jackie described how difficult it was to develop trusting relationships:

> Well, I'm not really sure who to go to. Don't really go to the clinical advisor. That's not really the role that they take with us. They should. But they don't. We go on to our clinical instructor who is our teacher. (Researcher clarification probe) Clinical instructor, teacher as in the classroom? (Jackie) Yeah, she is over the clinical sites. I had brought something to her in regards to how a tech treated a patient in a room. And, I was in the room and the tech upset the patient and I was left to apologize for the tech after the tech left. And I had taken it to her and she had taken it further without mentioning it. I mean, she did do something and I give her credit for that, but I wish that she would have mentioned it to me. Then I had the whole radiology department asking me about it. It brought it to a whole different level and you have to deal with these techs everyday. So I'm not sure who, you can trust and who you can't trust. And I think that there should be a lot of trust in the program. You do have to deal with a lot because of being in clinic.

Perceptions pertaining to how fair a person or a situation was or if someone could be trusted was dependent upon the students' viewpoint of the situation. Students indicated on several occasions that peers were treated differently due to, "students that know some of the techs on the family ground level" and "I find myself doing a lot more than somebody else." Students perceived that cliques developed at the clinical sites noting, "everyone has their favorites" or "that's just what happens in every workplace."

Impact of personality conflicts-clinical instructor. The clinical instructor observed that not all students appeared to be treated fairly by the technologists in the clinical environment primarily due to personality conflicts and lack of support by administration. These conflicts led technologists to ignore students at times. The clinical instructor explained when asked, do you feel all students are treated fairly?

> No. I think I do to the best of my ability. But there are a lot of techs, because of personality conflicts, once that is there they can shun a student to where they don't even talk to them or deal with them. Another issue, once again with

> management, where that's been discussed and, like I said, maybe there is flack from the rest of it, and it goes on and on, and nothing is ever accomplished.

The perception of how fair a person or a situation was or if someone could be trusted was not always perceived from the same viewpoint by the students and the clinical instructor. The clinical instructor passionately felt she was fair with the students and always willing to help them with any and all types of problems. However students previously expressed that they did not always perceive fair practices from the clinical instructor. The clinical instructor perceived that she would go out of her way to make sure students were included in group situations and attempted to bring issues out so they could be resolved.

> Fair is a big deal to me. I like people that, I'm really big on this, if somebody is having problems a lot of people don't want to deal with it. I'll go figure out that person and try to make them in on the group. I don't like to shut people out. I don't like that at all. When people do that I try to draw out the person that's out, in, and try not to talk about them. I'm serious about that. I don't like people that are like that. It's real important that everybody gets along. It's not that there can't be waves but I like to resolve issues. I don't like things, you know, I like things out in the open.

Significance of learning styles-clinical instructor. The clinical instructor described how students were treated differently with regard to their learning styles. Technologists that perceived students who comprehended how to do procedures sooner appeared to be more capable and these students would receive more positive attention and trust from the technologists in the clinical environment. Several technologists made positive assumptions in the clinical settings if students were able to quickly comprehend and perform exams. On the other hand, some technologists did not appear to have the

desire or patience to involve students and share their knowledge and understanding with the students. The clinical instructor stated:

> I think part of it is because everybody learns at a different level. The students that are doing more accelerated, I guess they're looked up to because they've learned it quicker and grasped things a lot quicker. And the other students that, you know, they are capable but they're just not there yet. Therefore, you have technologists that, oh she's really good and don't worry about her and, ah I got to stay away from her today or him today. They're diving me crazy because they don't know what's going on or whatnot. That's not really fair because you can tell if somebody isn't plain not cut out for it. And there isn't very many people that really aren't cut out for it. There is just a handful here and, you know, throughout the years. But sometimes I think it is very unfair how students are treated.

Attitudes and Socialization to Radiography Clinical Sites

Definition. Attitudes and socialization in radiography clinical sites were examined in relation to interactions displayed by individuals within the clinical setting. Positive and negative attitudes and relationships are associated with feelings of acceptance. The success of their socialization affects the ability of students to assimilate to the clinical setting.

Importance of negotiating good working relationships. Students in the bridging and external program models emphasized the importance of attitudes displayed. A sense of acceptance and belonging were stressed throughout the interviews and observation in both program models. Being in the clinical environment with so many different attitudes gave students a wider perspective of how they wanted to present themselves to others with whom they interacted. Learning was adversely affected if students were unable to negotiate good working relationships with the technologists. Students in this external program model expressed a deeper sense of not feeling connected or recognized in the clinical setting, as compared to the students' perceptions in the bridging program model.

Mary shared what she valued most in her clinical experience in the external program model, "It changes your perspective on things. Working with people, even just the techs, working with them, different attitudes, and you get a different handle on the way you want to present yourself." Jackie identified that relationships greatly affected her learning in the clinical environment:

> As far as putting the learning aside you have to come in to all these new people who don't know you from Adam. And you're tying to learn from them and you can't learn from them, these people, if you don't have a good relationship with these people. So, you try to establish yourself with these people and whether or not they like you or not. I think that's been the hardest obstacle for me.

It appeared during the observation phase studying the external program model that there was a separation between the students and the technologists in their social conversations. Technologists definitely set the tone and direction of the conversations regarding who and when someone, especially students, would be included. The viewing area, where the radiographs were processed and viewed in this radiology department, was also a place where the technologists and students gathered to wait for requests for exams. Along the wall was a line of chairs and in the middle of the room was a table and chairs. Early in the morning the technologists and students were in the viewing area sitting in the chairs along the wall and at the table. Some students were reading textbooks as they listened to the conversations that were going on around them. Students were quiet as technologists were joking and laughing with each other. One technologist was at the table filling out her Christmas cards. One bulletin board in the viewing area had important information and updates. Another bulletin board was full of fun pictures of technologists with fun captions beneath each picture.

Students were reviewing notes on the absorption process in the stomach and one of the students asked about what the stomach absorbs in the digesting process. No one really stated that they knew for sure. One of the technologists got up went to the computer and accessed the Internet to find an answer. The technologist found a web site and stated to the group one of items the stomach absorbs was alcohol, and everyone laughed. As the morning progressed most everyone was participating and looked relaxed in this social learning time.

Mary described her best clinical day as, "The people that you're working with are in a good mood." When asked about her worst clinical day, she said, "I think the moods around you affect how you are doing." During the observation, difference in attitudes and social interactions were demonstrated as students and technologists came together in the radiology department. The students were all dressed in the same uniform while the technologists were able to wear many different types of scrubs in the clinical unit. Several students were sitting at a table reviewing notes and their textbooks. Some technologists were sitting in chairs along the wall talking about personal issues. One student was in an imaging room performing a procedure. One of the technologists sarcastically said to the students sitting down, "Hope you don't sit there the whole time since she is watching you" (referring to the researcher). Some of the students looked up at her briefly. Others did not appear to want to acknowledge that comment. After a brief pause this same technologist stated, "I am only just joking."

Students in this external program model talked very passionately about the lack of professionalism frequently presented by instructors and technologists. Gossip and

disagreements between individuals displayed a lack of respect in the clinical environment, which the students said they found to be unreasonable. During the focus group interview students elaborated on what should be improved in order to enhance learning in the clinical setting.

> (Nancy) I'm most frustrated with the bickering. I mean, I get so sick and tired of hearing them ladies talk and talk about each other. It's ridiculous. I hate it every bit of it. I mean you get to a point where you almost say something. And than your like just shut up you cannot say that. You shouldn't be talking about that you know. It's none of your business. But than you're just kind of like, you got to walk away from it. (Mary) It doesn't feel very professional for them. (Nancy) And that's somebody we're suppose to look up to. (Mary) Yeah. They're all your teachers too. Yeah, exactly. (Jackie) That is somebody your suppose to be able to go to and trust.

In contrast when the students were asked if they thought the staff and clinical instructors were professional in their communications with them as a student they responded, "For the most part I think everybody is pretty professional" and "Yes, for the most part. The teachers are and most of the advisors are."

Implications of the social culture climate. Discrepancies were recognized in the external program model depending on which clinical setting students were assigned to, whether or not a student would be accepted into that specific group. Personalities at some clinical settings appeared not to match as well with some students and made them feel more uncomfortable. Students identified and discussed personality differences affecting their confidence for learning at a particular clinical site. When students in this external program model were comfortable at a clinical site they were more outgoing and willing to make every effort to get in and do more exams. Students were mainly anxious about personalities and attitudes presented at various clinical settings, more than about

patient care or procedures. Jackie and Nancy sufficiently described clinical relationships, as they perceived them, to be different, depending upon which clinical site they were assigned. Jackie commented, when asked how attitudes at the clinical settings are communicated, "I kind of put a guard up here." The researcher asked a probing question to clarify the response, "Can you tell me how you put a guard up here at this site but not at the other site?" Jackie explained:

> Well, at the other site I think that my personality fit better over there, so I was more comfortable over there. So that made me strive more and be more outgoing and you know, feel better about myself to do it and to get into an exam. Where I knew that if I was going to make a mistake I wasn't going to get negative feedback. You know that everybody is entitled to mistakes, especially when you are a student. Whereas here you're like, I would even be hesitant to do. Not all, but some techs, you're hesitant to even grab the tech to do the exam with you. I think I put a guard up because I guess I got a bad midterm grade that I had no idea was coming. I have always gotten A's in clinic and you get a bad grade someone is failing you. And you tend to wig out. And that was a big hit for me. I guess it made me put a big guard up because I wasn't for sure why it was, personality or, you know, things were said that weren't true, like, it took me an hour to take a patient back. You know it's just not me, and what hurts the most, and you know it's not true, and you can't do anything about it, and that made me really put a guard up. It made me have a whole different outlook on the whole program itself. I think that the student should have somebody that's going to back them 100% whether against a tech or unless they're in the wrong. Can't go to your teachers, and you can't go to your clinical advisor. You can't go to anybody unless you go to the dean and that's not helping you out any, I guess.

Nancy continued to describe how students perceived dissimilarities at clinical settings. She felt her learning was hindered due to personality conflicts.

> I mean you really realize, god, how disrespected some people are. And how much of advantage were taken, they're taken of us. But then, I don't know, it goes good and bad. But, I can sit here and realize now how you struggle more at this campus than at the other campus. It has nothing to do with your patients or procedures. It's all to do with personality and people which should be the least of worries in clinic but it's not.

Striving for a sense of acceptance and belonging. Students tended to feel when staff radiographers and the clinical instructor were approachable this eased pressure. Students perceived them to be "more flexible," "open minded," and that the students "would be able to bring problems to them." Transitioning from one clinical setting to another provides students with enriched learning opportunities, however, there were perceived difficulties for some students assimilating to a new environment. Students did not want to leave the clinical setting they had been at for a period of time because they had reached a level of comfort in that specific environment. Other times they were glad to leave a clinical setting due to strained relationships or for types of procedures that were available at another clinical setting. When students were assigned and began to participate at a new clinical setting, at times they felt inferior to the previous students that just completed their rotational assignment. Nancy and Jackie described how they felt about being comfortable in or part of a clinical site. Nancy shared in detail an example of some frustrations and difficulties adjusting to different clinical settings as she progressed from her first year into her second year. Nancy explained:

> At my first clinical site, of course, right when you come in you're really uncomfortable because you don't know what they expect of you. You don't know what they want of you. And at the end of my first year I didn't want to leave. You know. I was so comfortable and I was happy there, you know. And I come over here to my second area and I was so uncomfortable. I felt out of place. I felt like we didn't, you know, that we weren't as good as the other students that were here before us, I felt like at first. I've gotten to the point where I'm getting comfortable and it's somewhat personality, you know, with the people who you work with, you know. They're suppose to be there to make you feel comfortable and sometimes they don't do that. They talk about other people in front of you and you know it kind of makes you feel uncomfortable, like you don't want to be caught up in a conversation even though you're not saying anything and have somebody think that you have because you are sitting there, you know. There's that fine line where techs ask you, which campus do you like better, or well, who

> do like best or whatnot. You know you don't ask me that kind of stuff. I'm not going to answer it, for one. It's kind of like, don't put me in that position. That's just uncomfortable. You come over here and there are totally different exams from the other campus. In actuality, if I wasn't comfortable here and I wasn't getting along with somebody then I would have to leave. I would be upset because I would be missing out on what I need. Because I need the exams that are over here because you're not going to them over at the other campus. And I am comfortable with doing the exams that are over here now. But, at first, no, I wasn't. A lot of it has to do with the people because some of them make you feel so uncomfortable or you hear something that somebody had done to somebody else which, I never had a problem over here but I know of three people who have. Kind of like I feel bad for them, but I want to watch out for myself, you know, so if I should rub this person this way. Or, I can't joke around this way with that person. Sometimes I feel like I'm walking on eggshells over here. Like you don't know how to read people. You don't know if you should say this or if you can joke around about this. It just seemed so much more open at my other campus. I think we all clicked really well over there. Over here I just don't know if it's the same. It's definitely not the same but.

Jackie related a similar experience about feeling uncomfortable and not feeling like she fit in as part of a clinical department as she moved from one campus to another.

> I felt comfortable at my old campus and this campus has been different. It's more of a personality thing. You have to fit to do a good job. It's not with everyone. There is certain people that if you have a personality conflict with, you feel even that personality thing, even though they don't like you, you feel like you're walking on ice. And so it affects on how you do your clinic because if you're in a room and they're watching over you, can make you nervous and you mess up and you get a bad grade for that week.

Impact of hierarchical authority. In the clinical environment of this external program model there was a sense of hierarchical authority. Students in the bridging and external program models felt they were not considered at the same level as other individuals at the clinical settings. The affiliates, which were the clinical settings in the external program model, were perceived as having a controlling effect over the teachers and the college. Students felt the affiliates could dictate how issues were approached and whether or not any action would take place. Typical comments from students and the

clinical instructor included: "the techs, they are teaching you," "you are below them and you already know that," and "I think that sometimes you are looked down upon." The clinical instructor commented, "Someone that has a position that's higher than me, like a lead tech, I wouldn't say intimidated, but I know how far I can go without going over the line. You just have to know your place." Nancy elaborated on what she thought should be changed in the clinical environment:

> The people keeping, like things to themselves, like our technologists who we're supposed to be looking up to, you know. We're supposed to be wanting to be like them, you know, and they'll down talk people right in front of you. They talk about other students in front of you and I mean, just, stuff like that. I don't think it should be. And a big thing that needs to be changed is our teachers and stuff need to come together as a whole and make our clinical experience the best that it could be and I think that they have gotten a little intimidated by their affiliates. And so they don't want to stand up for some of the things that, the problems that we've had or having, and I mean, I think that needs to be changed as well.

Importance of effective interpersonal relationships-clinical instructor. A positive learning atmosphere in the clinical environment required effective social interactions between students, staff radiographers and clinical instructors. Being open minded to other ideas and willing to work through situations helped to ease tension in the clinical environment. In certain situations that needed to be addressed, being sensitive and understanding were essential to achieving a positive outcome. Positive or negative dispositions of individuals influenced the students' ability to function and learn in the clinical environment. At times technologists had a problem or a negative attitude with another technologist and communicated those negative behaviors to the students as they worked and interacted with each other. The clinical instructor found that it was difficult

in some instances to be discreet and nonjudgmental while working with a variety of personalities in the clinical environment:

> I would have to say I'm open minded and if there is something that somebody addresses something to me, I am willing to find out. If I don't know I will find out. You have to be willing to work with all kinds of people, not be real judgmental, and have an open mind. Definitely open-minded, and not being real judgmental. You have to learn to keep your tongue. You can't, you have to be careful what you say to people. Those are really important, and I have, and sometimes I have a difficult time with that, but I try really hard not to.

The clinical instructor identified technologists were not always patient with students when they made mistakes in their clinical experience. The clinical environment could be a place of apprehension and stress for students when technologists did not present a positive, supportive, approach when they instructed and assisted students. The clinical instructor observed that tensions decreased students' ability to collaborate with the technologists and led students to feel that they are not part of the team in the clinical setting. The learning experience could be more enjoyable for both the technologists and students if the attitudes promoted a positive experience where technologists shared their expertise and invited students to challenge themselves in various procedures. The clinical instructor explained:

> When there is not a lot of tension sometime, for the handful of techs that are a problem it's not that bad. But when there are rifts between technologists it affects students. And not a lot of times but sometimes techs take things out on students when it hasn't had really anything to do with them. So that affects how they feel in the work place. Although we try making things more fun, fun is really not a good word, but where you want to come to the clinic, I guess. So attitude is a lot in that. So, if you have to come to a place that you don't like or enjoy then it's going to be bad and not good for learning. Where you feel people are friendly and you can ask questions, you can make mistakes, although we do have some techs that feel like students can't make mistakes. They are a student and we try to reiterate that a lot to them. Look, they're learning. They're not going to be perfect. And things are going to happen and if it's a problem where it continues

> on, on, and on, that's a different thing. But, you know, you can't get upset about these things and hold them responsible when you're actually supervising them anyway. That can cause a lot of problems for a student when they feel like everybody is picking on me or that kind of thing.

Implications of role models-clinical instructor. The clinical instructors and technologists were the students' role models. Students were exposed to negative and positive role models in the clinical environment. The clinical instructor realized the importance of her behavior and attitude as she refocused on her role as a clinical instructor, "It does make you more aware of how you are treating people. More aware of your patient care because everything you do they're watching." There are instances in the clinical environment that appeared to be a dividing point for students and technologists with regard to what behaviors were deemed acceptable. Students were not expected to be able to joke around with technologists in the same manner as the technologists joked around with each other. The clinical instructor explains:

> The technologists kid with me a lot and there is joking and we all get along very well. There is a lot of fun in our department and sometimes the students are in on it, but they don't go overboard on it. They know how far they can go with that, so, but, like I said before, it doesn't help when were acting like that either. But sometimes it's good for stress when that goes on.

Supervision, Evaluation, and Recognition

Definition. Supervision and evaluation are descriptions of any discussion, expression or process of written or verbal feedback between individuals or between groups. Recognition can consist of appropriate positive reinforcement of behaviors. This includes expressions of appreciation and motivating comments.

Impact of recognition and motivation. Participants in the bridging and external program models discussed the positive and negative impact involving supervision,

evaluation, and recognition. Clinical instructors and students gained motivation and enthusiasm when they received positive recognition. Recognition was necessary for students and they felt more recognition if they received positive comments during their clinical experience. This external program model revealed that approval from clinical instructors and technologists gave students the confidence to try new and difficult exams. Students expressed a desire for recognition when they were performing well. Nancy said her best clinical day was one, "When I do everything the way I'm supposed to, and praise from, like, our instructors and stuff, telling you you're doing a good job. When you give them your paper at the end of the day and they write down at the bottom, good job, or something like that." For Jackie what has made the greatest impact on her in the clinical environment was, "People praising you and giving you good slips. Getting through exams that you didn't think that you could do, or trauma view, or different things like that."

Significance of feeling valued. Students suggested that as a group they were valued in the clinical environment because of the work they performed, but that the technologists did not always appreciate them. Students felt a lack of recognition from the technologists due to a lack of positive comments and a frequent emphasis on negative feedback. Jackie and Mary described their sense of value in the clinical setting. As an individual, Jackie did not feel like she was valued in the clinical setting. She stated, "Myself, no, not really." However, she said she believed students, as a group was valued because of the work they do but not appreciated in the clinical setting:

> I think students are valued. I think they are just not appreciated as much. You know, we do a lot of work and I know we're learning but we still do a lot of work,

> and I think that we should be recognized a little bit more even though we are students. Even if it is just a pat on the back or, you know, good job today, rather than the bad things, always knowing about what simple mistake that you make.

Mary asserted, regarding students' value in the clinical setting, "It depends. I mean, some people are more thank-you and that kind of thing. We help them out, I think, quite a bit. So, you can tell some people appreciate it. Some people help you, teach you, some do, and some don't as much." Nancy commented, "Certain days our work is taken for granted."

Although students wanted numerous learning opportunities, they perceived certain situations when they were being taken advantage of in the clinical environment. Students in the external program model definitely said they felt a huge lack of respect. When simple mundane tasks were to be taken care of there was an expectation that the students would perform those tasks. These expectations led the students to sense a lack of respect for them from the technologists. Jackie related her sensitivity to how students were treated with respect in the clinical setting. "I think that we are treated with respect. I just think it's a funny kind of respect...we do a lot of work for free.... We're doing the learning and someday we will get paid. But, you just feel like you have to do everything. So, as the respect I think, I don't know, some days you feel respected and some days you don't." Students may well be valued and appreciated by technologists, particularly during hectic times in the clinical setting. Nancy described the differences in being valued and sensing when learning was not taking place and when she felt students were taken advantage of in the clinical setting:

> There are certain times that I do think we are valued. When we get extremely busy I think the techs really do appreciate what we do. And then when we're not

> real busy I know we are the people who are here for the experience and supposed to be wanting to learn what we're going to be doing. But I don't think that it's fair that we are the ones that have to stand up and do every single exam regardless if it's a chest x-ray that you've done a thousand times or it's a knee or something like that. They can jump up, too, as well, and go get the requisition and dress the patient and whatnot, just as well as we can. It's not like, I'm twenty-four years old. I'm not a kid you know. I understand that I can go and undress my patient and I don't think that I have to do it a thousand times before they realize that I know how to do this. They can't get up and do it on their own. Because we aren't getting paid for what we are doing here we're paying you to do this, you know. And I just think that there are certain days that they take advantage.

The researcher observed a similar situation in the clinical setting. The students were the first ones to respond to the calls over the intercom that an exam was required to be completed. The students got up and went over to get the requisition for the patient. They then went and prepared the imaging room for the exam and assisted the patient to the dressing room. Mary went to get the requisition for a patient to perform a hand exam. She then prepared the imaging room and, as the researcher followed, Mary quickly turned around and said, "It is unusual for a tech to go get a patient!" The tech went to get the patient that needed a hand exam for this student.

Barriers in the evaluation process. Staff technologists, clinical instructors and at times a radiologist in certain procedures provided supervision and evaluation for these students during their clinical experience. The students wanted and expected frequent, honest feedback about their performance. Students perceived their clinical performances were often evaluated and judged on personality issues and not on their performance in the clinical environment. This perception was more evident in this external program model than in the bridging program model. The general consensus was that evaluations were concerned with what students did wrong more often than their successes. Nancy

asserted, "You can't be judged by your personality because it should be strictly on your performance. And what is good for one should be good for all and that's not how it is in this program." Jackie expressed the desire "to have more recognition for the good things rather than just the bad things. And I would like to have people that you can go to and be able to talk to them, people that you think that will help you in down time with positioning trauma views."

When the focus group was asked how they felt their clinical setting affected their learning, attitudes, personalities, evaluations, supervision, and recognition were of foremost importance to them. Being a student was perceived to be very challenging due to all these obstacles. Many times students felt like technologists pushed them to their breaking point in the clinical environment and they thought about quitting the program. Evaluations were not always based totally on student performance, but on how well a student was liked by technologists at the clinical setting. Some students were perceived as being able to get away with certain things while others received poor evaluations that were undeserved. How students made sense of their treatment in the clinical environment did make a difference in their ability to take in information. Positive constructive criticism was critical for students to develop and to succeed. The focus group's dialogue revealed how the clinical setting affected their learning:

> (Nancy) Sometimes it makes you feel, be down on yourself. Wouldn't you guys agree? (Mary) Yeah. (Jackie). Oh, Yeah. (Nancy) Like getting your weeklies and getting your midterms and I feel like I'd done a better job than what I've gotten. You know other people probably feel the same way. Other people probably gotten what you think that they don't deserve, you know. I mean, you know, you can't talk about it with anybody because it doesn't get anywhere. (Jackie) I mean I was there that day. Everybody has their breaking points, you know, where you want to quit. And, I think that I've had mine yet this semester, so I know that I had a bad time at clinic. It

> really, really affected the way I performed in class.... So, I think that hurt, you know, more than anything, but it's like I'm not going to let somebody get the better of me. And I'm going make the most of it. I didn't put myself in a program for two years to take time away from my family and everything else to let somebody, you know, win. You know, so I have been slowly stepping up to make the situation better. (Mary) It really affects you. The people that you're working with and their attitudes and the personalities and how they talk to you or treat you. Whether they're giving encouragement or not saying anything. It affects you a lot. (Jackie) I think the big thing is that it's supposed to be a learning environment and we don't get enough praise. I think, you know, if you do something wrong people are first to jump and write that down about you and send to your teachers. But, you do something good you should also be praised. Say, good job, or get a pat on the back every once in awhile. And, I think that would lift a lot of spirits. It's hard being a student. (Mary) Yeah.

Lack of constructive criticism communicated with supervision. Expectations in the clinical environment from the technologists to the students were not always made clear. Students wanted to learn from their mistakes and have constructive criticism communicated to them from the supervising technologist. However, most of the time they did not have technologists with them who wanted to teach and help them learn from their mistakes. Many times students received feedback or an evaluation that stated what they did wrong but no communication on how to address what they did wrong. Jackie explained, "I just want someone that is willing to teach us. Let us make mistakes because that's how you learn. And, you know, tell us when we're doing a good job. Evaluation, I think that if we're doing something wrong, instead of just saying something bad, let us know what it was and you know, how to fix it."

A variety of attitudes were communicated to students through evaluations and while under supervision by technologists or clinical instructors. How these attitudes were presented to students was significant for their capability for learning and being encouraged in the clinical setting. Negative attitudes were displayed by certain

behaviors, such as technologists shrugging their shoulders at a student or totally ignoring a student's question or request. If a mistake occurred during an exam some technologists shifted the blame totally onto a student even though they were responsible for supervising that particular student. Nancy expressed her frustration with trying to work with some technologists' attitudes in the clinical setting:

> Oh, I have heard, like, verbal attitude. Like something will go wrong with a student and a tech in a room working together. Something was marked wrong, lets say, and that person totally flipped out, blamed the, blamed the student. Well, you should of this or you should of done that or, you know, and they'll actually say it to you and some techs will just, you know, do like one of these, Ohoo, you know, and it's like, what am I doing wrong? Tell me what I'm doing. And then you'll get just, like, the shrug of the shoulders, somebody totally ignoring what you're asking them. Like yesterday I asked for help on how to do tomos, in one of the rooms that I've never seen done before and she totally ignored everything that I had to say. She didn't come up and help me or anything so I comped on it and I was kind of clueless as to what I was doing. I mean you get all sorts of body language and facial expressions. I mean, some of it's verbal as well.

Supervision approach-clinical instructor. The clinical instructor identified her role as a resource for the students: the students' contact person to supervise, evaluate, advise, and resolve a variety of issues that arose in the clinical setting. She acknowledged that she would spend time talking with students to inform them of their clinical responsibilities and provide them with direction and feedback. A goal for her was to help them become critical thinkers and help them apply learning to real life situations that became available to them in the clinical setting.

> Basically, while the students are in clinic, I oversee them. I make sure they are on time for attendance. If techs have issues with students they come to me and I try to resolve it while they're in clinic. If it can't be resolved in clinic then I contact the college and we do it that way. If there are things that they are not familiar with, let's say procedures or something like that, I might go over something that's usual with them prior to them doing it with another tech. They basically come to me with most of their problems.

During the observation period, in the clinical setting the clinical instructor provided good clear feedback to students as they performed procedures together. She made sure to tell them why things were right or wrong and guided them though the procedure when they seemed to hesitate on knowing how to proceed in certain situations. In the clinical setting after Nancy performed a portable chest exam with the clinical instructor, they processed the image and the clinical instructor provided feedback to Nancy. She explained to Nancy how to mark the image on the computer and explained that, due to the patient's size and the difficulty of performing this portable procedure on this patient, they clipped off the bases of the chest. They discussed why the bases were cut off because Nancy was uncertain as to why the bases were cut off due to how the image receptor was placed, because it appeared to her to be a good placement. The clinical instructor provided feedback informing Nancy that the placement could look good but, due to the different positions of patients for portable procedures and how long his lungs were, the image receptor needed to be placed lower.

Staff technologists and clinical instructors provided supervision and evaluation for students during their clinical experience. With experience the clinical instructor found, in a variety of situations, that she was able to supervise and evaluate students while attending and caring for patients at the same time. She stated, "I can deal with unusual circumstances and still be calm with the patient and with the student even when there is a stressful situations where the student is not doing well. I can control myself fairly well, which took some practice." The clinical instructor further identified, that when other technologists were supervising students, it was not always a positive

experience. Students experienced a lack of respect from certain technologists if there were personality conflicts. The clinical instructor said:

> If a tech is working with a doctor and wants things to go well, they might be overly nice and not really themselves. If they are working with a student and they don't care for the student, they feel they can talk to them any way they want. Not all, I'm just saying certain people. They're not as respectful as they could be. Yeah, it definitely depends on, for some people, who they're with as to how they adjust themselves.

Importance of recognition-clinical instructor. The clinical instructor identified that positive recognition from the students was extremely important for her. She derived motivation from positive acknowledgment by students to improve her performance in her role as a clinical instructor. The clinical instructor emphasized:

> I like the fact that, for me, that the students, and I don't know, this is just what the program chair and people tell me, that they respect me, and that I am easy to talk to. So that's a big impact for me, as like wanting to do my job and do better. Because, you know, I usually get positive feedback about how I deal with students as opposed to negative like a lot of techs get.

The clinical instructor said she felt that the college faculty acknowledged and demonstrated recognition for her clinical teaching. This respect for her by others in the college was extremely important to support her in her role and responsibilities as clinical instructor. There was no economic incentive for taking on these additional responsibilities. She stated:

> I don't know if we ever really got recognition for anything that I can recall. I know for awhile there they were giving these, this was probably before my time where they gave a thank-you type acknowledgement in a frame. I don't even know what it was exactly. But, its not that D. and P. and all them aren't appreciative. They are and I know that they are, but I don't think that there is any kind of, other than that, no reward in it other than self-satisfaction.

Internal Model

The data collected for this model was acquired at a hospital based program in the Midwest. The teaching of theory and clinical instruction was conducted within the same institution. This model used a hospital or clinic with an internal education department that provided both theory and clinical education (Bench, 1999). The clinical instructors who provided students with instruction, supervision, and evaluation at the clinical settings were hired by the hospital and taught students in the clinical setting and in the classroom.

Students at this educational institution received a certificate upon completion of the radiography program. This hospital-based program enrolled seventeen to twenty students once a year. The radiography program had a current enrollment of seventeen second-year students. The Joint Review Committee on Education in Radiologic Technology provided accreditation for the program. This program mainly used two clinical settings from two separate hospitals that jointly support this program.

Participant Demographics

Student participants in this study were three second-year students and one clinical instructor. The gender, age and race of the three students were two white females and one white male. Their ages were 20, 22, and 32. The non-traditional student (32 years old) was a single white female and the other two students were single. Each of these students reported having prior educational preparation beyond high school before entering this radiography program. The 20-year-old student who will be referred to as Tiffany had completed some limited radiography. The 22-year-old student, who will be

referred to as Roger, had completed two years of college. The 32-year-old student, who will be referred to as Barb, had completed a B.A. degree and some other college coursework.

The gender, age, and race of the clinical instructor was a married white 37-year-old female. Her prior educational experience included some college and completing a radiography technology program. She had eight years of experience in radiology and three years as a clinical instructor. Her responsibilities for teaching were providing clinical instruction and teaching courses in the classroom, which consisted of critique I, II, III, patient care I, II and cross-sectional anatomy. She teaches in the clinical setting and in the classroom and will be referred to as the clinical instructor.

Internal Program Emergent Themes

Student and clinical instructor participants were interviewed regarding clinical experiences and how these affected learning perceptions. The semi-structured individual in-depth interviews were conducted with students and with a clinical instructor. A focus group interview was conducted with only the student participants. Several themes emerged from the semi-structured individual in-depth interviews, an observation, and the focus group interview. These themes consisted of: (a) learning opportunities and integration of knowledge, (b) trust and fairness, (c) attitudes and socialization to radiography clinical sites, and (d) supervision, evaluation, and recognition.

Learning Opportunities and Integration of Knowledge

Definition. Learning opportunities integrate classroom instruction with clinical experiences to form a base of knowledge. Learning opportunities can be formal or

informal. Formal learning opportunities involve planned curriculum and clinical experiences. Informal learning opportunities arise spontaneously during observation of, and participation with, those already in practice. Learning opportunities include acquiring competencies and being acculturated into the profession. Integration of knowledge can be reflected in descriptive comments and discussions, and demonstrated through application of classroom knowledge in clinical experiences. Integration of knowledge or skills is related to students applying new knowledge or making connections based on prior learning experiences.

Significance of learning opportunities. Learning opportunities were reported by the students in the three program models to be important. Students in the internal program model commented they, "just want to learn as much as I can" or "we like to take any knowledge we can." Students perceived in the classroom that they did learn the standard methods for performing procedures, which was not always how procedures were completed in the clinical environment. Tiffany commented, "You can observe how they do it, and maybe in the future you will do it that way, but schoolwise, we have a certain way that we do it, and so, the techs all know that and so they respect that we can't do everything that they do." Students tried to integrate knowledge and skills from the classroom to application in the clinical environment. Students in this internal program model described it was a combination of class and mostly clinical that assisted them in learning radiography. For Barb, classroom and clinical was important, but she needed the clinical experience for her psychomotor development, which she explained as "muscle memory." Barb explained:

> It's a combination of mostly clinical and the classroom. I guess I learned a lot of the anatomy and what I'm suppose to be seeing on a film in the classroom, but then the how to make it look like that comes from the clinic. So, I guess I learned what it's supposed to look like and the theoretical how you do that there and then, the hands on, it's really in the clinic. I think you also have this muscle memory, you know. Like, you can remember things in your head but I also remember things, how I did it.

Students discussed the significance of procedures class as they moved through their clinical experience. This knowledge was beneficial for students to have a basic understanding of anatomy and positioning in order to know how to adapt to a variety of situations in the clinical environment. This also gave students the confidence to understand and the ability to point out what was demonstrated on an image. Tiffany said she appreciated her procedure class:

> I think we as students all thought a lot of the procedures class, didn't realize how much it helped us when we were starting to go through it. We were like, oh, man, this isn't going to be fun. But we learned a lot that helped us a lot, that helped us out anatomy wise and everything. They just really made it stick in our head. And so we were able to take x-rays and we were able to point out all the anatomy and that was just really cool that we could do that.

Roger discussed how valuable procedures class was for his learning and the practical application of this knowledge. The classroom knowledge gave him the understanding of certain concepts so that when in the clinical environment he felt he had the knowledge to be able to adapt to a variety of situations. "Even though I said clinical is probably the most valuable, I think there are a lot of things in procedures class you learn. I mean you couldn't just go into clinic and learn it by watching it only. I think you need procedures class. You need...the basics and then you can adapt to different patients from there." Students understood they were taught a specific method for procedures and

as they experienced numerous situations in the clinical setting they identified when variations from the typical method was required. Barb explains:

> Procedures, we do most of the things that were taught in procedures. The way that we were taught in procedures in terms of the distances and the positioning and the central rays. You learn, in clinic, like, I learned about how to take a postoperative hip picture. I'm gonna center a little bit lower because I want to get the whole prosthesis in there. I guess that's what I'm talking about with the variables. You learn in certain situations you do things differently and you learn what situations those are.

In this internal program model there were occasions when students were in the clinical setting when patient numbers were down and this resulted in fewer learning opportunities for the students. Roger explained the importance of having opportunities being available in the clinical setting, "I think the more experience that you get, too, so that if it's slow all the time you're not going to learn real well because you don't get practice." When Tiffany was in the clinical setting she said she wanted to, "Just to do my best. I want to get in as many exams as I can, just to gain that experience."

Significance of accountability for learning. Students in this internal model specifically perceived accountability for learning to be their own responsibility. How involved and the degree of participation in clinical was connected to self-initiative on the student's part. Students realized avoiding certain exams or sitting in the viewing area while exams were being performed were missed learning opportunities. They commented that they were accountable for their own learning and made sure they took advantage of those opportunities. Tiffany indicated, "I think that how much effort you put into it is how much you get out of it. Um, you don't want to sit off to the side, or sit in the corner or, not wanting to learn, because the people in the clinical side are not going to

want to help you if that's how you are. So, yeah, I would say, yeah, that we are definitely accountable for how we learn." Barb concurred by explaining:

> I think if you don't want to learn you don't learn very much. If you don't choose to go into a room you're not going to learn anything from sitting in the chair in the generals area. So, yeah, we're very responsible. Makes you responsible for getting in a room and watching an exam and learning, especially if you're assigned to somebody who just doesn't explain everything as they go along. Then I feel like when I have those questions I need to ask them. That's my responsibility to gain that understanding.

Students were not always so willing to participate in certain exams especially if they did not have much experience with them. This was demonstrated during the observation period, when a procedure came in for a pediatric portable chest. A technologist came into the viewing area and announced there was a pediatric portable chest to do. There was a moment of silence in the viewing area. The technologist stood there for a while and none of the students seemed like they wanted to go for this learning opportunity. None of the students made eye contact with the technologist. After some time of silence and the technologist patiently waiting, finally Tiffany decided to go with the technologist for this portable pediatric chest exam. As Tiffany and the technologist left the department Tiffany said, "This is like the second one that I have ever seen."

Integration of theory to practice. Students appreciated and at times strived to integrate the differences between what was taught in class and at the clinical setting. Students in the three program models understood the reasons for various approaches for completing different procedures and appreciated the professional knowledge shared by clinical instructors and technologists as they participated in the clinical setting. Students in this internal program model found technologists that showed them some tricks or tips

of their profession, were extremely helpful for understanding the need for different approaches to complete procedures. Barb said her best clinical day was "to experience something new." Tiffany described that when technologists shared their own specific knowledge was one part of the clinical experience that she viewed as most interesting. "There are different ways people take x-rays, tech-wise. They all have their own little tips and tricks that they try and teach you, compared to, like, the set rules that you have. And so, I think it's, and it's just interesting to see. They'll show you different little ways to do the same exam. And you're like, Oh, there's more than one way to do this." Once Tiffany decided to participate on the portable pediatric chest exam she was able to experience a relatively new procedure for her and see different methods and tips for obtaining a chest exam. Tiffany went on this portable procedure with a schema for this procedure and now she had the opportunity to compare what she previously thought with a new experience. Throughout this experience the learning opportunity was up to Tiffany as there was very little verbal instruction provided from the technologist. The accountability for learning in this situation was up to the student.

During the observation period, Tiffany and the technologist left the department to go to the pediatric unit, which was in a different building connected by a tunnel. The pediatric unit was set up with its own portable x-ray unit and computed radiography system connected to the hospital. Tiffany and the technologist washed their hands before entering the pediatric unit. The patient was approximately one month old. The technologist positioned the portable x-ray unit and the central ray. Tiffany assisted in moving the portable unit. Tiffany watched intently as the technologist decided how to

place the image receptor. The technologist did not explain to Tiffany about the positioning for the anterior posterior projection and placement of the image receptor for the patient. Tiffany tried to make sure that she saw everything the technologist was doing for positioning. The technologist asked Tiffany what was set for technique and then told her to what to change it to. Tiffany and the technologist wore their lead aprons and the technologist stayed with the patient to hold the position. Tiffany took the exposure, making sure it was at the time of the infant's inspiration. After this exposure the technologist set up for a cross-table lateral. Tiffany moved the portable unit into place. Tiffany watched attentively as the technologist positioned the patient and placed the image receptor. The technologist again held the patient, told Tiffany what technique to use, and Tiffany took the exposure.

There was not much communication before or during the exam between the technologist and the student. Next they went together to process the images. As the images were displayed on the computed radiography system the technologist did not offer specific feedback to Tiffany. The technologist accepted the images as good and sent them through the computer system to the radiologist for interpretation.

During the focus group interview students shared the following dialogue regarding connections between classroom experiences and integrating knowledge during their clinical experiences. Students perceived this connection to be well related after approximately three to four months into the program. Students in this internal program model concurred that clinical experiences brought student's clarity regarding concepts as they reflected upon their prior classroom instruction. Students appreciated using their

knowledge and being able to adjust to new or different meanings for understanding and applying concepts.

> (Roger) A lot of the stuff they teach they relate. Like, if they go over a point they'll say, like in clinic, and they'll try to clarify it. Most the things they teach transfer right into clinic. (Barb) Sometimes when you see something in clinic the light bulb goes off and you're like, oh, that's grid lines. Okay (Roger) Yeah. Yeah. (Barb) Most of the things we learn we do. (Researcher probing question) So is there a good connect? (Roger) Yeah. (Barb) I think so. (Researcher probing question) Do you see areas where there is disconnect? (Roger) I think they're pretty good with that. (Barb) For the most part they teach the procedures that the radiologists require and we do those procedures. You know, a few times the techs will take a short cut, do it a different way, and they get a result, I don't know, you know. You never know which way is better or worse, you know. Sometimes people just have different methods rather than right and wrong methods.

As Barb and Tiffany participated in the clinical environment, their ideas relating to procedures changed. They began to understand why differences in people required flexibility when doing procedures. They learned there were different interpretations from the technologists of situations linked with the patients' conditions, which directed the course of action to successfully complete an exam. Barb expressed, "I think there are some things that are technically proper and then there are some things that you learn in clinic. Okay, that's the way they teach you how to do, but you can also do it this way...You learn you end up learning a little more flexibility because there are different people and there are different techniques that result in the same thing." Tiffany found,

> One of the most important things I found most helpful was learning the trauma type situations, 'cause now that we're further along we do evenings and we see a lot more traumas, and there are only one or two students there, so it's like, wow, you get to do this. And so, they taught us how to do different exams that came in that you didn't normally get to do. And so, that was a big experience for us all.

Students expressed how they assimilated to the various experiences they encountered as they progressed from their first year to their second year. The previous

experiences that occurred during their first year in the clinical setting provided students the ability to integrate past knowledge and to formulate new understandings to derive a different perspective and behavior response. Barb valued her clinical experience for being able to observe different approaches and see the results:

> I think we learn a lot by being in the clinic and watching how certain things work out. It's frustrating when you try to do things the way that you are taught and it doesn't turn out. But it's equally frustrating when somebody says, okay, I want you to try it this way and you never get to try what you learned, learning. So, yes, I value the clinical part. Its good to see the results. I guess it's the seeing is believing, that kind of situation, sometimes.

The clinical setting had a significant impact on how and what students learn. Students in the this internal program model emphasized the need to find appropriate role models to positively influence what they were learning and thus how they put that knowledge into application. Roger described being greatly impacted in the clinical environment by trying to comprehend who would be a good role model while he was learning. "Just adapting to different traits from different techs or teachers.... Everyone has there own little quirks, the way they position for this, or a trick they remember that worked really well for that. And I think, just in general, figuring out who you want to be and who you want to model yourself after." Tiffany recognized how theory related information combined with hands-on experience was helpful. However, the opportunity to finally perform an exam independently facilitated her learning. Tiffany stated, "The classroom stuff all helped builds us up to an education, but the hands-on clinic area, where you can get right in there and learn it yourself and not have someone constantly showing you, I mean, they show you to a certain point and then you go on your own. I mean it's just like finding your wings to take off and fly from a certain point."

Bridging the gap between theory and practice. The students in the internal program model identified several difficulties in the connection between theory and clinical practice. Some students placed more emphasis on their clinical experiences for learning while others commented that the classroom knowledge was just as important. Roger commented, "I don't think that you can really learn it in class, no matter how well they describe it. I think there's a lot of things that happen that you just have to be a part of, you have to do on the job, so it takes clinical." However, learning in the lab and clinical helped Tiffany to realize she could perform an exam. She stated her learning process as seeing an exam and then go try one:

> We had anatomy classes and procedure classes was probably the most helpful that we had. They would take us into the clinic and do labs with us and they, you know, didn't let us stop until we knew it. And that was probably the best way for us, that we all learned, you know. 'Cause here we do it, you know. You see an exam and then you go and try and comp on your own. Then after you have that comp period, you are able to do it on your own. So I think only having those two steps helped us out too, just 'cause we got in there doing the exams more often and quicker and then we were able to start doing them on our own and that kind of pushed us to be like, wow.

Comments were made from students in this model, which indicated they felt uncomfortable, or not as prepared for patient care, in the clinical environment. Most knowledge and skills were acquired concurrently because, "we were in clinic from day, from, like, the second week." These students in this internal program model wanted and needed specific theory information prior to entering the clinical environment. These students did not have that opportunity because they started their clinical assignments the second week in the program. Students felt unprepared and did not know what and how to respond in many situations in which they were placed. They had no background

knowledge of how they should behave and what would be the correct approach for them to assist. Tiffany commented, "It took us a little bit, the first, probably, three or four months to get comfortable doing it, but after that it just became a routine for us. That was probably the biggest thing to overcome was the first three months of learning everything and to go, oh my gosh, I have to go do this on a patient." For Barb, she did not feel prepared in the clinical environment when providing patient care in some situations.

> I think in fluoroscopy sometimes there would be a patient who was having trouble breathing and they had to use suction. And that's something that I don't think that we were very well prepared for. Or if somebody had a code blue and you were a junior student and then you just didn't know what to do besides get out of the way.

In relation to patient care Barb commented, "I think I learned most of my patient care from clinic. We do have a patient care class but it seems like we covered a lot of things in patient care after we actually did them in clinic, which is kind of unfortunate because patient care was done, oh well!" Tiffany said she had skills and knowledge of patient care that she gained before coming into the program. This knowledge was beneficial to Tiffany, she said, especially when she encountered the elderly or pediatric patient:

> I worked in a nursing home for a while. So, I kind of learned how to communicate with the elderly, which is something I had never really known how to do really well before working in health care. So that was a big thing for me, just knowing how to relate to them in the clinical setting. I also worked with pediatric kids for a little bit too, in a youth camp for a summer and so that was a big help for me too. Just because, I was kind of, okay, I kind of know how to relate to the kids in a way and then the elderly, good communication with both levels, the pediatric and geriatric.

Students in the bridging, external and internal program models experienced a sense of uncertainty at first when learning in the clinical setting. However, students in the internal model expressed uncertainty along with a sense of urgency regarding how

fast they were able to meet expectations that seemed to be beyond their knowledge level. In addition they felt the need to try to participate in procedures before they were prepared. Roger elaborated further that learning in the clinical environment brought a totally new set of concepts to understand. Students were not given much time for learning and had to pretend at times that they knew and understood more than they actually did.

> Just to realize that at least in the beginning it's totally foreign and just now we're getting comfortable where we can do the job.... But a lot of things are kind of handled like we're expected to be doing the job a year ago. So, kind of that expectations might not always be where the learning curve actually is. And at certain times you kind of have to act like you know more than you really do to get by.

Opportunities for interaction. Students discussed, in the focus group specifically, how clinical experiences throughout their first year to their current status as a second-year student influenced how they communicate, their confidence level, their ability to adjust to stressful trauma situations, and how to adapt to certain rotations that at first made them feel physically sick. Students felt, in their first year, entering some procedures was frightening because they did not know what to expect or have the knowledge to participate effectively. Now in their second year, the students said they felt much more independent in their abilities due to their increased knowledge level. They said they were able to understand the workflow of the procedures and not feel awkward in their performance:

> (Roger) Definitely, kind of what you were talking about with the trauma alert. Right when you started school that would of scared us probably to watch it. And, or somewhat at least, and now we're way more independent. We do almost everything on our own. So, I'd say we're a lot more independent. (Tiffany) I think communication skills, like, increases as you get more knowledgeable and more

> positive in yourself and confident. (Barb) I remember when I first started the program I was really worried about venipuncture and going to surgery and being queasy and all that. And then I just had my surgery rotation last week and I was explaining all of it to a junior and just standing there watching it and thinking, you know, at one point I was queasy and worried about this. You know that was a realization. It was like, oh yeah, this use to bother me and it doesn't bother me anymore. And, you know, it's like I've moved over that hurdle. Communication is a big thing. You learn how to communicate with your fellow students and with people from different backgrounds. You have to learn the terminology that they use. (Roger) Yeah. (Barb) So, you're not saying something and they're thinking something completely different. And, like when you're working with a patient and you want them to help you, you have to be able to say it in a diplomatic way so it's not demeaning to the patient in anyway. (Roger) Yeah. (Barb) You still have teamwork. (Roger) I think communication is probably part of it but I think even more of it is like the lingo and the whole new system that we weren't use to, a whole new set of everything. Yeah it's just way more easy to be on the same page as everybody when you know what's going on. (Barb) It took a long time to learn the workflow of things, too how to be helpful. At the beginning, I remember they always wanted us to jump in more and do more things and you felt like, AWWWWK, I don't know what you're doing right now. I wish I could help you but I don't know what in the world that you need. But, I think we as we've progressed and learned, the work flow and what you need to do for certain exams, that's become a lot easier.

Barb contended that some patients could be intimidating because of their medical condition and the uncertainty of radiation dosage received:

> I think there are patients who really want things done quickly and those are intimidating. Or a parent that is really concerned about how much radiation their child might be getting even though it's a very low amount. Those patients can be intimidating. And then there's people intimidating just because of the nature of their injuries, trauma again. You know if somebody is screaming in pain it's intimidating to every student to try and go in there and try and do the right thing 'cause you're flustered.

Procedure comfort level. Students indicated they were very comfortable with routine exams due to the repetition of those experiences. Incidents where students were uncomfortable were related to exams that were not ordered very often, multiple trauma situations and certain rotations such as surgery. In this internal model Barb noted

specifically, "There are those exams that do not come in very often like sinuses or head work that often go to CT. Now, I don't feel very confident in those. And I don't feel very confident doing things in surgery because there's always that, that feeling that you have to please the physician who is right there in the room." During the observation in the clinical setting the students pointed out that the new construction in the department was to remove a general x-ray room and convert it to another CT room. This department continues to see increases in the number of exams for CT that formerly were completed in general x-ray.

Students indicated the clinical environment provided them knowledge and skills "to learn to be a competent tech" and "how to interact with the patients so it's not an awkward exam." However, students identified not having access to particular exams, such as serious trauma exams that typically came into the radiology department more often during the evenings and weekends, as an obstacle, since they were not scheduled for later shifts and because more procedures were being completed in Computed Tomography (CT). Occasionally, students did have the opportunity to participate in a serious trauma experience, but they felt unprepared to participate in the procedure and to care for the patient effectively.

Lack of experience with trauma cases was apparent for some students, affecting their approach to some patients. Students said they felt unprepared to address patients' fears and proceed through the exams in a timely fashion to expedite their care. Thus, students felt less effective in the clinical environment. Tiffany wanted additional clinical

assignments to include later shifts, as she felt not having those options was detrimental to her learning:

> I have to say not being able to work the late evenings we don't get to see a lot of the very serious traumas that come in. Rarely, anyways. Um, CT took over in a lot of general X-rays, has been kind of a downfall for us, as well. Just because and other places that we eventually go to, we might need to know how to do that and we didn't have the chance to learn now in advance. That's probably been the biggest obstacle for everyone. Wanting to get that extra strength, but not having the capability to get it.

Influence of peers on learning. Peer interactions definitely had a significant impact on learning and integrating knowledge in the clinical setting. Peers affected learning opportunities and at times the integration of new and different knowledge or skills due to the number of students and the number of procedures in which they could participate. Students in this internal program model specifically pointed out the positive and negative effects of peers, depending on the situation and what needed to be accomplished in the clinical setting. In making difficult choices students commented they preferred to, "Consult with my fellow students" or "If it's something that another student might need to come in and help assist me do something, then I'll go for a student." Barb commented, "The thing that I dislike the most is when you just sit around and there is nothing to do. There are too many people in the program! On certain days there are too many people in clinic and so there's not enough work to go around." Tiffany noted how, early in the program, peers were assisting in facilitating the learning process at the clinical setting, "Senior students usually always kind of take the juniors under their wings that first week and just kind of have them watch exams...As seniors

you just try and explain to the juniors what you are doing step by step and they start learning."

Adjusting instruction to knowledge base-clinical instructor. As students progressed from their first year to their second year their learning styles seemed to change with an increased knowledge base. The clinical instructor recognized that first year students usually needed more step-by-step instruction in the clinical setting whereas the second year students would prefer to learn by watching.

> Certain students need different things. Some of the classes itself are more needy. Like, okay, do this, turn it here, and put this there. And other ones are like just do it and I'll watch you and I'm done. By the time they are the senior status, if they're learning something new, which usually doesn't happen with procedures, but they may learn a new way to do something, they just want to watch you do it. When you're first learning you're so much more critical of what's going on. They want details step by step. Then you have the ones that are like, show me, I'm good. So it just depends on, we are so hands-on here that students do so much better when you go in and do it, show them that way, rather than the didactic side of it, and that's where me being in the clinic all the time with them helps tremendously.

During an observation period, learning and integration of knowledge was demonstrated in the clinical site when Barb and the clinical instructor worked together on an elderly patient to complete a chest exam. The clinical instructor recognized in this situation Barb's ability level to facilitate patient care and positioning. The clinical instructor assisted Barb in certain parts of the procedure because of the patient's condition. Even though Barb was a second year student she still needed support in setting priorities to complete this procedure. This patient could not stand up for the exam. He was on a cart and hooked up to oxygen. This exam was being done in the digital imaging room. The clinical instructor and Barb brought the patient into the room.

The clinical instructor was talking to the patient, telling him what was going to take place, and asked the patient, "Are you okay?" She also explained to him why it was important for him to sit up for the exam. As the clinical instructor was talking with the patient, Barb was setting the technique for the lateral chest. The clinical instructor gave instructions to Barb as they worked together to position the patient. They discussed the position and agreed that the patient needed to sit up more. Barb repositioned the patient as the clinical instructor gave the patient instructions on how to place his arms. Barb gave breathing instructions to the patient as she made the exposure. The image was quickly displayed. The back of the patient's chest was cut off. The clinical instructor and Barb went back out to reposition the patient. The patient appeared to be a little dizzy. The clinical instructor told the patient how to breath better with the oxygen. They retook the lateral projection and it was acceptable. Only the lateral projection could be done using the digital system.

Barb and the clinical instructor placed the image receptor for the anterior posterior projection behind the patient's back since he was on a cart. This projection had to be completed with Computed Radiography (CR) because the image receptor had to be placed behind the patient and thus digital imaging could not be used. As they were placing the image receptor behind the patient, the clinical instructor noticed that the patient seemed to be in pain and asked, "Mr. G what is hurting you?" He stated, "I hurt all over." Barb finished positioning the patient and instructed the patient on how to breath for the exposure. Once the exposure was completed they both went to get the image receptor out from behind the patient. Barb took the image receptor to be processed

and the clinical instructor stayed with the patient and continued to instruct the patient how to breath with the oxygen. Barb asked another technologist to check her image. The technologist told Barb the image was good. Barb went back to help the clinical instructor move the patient out of the exam room. Barb stayed with the patient until the transporter came because the patient was trying to remove his tubes. After the exam the clinical instructor said, "I'm so used to working with juniors that I have to remind myself to back off'. While the clinical instructor was cleaning up the room she commented to the researcher, "She was a little slow in some areas, so I had to speed her up, with the patient's condition." The clinical instructor facilitated learning in this clinical experience by assisting the student and acknowledging the patient's condition throughout the completion of this procedure.

Procedure comfort level-clinical instructor. The clinical instructor indicated students became very comfortable and confident with routine exams due to the repetition of those experiences. Thus, when patient numbers were down or the lack of certain types of procedures resulted in less learning opportunities and diminished possibilities for integration of new knowledge in different situations. The clinical instructor noted that some technologists did not allow students adequate time to adjust and learn within the clinical environment, "You know they're there to learn and they don't know everything and the techs just need to remember sometimes what it's like to be a student. And if they could just remember that always, it would be just so much better. We've got great ones, we've got bad ones, and we've got ones that are great one day and horrible the next."

Significance of learning opportunities-clinical instructor. The clinical instructor strongly values clinical experiences to enhance students learning and she saw herself as being the one to assist in building up the students' confidence. She believed when students made mistakes in the clinical setting these were learning opportunities to help make them better. The only way to get better was to be in the clinical setting to do exams in order to gain real understanding:

> I think the clinical is huge, totally huge, because they're not going to get it unless they get in and do it themselves. And since this is what they do when they get done, they need to know every aspect of it. And they need to go through it, whether it's a mistake or not, because that's how we get better is by doing that. So I'm really into what they're doing when they're over there that they know what they're doing. They're comfortable in learning it, too. I don't want them to be afraid to come to me (A) for whatever issues there are or (B) be afraid to go into the room to do an exam. I think that's my job is confidence building in them plays a huge part, so, I think.

The clinical instructor clearly emphasized the importance of clinical experiences, "You can learn it and do it, but the only way that you get better is by doing it more, more and more, and more. So, it's all about experience and how do you get experience is by being in clinic. So, I think you can't have too much clinic."

Trust and Fairness

Definition. Being treated differently defines the parameters of fairness. Students establish trust with their faculty and clinical supervisors and peers based on being "treated fairly". Trust and fairness reflect in comments and discussions that are open and confident. Student interactions are more effective when they trust that they will be listened to and understood, and responses to them reflect fairness.

Importance of peer connections. The students perceived trust and fairness to be important issues in the clinical environment for learning. This internal program model identified areas of difficulty that were somewhat different than those discussed in the external program model. Students firmly trusted and had a sense of fairness connected with their peers as they depended on each other in the clinical setting to help them in times of strife. Tiffany shared, "If a tech got mad at a student, we'd all be right there sticking up for them. It's just, we have a really good team-working relationship and I think that helps makes the clinic experience go so much easier, to know that you have a group of people standing right next to you." Roger explained when he had to make a difficult choice, "I try to think it through myself and usually I can make sense out of something after I slow down and just process and think about it myself. If it's that hard I ask another student that I trust."

Barb and Tiffany indicated frustrations in the clinical environment and identified their peers as the ones they could trust and relate to their predicament. Sharing similar experiences appeared to bring these peers closer together. They felt peers could trust each other to help and understand their irritations. During these difficult situations the students felt closer to each other.

> (Barb) And we have some more frustrations so if you need to talk about something usually the students are the ones who are going to understand it the best. (Tiffany) I think that we all found that outside of school there's not very many people that you can really relate to when it comes to being frustrated through a day or something. Like, the other students that you're working with, they are people that go through the same thing everyday. I think that kind of brings us a little closer, too.

These students did not approach the technologists or clinical instructor first when they had questions at the clinical sites. Tiffany felt more secure while at the clinical site to communicate most often with another student, especially if she had a question. She explained that peers were her first choice to communicate with at the clinical setting, "Probably the students. We feel comfortable knowing each other and being able to talk about anything with each other. If you have a stupid question you don't want to ask somebody like a tech or something that another student might know, it's a probably a student that you're goanna ask first."

Difficulties in building trusting and fair relationships. Roger felt strongly that students were treated unfairly. Roger described his best clinical day, "I think students kind of get the ahhhh, I don't know, abuse is pretty strong word, but treated unfairly, sometimes. I guess when we're treated as equal and make fewest mistakes would be a good day." Tiffany thought there were many situations where a person perhaps did not know all the issues involved to make an accurate conclusion. There were so many rules that she just wanted to avoid such situations related to fairness issues:

> I try to stay out of situations and just mind my own business. But I know several students do feel like they don't get treated fairly. Um, there're so many rules that go along with the radiology program that it's hard to know when the rules are changing and when they're not. I guess so it's just difficult, it's just hard to depict and this person was sick and the other person didn't have as many hours taken out, like, was that fair, or what was the situation? It's kind of hard to say 'cause you don't know everyone's situation.

Not all students perceived fairness to be a major issue all the time. Barb viewed that students were treated fairly "most of the time." She emphasized, mainly in regards to fairness, "It seems like some person has gotten a comp that maybe shouldn't have and

maybe who was graded more leniently or something like that. And that's something students would consider unfair."

Students did not always perceive the technologist or clinical instructor as someone they could count on to be fair and trusting. When students had a difficult choice or problem and issues were brought to these individuals in the past, they emphasized that in the end it seemed to escalate the situation. Technologists seemed to ask students for information about other students, which was viewed by the students to be disrespectful and placed the student in a difficult position. The development of relationships was further identified through discussion of trust. Tiffany described:

> We have had a few situations, tech-wise, at hospitals where they will have a problem with a student and they will pull other students aside asking them about the student. Um, we've all kind of figured that out. And so, we're good about not saying anything and keeping the answers short. But, there's been emails sent from techs to, like, the instructors, letting them know what would be going on. There's just a big different situation of hurtful words, I guess, said about several students. But, we all didn't think it was very respectful. They all should have gone to the students themselves and talked to them.

Students thought they should be trusted to complete certain exams as much as others were trusted in the clinical setting. Roger mentioned trust as a frustration in the clinical setting, "They don't trust. I mean, they don't assume you'll be able to do it as well as everybody." Once a student had a reputation that seemed to dictate how the student would be treated. So some students preferred to direct questions to their peers, especially if they thought their questions might be considered stupid. Roger did not feel that students were treated fairly but really did not want to say the word "unfair treatment." Roger phrased the fairness of students as, "I don't know if I would say unfair treatment. I wouldn't say unfair treatment, but I think reputations are gained that you

can't change. If you're liked, then you're liked, even if you screw up you're liked. And if you're not liked, it's really hard. It's a lot harder for some people to get by than other people."

Impact of personality conflicts-clinical instructor. The clinical instructor perceived that students had reasons for not trusting all the technologists, because not all students were treated fairly. The clinical instructor explained that not all students were always treated fairly, especially if there was a conflict or personality issue between a technologist and a student:

> For the most part, yes, there are personality conflicts sometimes between the techs and a student or between a student and a student. So, there may be points where, oh no, I don't want anything to do with them so they're kind of like, avoid. The techs will avoid helping that student or whatever. But, across the board I think its okay, especially from the instructors. We really try hard not to do that. So, you know there's ones that you're goanna like and there's ones that you aren't going to like. We try not to show that and I think that we all do a pretty good job of that. We may complain behind their back, but.

The clinical instructor tried to assist students with how they were being treated in the clinical setting. She perceived her role to include acquiring information, which can help students and technologists to share knowledge and understanding. She also felt that she was the person who could make a difference in how students were perceived by the technologists. She stated, "The techs themselves look up to me, yet, since I was a tech there for so long. They still kind of think of me as one of theirs, I guess is the best way to say that."

Impact of reputations ascribed to students-clinical instructor. The clinical instructor wanted to change attitudes of some individuals in the clinical setting to ensure that students, if they did make a mistake, would not be labeled with a certain reputation,

lack confidence, and be treated unfairly. She wanted students to be trusted to complete certain exams as much as others were trusted in the clinical setting. She described an ideal clinical setting, "One where students are able to actually do well within the radiology, get in the rooms and do exams and feel comfortable after doing them. And they're not going to be criticized with every step, and have confidence to do it."

Attitudes and Socialization to Radiography Clinical Sites

Definition. Attitudes and socialization in radiography clinical sites were examined in relation to interactions displayed by individuals within the clinical setting. Positive and negative attitudes and relationships are associated with feelings of acceptance. The success of their socialization affects the ability of students to assimilate to the clinical setting.

Striving for a sense of acceptance and belonging. The significance of attitudes displayed and a sense of acceptance and belonging were stressed throughout the interviews and an observation period in all three-program models. Students in this internal program model perceived attitudes in the clinical environment to be, "the biggest thing is how you get treated," "they're just doggin ya," "treated inferior," and "personalities who aren't open to change." Students observed strong difference in how students' learning was affected, depending on how they were accepted socially into the clinical department. During an observation period a couple of students and technologists were talking together in the viewing area. Some technologists were standing and others were sitting in chairs around a table in the middle of the room. People were smiling. Everyone in the room appeared to be professionally dressed and greeted people as they

came and went off to do exams. A recent graduate of the program came to visit and everyone in the department greeted her and inquired where she was working and how did she like her new job. Students were not engaged in the conversations as they were checking the computer for patient orders and stocking the exam rooms. When an exam did come in, the clinical instructor and students immediately were the ones to do the exam. The other technologists kept on with their conversations as the students prepared the rooms for a couple of exams.

Students specifically expressed they felt less significant or inferior as an individual in some of the clinical settings. At one clinical setting the technologists definitely viewed students as being beneath them. It appeared the students were expected to do most of the work at that clinical setting. A lack of cooperation between the students and the technologists was identified, which was an area currently being addressed in the program. Tiffany shared what she would like to see changed most in the clinical environment, "There could be more student-tech type relationships. Um, at one hospital down here, there's a very good relationship and the other one, there's not a so good relationship. They're always willing to help, but the way they go about it, sometimes, isn't as well as we would like it." Roger indicated, "students are taken advantage of"...in the clinical environment. "If you screw up or if you, you sit around then its bad news for you as a student. Bad reputation. That's kind of typical especially at one of the hospitals more than the other probably," Roger said.

Tiffany and Barb distinguished clinical relationships, as they perceived them to be different depending upon which clinical setting a student was assigned. Making personal

connections was an approach students recognized as a way to fit into a specific clinical setting. Students would try to act differently to increase their chances of being accepted with certain individuals at one particular clinical setting. If the technologists included students into their conversations, students felt more welcome and part of the team:

> (Tiffany) I think it depends on which department you're at, too like where you're learning. 'Cause the environments are so different. (Barb) I think when you make a personal connection with, somebody and they you know if they tell you about something that was difficult for them sometimes it seems easier to stick your neck out a little bit and try something new. 'Cause you know that they realized that they made a mistake when they were at this point too. And you know you're going to make mistakes and it's nice to know that they recognize you're still in the learning stage. You're not going to get yelled at for, for what you're trying to learn.

Tiffany felt, "for the most part" comfortable at the clinical department where she was assigned. She expressed, "There are moments when you're kind of wondering if I need to act different to be accepted by them. At one hospital, um, they are very welcoming. And you just feel like you are one of the team. They take you in and they tell stories to you, ask you how your weekend was..... Over at 'L' certain ones, well, certain ones don't really care." Barb explains, "In terms of a social aspect I feel comfortable because people talk with the students. There are different environments where you feel like an outsider because you're not included. But, I think most of the places where the students go the staff are very adapting and very outgoing in terms of trying to get you involved in different things."

Implications of the social culture climate. Learning to be successful in the clinical environment required effective social interactions between students, staff radiographers and clinical instructors. The external program model and this internal program model

shared similar perceptions of the importance of certain attributes that were deemed essential for instruction to enhance student learning. These attributes shared by students in the internal program model were: when instructors and technologists were excited about teaching, tactful, and open to questions and ideas in the clinical environment. Barb realized her learning was facilitated by "my attitude." She added, "Having instructors who are enthusiastic about having a student, those who really like to teach, are those people who I really like to follow. Other things that are, that facilitate my learning, I think, are people who are open to questions, who are willing to think about it a little bit differently."

Students in the internal program model sensed more pressure to expedite their learning to be able to perform exams than in the previous two program models. In the clinical environment students felt they could not rise to every technologist's expectation no matter how hard they tried. There appeared to be intense pressure placed on the students to learn quickly in order to perform exams. This pressure seemed to be more apparent in their first year and lessened as they moved through their second year. Roger said relationships greatly affected his learning in the clinical environment, "I don't want to make it sound like it is miserable but, at times it's not comfortable. Sometimes you feel kind of at the mercy of everybody else. And you're there to do the work but you still can't measure up all the time." Tiffany explained, "There's certain people, and you're always going to have this, no matter where you're at, that don't have good attitudes. We just kind of learn how to work around that, I guess. As students you kind of get to learn how a person is and we just work off of that." Roger acknowledged "negative vibes"

had the greatest impact on him as a student in the clinical environment. He clarified, "I don't mean to sound like it's all bad. It's not. I do like parts of it, but the negative aspects have really worn on me for a year and a half. That's probably what's affected me more than anything else." Researcher's probing question, "What is the one negative thing that you've seen the most that has worn on you?" Roger stated, "Just kind of what I've been describing, lots of pressure and not a lot of encouragement, not a lot of reward." There were times when staff or clinical instructors seemed to be intimidating in the learning process. Barb remarked:

> Not so much by staff at this point. I think definitely as we began our clinical experience if you did something that they didn't think was right and they took over an exam that was very intimidating. Especially if it didn't feel like it was done in an appropriate way or if you felt like they demeaned you in front of a patient, that was very intimidating. There is not too many instructors that do that but it happens.

Attitudes were communicated nonverbally. Students explained how attitudes, communicated nonverbally by patients and technologists in the clinical environment, impacted their learning. Patients' attitudes energized and encouraged students to focus on important matters in their lives. Tiffany discussed the personal benefit and what made the greatest impact for her in the clinical environment:

> I would have to say my patients. Um, there are so many of them that will give you a hug, or smile at you, or make jokes with you, and it's always the ones that are going through cancer, or just they are having the worst day of their life, that will just come down with just the best attitude ever and it just make me look at them and I'm like Wow! If they can be that positive toward life, wow, there's nothing that can stop me from being that way too. And so I think, just working with the people are one of the best things.

Barb indicated that attitudes were communicated nonverbally by the amount of actual time or the lack of verbal interaction an individual was willing to give during

certain exams, "There's a lot of nonverbal communication of attitudes. I think, if a person is, if we don't consider this an important exam, then we'll spend the minimal amount of time on it and get out of the room. Or this doctor is not pleasant to work with so I don't speak to him very much when he is in the room." During an observation period, a nonverbal communication of attitude was demonstrated in the clinical setting when a technologist went to get an image receptor plate and a grid fell on her foot. She was hurt and as she was limping in extreme pain. A couple of technologists asked her if she was okay and she said, "No, I think I broke it." No one in the clinical setting appeared to take her seriously as they walked away and did not wait to hear her response. She tried to take her shoe off and couldn't get it off. No one came to help her. She was trying to hold back her tears. Everyone one in the department went about their conversations and doing their exams. No one came to help her as she limped out of the department.

Importance of effective interpersonal relationships-clinical instructor. The clinical instructor realized that effective social interactions between students and staff technologists required her to listen attentively and offer constructive responses in various situations. Being open minded to other ideas and willing to work through situations helped to ease tension in the clinical environment. Her ability to address sensitive individuals and bring about understanding was essential for moving toward a positive outcome. Attitudes of individuals and the degree of acceptance into the clinical site influenced the students' ability to participate in the clinical environment. The clinical instructor explained that it was difficult in some instances to be tactful and

accommodating while interacting with a variety of personalities in the clinical environment.

Sense of acceptance and belonging-clinical instructor. The clinical instructor identified several distinctions in how students' learning was affected depending upon how they were accepted socially into the clinical setting. The clinical instructor concurred with the students as she noted that students were perceived to be at the bottom of the totem pole beneath the technologists. There is a need for better cooperation between students and technologists. Students believed they were expected to do most of the work. The clinical instructor was working on these issues for change in the clinical environment:

> I would like to see a little bit better cooperation between the techs and the students. Meaning, the totem pole not be so wide that where the students are at the bottom and the techs so high. We're working on that. But, it's still that, okay you're beneath me thing and the students feel like they do a whole lot of the work where the techs don't do much work. It's getting better. We're working on it, so. That's one improvement I would like to see but, it's getting there.

The clinical instructor described that personality was a "you got to have it" as part of the skills and knowledge needed to be a clinical instructor. The role of a clinical instructor was being able to provide counsel or advice to assist students, and to pump up the students' confidence when others in the clinical environment knocked it down:

> You've got to take the hits that you get because, you know, the instructor's always the bad person. And you got to be able to be counselor to take care of their personal issues that they have, to give them confidence too, you know, to give them that initiative to do what they want to do. So, a lot of them come in here and make them take an exam and their confidence will be down to zero and you've got to jump in there and build it back up. And a lot of the students will say, you know I'm good when I'm in the room with you and when you're not with me I'm, like, down here. But, when I know that you have faith in me so I get in there and I just do a great job, so, that's huge. You've got to have that drive.

> You've got to know what you're doing. You've got to have that counselor side of you and you've got to have that attitude to say, we're going to make them do good today.

To facilitate a better and successful learning environment in the clinical setting, effective social interactions between students, staff technologists and clinical instructors were necessary. The clinical instructor emphasized the importance of being tactful when interacting with others in the clinical environment. "I've definitely honed my counseling skills, oh my goodness. Letting stuff hit you and roll off your back, you know, you get really tough skin when you're an instructor. I think all of those things. And I'm still working on all of them but I'm much better than I was. And tact, whooo!!! I had to gain some tact here."

Supervision, Evaluation and Recognition

Definition. Supervision and evaluation are descriptions of any discussion, expression or process of written or verbal feedback between individuals or between groups. Recognition can consist of appropriate positive reinforcement of behaviors. This includes expressions of appreciation and motivating comments.

Impact of recognition and motivation. All participants discussed the positive and negative effects of supervision, evaluation, and recognition. Students felt a positive sense of recognition if they were included and encouraged to be involved in exams or procedures that were not always considered routine. Barb believed a lack of recognition was detrimental for learning in the clinical environment. "If I perceive that I am not wanted because I'm not encouraged to get involved in that particular case or with that

patient. And it's detrimental if I feel like I'm doing the same thing over and over again because someone else doesn't want to do it."

Students desired and liked to feel that they made a difference in somebody's life. Students recognized this when patients thanked them and when they did indeed help improve someone's day by seeing real results that occurred in the clinical environment. Students made personal connections related to how they extended themselves in the clinical setting in caring for others and knowing how much it meant to each patient they encountered. These types of experiences motivated students especially if they improved the patients' quality of care and the exam went well. Barb's motivation was inspired by:

> Watching somebody who does things well motivates me. To be able to say, wow that exam went really smoothly and I noticed that they did this to make it go better. That motivates me. When a patient leaves the room and feels happy about their experience there, that motivates me. Obviously there are negative motivators, too. I did that really bad and I don't want to do that again. So, I guess the standards that I set for myself are sometimes motivators. I think having certain competence, number of competencies that we have to have done by a certain time, that's a motivator.

Tiffany described how she strived to make a personal connection with each patient, "I am big on trying to make a patient laugh or smile every time they walk through a door. I've had a friend that went through cancer and passed away. And that really made me realize that these people need us, um, not just as an x-ray tech, but as a person to actually care. That just really has made me wanna learn more than ever before probably." Barb was also encouraged when she did well on completing a difficult exam and being able to interact with patients:

> I also like to feel like I did a good job if I take an image that was particularly difficult and it turns out well, then that's encouraging. So that feedback is, is part of making a good day, I guess. I also enjoy interacting with the patients though.

> That's one of the reasons why I decided to do the program is to get into a profession where I was interacting with people feeling like I did something that benefited them. Being able to go home at the end of the day and say, okay, I did something that had a good result or improved somebody's life.

Enhanced self-sufficiency with indirect supervision. Students preferred supervision that was attentive to assure that they did not make unnecessary mistakes. However, students also desired some independence in performing exams, especially since they were now second year students and no longer felt the need to be supervised so closely as when they were juniors. Roger described his preferred type of supervision in the clinical environment:

> I think someone that will pay attention to the exam you're doing and actually try and watch how you're doing and see if it's going to come out right. And they won't let you screw up. I mean if they see something positioned wrong they'll fix it or they'll tell you, I would do this. Um, so, somebody that will let you do it but pay attention enough so that you feel like you have a backup, especially when things are new and you're not really sure what you are doing.

Tiffany explained why she felt the level of supervision should be adjusted as students progressed from junior status to second year student status. "I think at the very beginning, as a junior student, it felt really good to know that there was somebody right behind you. Now that we're further along... you don't need to watch us. Like, we want to do this on our own because we need to learn by ourselves."

Importance of evaluations to build confidence. The students wanted and expected frequent, honest feedback about their performances. They explained the more open and supporting the technologists and clinical instructors were with providing feedback, the more they built up the students' level of confidence and seemed to encourage learning. The students did not perceive evaluations that focused on either one or two good or bad

events as an adequate evaluation of their performance in the clinical environment. Barb commented, "The more open techs are to letting us do things and support us rather than doing it for us, then I learn more. I'm a hands-on learner and in order to feel confident doing something, I have to know that I can do it. So that's one of the things that really facilitates learning for me." Roger was inclined to think the evaluation process could be improved upon:

> It's probably helpful. I think it could be better but, you know, only in a perfect world probably. I don't know if there is really a good way to do it. 'Cause I think when they fill out an eval, one thing can stick in their mind, either a good thing or a bad thing, and that's all they see. Or they can only remember one or a couple of bad things even though you did all these good things, that what you get graded on. Not that they mean to do that or are like that all the time but it's just easy to generalize and grade on a couple of events rather than on a whole week or whatever they're supposed to.

Importance of peers for positive feedback. Students reported that peers were instrumental in the clinical setting, assisting in evaluation and recognition of others. Student peers were noted for giving each other the most positive feedback and support in the clinical environment. The majority of feedback from instructors and technologists to students during their first year appeared to consist of mainly negative feedback on what they were doing incorrectly. Barb and Roger described the importance of peer connections in the clinical setting for positive encouragement and advice:

> (Barb) I think we're the ones who give each other positive feedback the most. A lot of the times you hear what you've done wrong from your instructors. You don't always have somebody right there to say you did a really good job. And so a lot of times that falls on our shoulders to do that for each other. 'Cause I know our first year we were really frustrated with how much negative feedback we got and how little positive feedback that we were getting. (Roger) Plus, it makes the day a lot more enjoyable. When you know how to work with somebody you're not going to steal somebody's exam or take over. You know who and what kind of help and they'll help you, so you can work together.

Desirable characteristics of clinical instructors and staff. Students identified certain behaviors from their clinical instructors or technologists that facilitated their learning during their clinical experience. Students noted that clinical instructors or technologists who were patient, confidence builders, encouragers, and provided supervision and evaluation allowed for the development of student confidence and learning. These individuals allowed students to think and try new skills and informed them on what needed to be corrected. Students recognized that they were valued when instructors made sure to include them in on procedures and through sharing experiences from their background to ease students' learning frustrations with new and different experiences. Barb illustrated the qualities of clinical instructors or radiographers that she admired:

> Patience, and I admire the people who are willing to let you try something and if they noticed something wrong then they'll correct it. But, there's a difference between doing it for you and allowing you to do it and then showing you what you did wrong. So those people that allow you to do it yourself and then correct those errors are the ones that help you learn the most. People who are confidence builders, those who say, you know you did a really good job, let's try and do this differently next time or you should try this more often because you're doing well. So those are good things. I think one of the really good instructors I've had would always include someone if they went to do a procedure. They didn't just jump up and do it themselves. They would include somebody so if they, so if that student was not ready to do the exam themselves at least they were in there watching it. And once they were ready to try it on their own, he always encouraged the people to do it. And he would share experiences from when he was a student and learning things. You know, yeah, I was frustrated by this exam, everybody has there own exams that they're frustrated with, you know. I guess he had empathy for the students for that whole learning process and learning curve.

During the focus group discussion, students dialogued regarding ideas for improving learning in the clinical setting. A major concern identified was a lack of availability of a specific person for students to be able to approach in the clinical

environment to address their particular questions and needs. Students wanted someone who had the time to concentrate only on their learning needs more often. These students felt their clinical instructors were too busy outside the clinical site with other work-related items such as documentation:

> (Barb) I kind of wish there was somebody to go to more often in the clinic. Say like, I am working on a certain exam, like a c-spine, and it doesn't turn out and I don't know really why it didn't turn out. This person's anatomy seems to be different, I don't know, you know. I wish there was somebody always there that was willing to take those kind of questions and had the time to do that. There's not always the time. (Roger) That's what I was going to say. The clinical instructors are fine but they have so much to do outside of clinic they're really not there a ton. They're there as much as they can be. They have so much paper work and stuff that they're not truly, truly, truly a clinical instructor 'cause it's not like they're always in clinic with you. That would be nice to have, like you said, you know that somebody is going to be there. (Barb) They never say, oh, I don't want to spend time with you or I can't take time for that but you know they don't have the time to sit down and look at everything that you want to have answers about. (Tiffany) Which they do have pagers and stuff and if there is a bad situation we can call them, but it's one of those things if it's not that serious and you just have a question, you don't want to page them.

Significance of feeling valued. Students indicated they were aware of their value in the clinical setting and perceived that their value increased as they gained more knowledge, to apply skills and in general be able to do more independently. Students realized as their knowledge increased they had to be discrete in their communications with the technologists, even though they could perform the exam differently and obtain the same or perhaps a better result. For example, Barb revealed, "It's a different learning curve, how they like to do things, not stepping on their toes by telling them, well, we learned how to do it this way and you really should be doing it that way. You just have to learn who you can ask questions and how you can ask the question so it won't hurt anybody's feelings or so you can get more clarity." Roger passionately suggested that

students really are a valued in the clinical environment, but the technologists see students' participation in clinical as payment for gaining experience. "I think that we're taken for granted. I think if techs and staff step back then, yeah, but I think most of the time we are taken for granted. They look at it as our, the price we have to pay to get the job. I think if they think about it then, yeah, we're valued, but most of the time we're taken for granted by most people, not all." Tiffany said,

> I think a lot of us sometimes feel like they know how much we do but they don't realize it until we're gone. But, it's when we're gone and there are only three or four techs working and then we come back and they are like, oh, my gosh, you guys, we didn't realize how much we needed you guys. So, at moments they, they value and there are other times they forget I think.

Impact of supervision and constructive criticism-clinical instructor. Staff technologists and clinical instructors provided supervision and evaluation for students during their clinical experience. Desirable student qualities identified by the clinical instructor related to students wanting and appreciating supervision and feedback from instructors and technologists. These students realized that supervision and feedback is not an attack on them, but to help them to grow, learn, and feel more comfortable in performing exams. The clinical instructor explained how different students perceived feedback and how this could become a challenging event:

> Ones that actually want to be here and they want to learn and they realize that the things that I say to them in constructive criticism aren't an attack: it's to make them the best that they can be. Those are the students that make it easier and then they don't run from it and become better and it's like, ohhh, that's what I'm here for. So, those are the ones that we like the best. Then you got those challenge ones that fight, fight, fight and all of a sudden they get it and you're like, ohhh, even better. So, you know, you've got your mix. And if we didn't have those it wouldn't be interesting.

The clinical instructor when observed in the clinical setting did not step back and allow second year students to perform exams on their own. She actively participated in every exam with the second year students and in every exam did make sure to inform them regarding their performance outcome. The students communicated with their patients until the clinical instructor entered the exam rooms. She would take over the conversation in the room and then students spoke minimal or at times not at all until the clinical instructor left the exam room. For example, Roger and the clinical instructor went to perform a knee exam. As they went into the exam room the clinical instructor informed Roger that he should have cleaned up the room after he was done with his last exam. Roger responded that he forgot to come back into the room after he took his last patient back. Roger left the room to get the patient for the knee exam as the clinical instructor cleaned up the room.

While Roger was getting the patient ready for the exam the clinical instructor went ahead and prepared the room and set the technique. Roger was informing the patient about the exam and obtaining a medical history for the exam as they entered the room. The exam was to be done because of disability. Since the exam was for disability the clinical instructor left the room to verify to see if any additional views would need to be taken. Roger started to position the patient for the exam and continued to instruct the patient for the first two projections of the procedure and was interacting with the patient. When the clinical instructor returned to the room the clinical instructor talked mostly with the patient and Roger quit talking with the patient. The instructor took over positioning on the lateral knee projection and Roger took the exposure. They went out of

the room to evaluate their images and the clinical instructor told Roger in a lighthearted manner, "You really do know how to take images. Good images."

Importance of recognition-clinical instructor. Recognition by students was extremely important for the clinical instructor. Knowing that students perceived her as being a knowledgeable instructor regarding to patient care and doing procedures was essential for her positive self-recognition. She emphasized that these attributes, which identified her as a knowledgeable clinical instructor, and being able to prove it to the students, were significant for her. There was added pressure in becoming a clinical instructor due to the implication that she was now considered the *expert* even when she did not always feel like the expert in every situation:

> Because when I go in a room and they watch me do an exam I hear like, WOW, you really have good patient care skills. Or, WOW, your images are great. Or they'll look at my image and be like, you really do know what you're doing. So, that's proof right there that I understand that they question because they don't see me in the rooms all the time. When I do get in there and perform they're just like, oh, wow, she really does know what she's doing. So, it's more proven than anything else. And it's like I don't know how to do that, let's just ask Rachel. You know once you become a clinical instructor you seem to be the expert. Even if you're not the expert! You sure are labeled that way so. And what, that made me drive to study even more outside of the clinic. Okay, they're going to be asking me these questions I really got to know. And, you know, before, you just don't know details.

The clinical instructor recognized the importance of peer recognition among instructors and the technologists. When the clinical instructor was acknowledged in the clinical environment in a positive manner by the technologists for her position and how well she was performing this was extremely important and encouraging to her. Recognition from the technologists and her supervisor was significant for her as a clinical instructor even though the position did not provide any formal rewards or recognition:

> Very rarely but occasionally I get "that a girl" from the staff over there. When they say, oh we just love it when you're up here, you know, it's just so good to see you up here. And huge changes because we have been going through so many changes from before to now, oh, we're just so much happier, you know, I get that. Without like thank-you, it comes in other forms. My supervisor is um, doesn't do it often but she does it where it's enough to say, okay, you know, here it is, I don't give it often, but wow, you're doing really good, which is good for me. I don't need the pat on the back all the time. To hear it once in awhile means more than to hear it once a day, once a week.

Comparative Profiles

Two profiles were presented. The first profile represented a traditional student in a radiography program and the second profile represented a nontraditional student in a radiography program. Students that were 25 years of age or older were considered as nontraditional students and under 25 years of age were considered as traditional students in this study. These profiles were presented to illustrate and describe the way traditional and nontraditional students experienced learning in a clinical environment.

Klein et al. (2001) suggested that traditional and nontraditional students might be conceptualized by their needs and preferences for learning opportunities. Students considered traditional might also have the same needs or consideration as adult nontraditional students when these traditional students have a more distant permanent residence. Traditional and nontraditional students in these radiography programs did not live on campus and were perceived as having similar needs. All these radiography students had various types of educational experiences before entering their radiography programs. The youngest student was 20 years of age. Thus, with the rising tend of nontraditional students enrolling in higher education, the distinction between the two groups may become blurred (Schuetze & Slowey, 2002).

Traditional Student Profile-Nancy

Nancy was selected for this comparative profile, as she represents a traditional student attending a radiography program. Nancy was a student attending an external radiography program model. In the external program model the teaching of theory is *divorced* from the clinical setting. All the students' theory teaching is at the community college and the clinical education is provided by other health service providers, instructed by their own staff (Bench, 1999). This profile demonstrated how a traditional student perceived their learning in this clinical environment.

Nancy, being a traditional student, presented some characteristics of the nontraditional students, which have been identified to have various responsibilities (Dill & Henley, 1998). Nancy had multiple roles. She was a mother, a student, and an employee, which was more typical of a nontraditional student. Nancy was a 24-year-old white student and a single mother. Her baby was born just as she was beginning the radiography program. Nancy completed some general education courses before entering the radiography program.

Nancy was dressed neatly in her student uniform and was professional both during the interview and the observation. She articulated her perceptions and values without hesitation. Nancy demonstrated a relaxed, open and friendly manner throughout the interview and observation. During the interview she sat up attentively, maintained appropriate eye contact, smiled frequently, and rolled her eyes at times as she gave several explanations. Nancy spoke with enthusiasm and at times with disappointment during the interview, expressed by her vocal inflections and use of gesturing.

Significance of motivation. Traditional students tended to place an emphasis on extrinsic motivations for continuing their education at the postsecondary level. Usually their motivations revolved around improved job, career, and financial opportunities (Carney-Crompton & Tan, 2002). Prior to entering the radiography program, Nancy was in school for pharmaceuticals for a while, which she found to be boring. While she was taking different classes at the community college, a recent graduate from the radiography program told her about it. Nancy selected this specific radiography program after talking with this recent graduate from this program. Nancy found this program to be interesting and it was short, consisting of two years, and one could make fairly decent money in this career. Nancy stated what motivated her to pursue this education was, "My daughter, because I have to be able to maintain a good household and I have to be able to financially, you know, take care of her. This is how I'm going to do." Nancy thought the program might be too advanced for her. However, she said, "It was more advanced for me so I was going to challenge myself".

Nancy described her best clinical day as performing exams correctly and obtaining praise from her instructors. Traditional students are more extrinsically motivated by their friends or professors as indicated in the literature (Landrum et al., 2000). She stated, "I do everything the way I'm supposed to and praise from like our instructors and stuff, telling you you're doing a good job." For Nancy, the patients were what interested her most in the clinical environment, "So many different types of people. The interactions with outpatients that are fairly easy and then the patients from the psych area in your hospital and it's like, oh my god, how in the world am I going to do this?

And I think that's what interests me most. Just the different personalities and the different people." Then in contrast Nancy described her worst clinical day, "I just couldn't do anything right. I clipped every chest x-ray I'd done."

Importance of personality interactions and peers. Personality and interaction behaviors were more important for the nontraditional students than traditional students (Keller et al., 1991). However, interactions between individuals in the clinical environment were perceived to be extremely important to the traditional students. Traditional and nontraditional students perceived personalities and attitudes to affect every aspect of their clinical experience. Overall, Nancy found that personality conflicts were demonstrated at all of the campuses. One campus appeared to have more personality conflicts than the others:

> In our clinical environment there is a lot of issues between the technicians or the technologists, I would say, and just bickering. You hear it constant and that's pretty much not what we're here for and we hear a lot of it and that's probably my least interest that goes on in the clinical setting. You hear it at both campuses that I've been at but it's more at this one. Big time personality conflicts between everybody here.

Nancy described in great detail what she would like to see changed in the clinical environment. She elaborated on many areas concerning how individuals interacted in relation to supervision, evaluations, clinical assignments, role modeling, attitudes, recognition, and learning opportunities in the clinical environment:

> Advisor, our clinical advisor that work here and then we look to them. There is one of them that really shouldn't be an advisor because that person is never there. So really, when it comes for them to fill out our midterms, I don't that that they are really qualified, you know. The people keeping, like, things to themselves, like, our technologists who we're supposed to be looking up to, you know, were supposed to be wanting to be like them, you know, and they're down talk people right in front of you. They talk about other students in front of you and I mean

> just stuff like that. I don't think it should be. And a big thing that needs to be change is our teachers and stuff need to come together as a whole and make our clinical experience the best that it could be and I think that they have gotten a little intimidated by their affiliates and so they don't want to stand up for some of the things that, the problems that we've had or having and, I mean, I think that needs to be changed as well....There's been certain things, nothing that happened with me, but there's been certain people in our program who have had big-time problems and nothing ever gets addressed. And it's kind of like, well, what's the point of me coming to you if I have a problem but then you can't fix it or you can't attempt to fix it. And so, I mean, there are things that have been addressed and I'm not sure if it's still in progress or what.

Peer and social events were more significant for the traditional student than the nontraditional student (Dill & Henley, 1998). Peer interaction was important for Nancy in the clinical environment as well as outside their clinical time together. Nancy stressed how much her peers would work together and how much they did depend on each other for support in the clinical environment. Her peers were the ones that encouraged her to stay in the program when she felt overwhelmed and did want to continue. Being able to attend study groups with her peers allowed her to vent on certain issues together, which allowed them to open up and improve how they felt, particularly if they experienced a bad day. Nancy said:

> We like to work together. And there's probably certain people who like to work together more than other people. But sometimes you'll be having just one of those off days and you have that, other people behind you, sometimes it's helpful to be like, don't forget to do this or don't forget to do that. Or maybe just put in a little bit of insight and be like, maybe you should just rotate him up just a little bit more or something like that. Yeah, very helpful and two heads are always better than one. There's been a number of times where I'm like, I'm so not doing this anymore. And it's just because, it's not because I don't like what I'm doing it, you know, certain days where our work is taken for granted... when I just don't feel like I want to keep going when I'm just so strung out and tired because I had a baby at the beginning of the program which put a big damper on it. And there's just certain times where I've been up all night and I come into class and I'm like, I just can't do this, I just can't do it today and they'll be like, you've been here for this long and you've waited this long to get here so you might as well just stay,

> you know. Study groups and stuff and somebody will have a bad day we'll get together and just lash out, get everything out in the open, so it makes you feel that much better.

Importance of instructional approach. Nontraditional students indicated preferences such as wanting practical applications to real problems, and wanting instructors who were enthusiastic and loved their subject (Keller et al., 1991). This traditional student also wanted these learning opportunities and enthusiastic instructors in the clinical environment. The clinical experience was valued by Nancy because it allowed her to have learning opportunities with hands-on experience, performing exams on real patients in a variety of procedures:

> I do value it a lot. There's certain days where nothing is going on, like certain shifts that we do where there's, like, we're not needed. And I feel like we're not getting anything out of the experience. But there are other days where you're just swamped. I'm glad that I've been there that day because, I mean, you get so much out of it. I don't think that I could go through the program with just class and not have a clinical. I don't think that I could have ever passed. You know the hands-on is awesome.

Nancy said she really appreciated her positioning instructor, because she was enthusiastic and prepared them well in class to be able to apply their knowledge in the clinical environment. Nancy emphasized, "We had an awesome procedures teacher. I wish she was still here with us, but she isn't. She taught me and everybody else as much as I needed to know, if not extra. She was extremely helpful, extremely!"

Nontraditional Student Profile-Linda

Linda was selected for this comparative profile, as she represented a nontraditional student attending a radiography program. Linda was a student attending a radiography bridging program model. In this bridging program model the theory was

taught in an educational institution and the financial and administrative responsibilities were separated from the clinical institution. In this example, arrangements were made so that the theory teacher also taught clinical and some clinicians also taught theory subjects (Bench, 1999). This profile demonstrated how a nontraditional student perceived learning in the clinical environment.

Linda presented herself in a professional manner during the interview and observation. She came dressed in her uniform and was articulate and soft-spoken as she addressed each question. Before responding to most questions she paused and reflected on prior experiences before sharing her thoughts. Linda was relaxed and presented an enthusiastic manner throughout the interview and observation. During the interview she was attentive, maintained appropriate eye contact, smiled frequently and would pause for reflection before she gave explanations. Linda spoke with interest and excitement. At times she expressed a deep appreciation for others in the program during the interview as noted in her tone of voice and gestures.

Significance of motivation. Nontraditional students have been identified as having various responsibilities (Dill & Henley, 1998), which Linda did present. She was a mother, student, and an employee. Linda was a 38-year-old white single student with two young children. She was pregnant and engaged to be married. Linda completed course work at a community college prior to entering the radiography program. Prior to entering the radiography program Linda worked part-time as a secretary at one of the clinical setting hospitals and continued this employment while in the program. Linda selected this specific radiography program because it was close and convenient.

She became interested in radiography after having some exams done at one of the clinical settings. Linda commented, "I have a couple of little kids, and I thought about going back to work when they got older. So when I had this exam I thought everyone was so nice and I thought, hey, I could do this. And I do like working with people."

Nontraditional students aged 25 years and older indicated they were intrinsically motivated by trying their best, understanding the subject, learning something new, and learning practical skills that they can use (Landrum et al., 2000). Linda said what interested her most when in the clinical environment was, "Probably just all the new things that come in. You didn't even think about that you'd being doing those types of exams. Just, everybody's different and it's interesting to see how different people, different things, new things." Linda enjoyed learning how to apply new information in the laboratory and the opportunity to be able to practice these new skills prior to performing these exams in the clinical environment. Linda put forth her best efforts by getting involved and performing exams to obtain as much hands-on experience in order to gain confidence in her abilities and to recognize her increased knowledge. Linda said her best clinical day was one where she could be challenged to try her best and increased her understanding of procedures, "I think it would be if we had a full day of scheduled things to do, keep busy. Maybe somewhat challenging exams, something new, and then just do a good job at it and feel good about it."

Importance of personality interactions and peers. Personality and interaction behaviors were more important for the nontraditional students than traditional students (Keller et al., 1991). Personality and how people interacted in the clinical environment

was important to Linda. As previously noted these issues were also just as important to the traditional students. For Linda, when there were unresolved conflicts related to attitudes and how people interacted with each other in the clinical environment, this caused her frustration. She indicated, "Maybe some of the techs you work with might not be as easy to work with. You just feel like you're not getting along all day and things are going wrong. That would be a bad day."

Peer and social events were less significant for the nontraditional student. Nontraditional students may have less time to spare to build social relationships with their peers due to other obligations (Dill & Henley, 1998). Peer interaction was notable for Linda only while in the clinical environment. Peer interactions did not appear to influence her to a great extent as she participated in the clinical environment. Positive peer interactions were deemed good. To have peers to converse with who could understand what went on during any given day was beneficial. Linda did not feel peers had a significant impact on her in the clinical environment, "I don't know if they really impact it. It's nice when you have other students there just to kind of talk to and tell them what you're doing that day or what's going on. If something goes on they understand and stuff like that."

Importance of instructional approach. These nontraditional students indicated preferences such as wanting practical applications to real problems, and wanting instructors who were enthusiastic and loved their subject (Keller et al., 1991). Linda appreciated instructors and staff technologists who were encouraging, open-minded and showing a real desire to teach. During Linda's clinical experience she found these

individuals to be knowledgeable and willing to share their knowledge to provide her with effective feedback:

> If we're having trouble with something they'll work with you on it. I had done an exam, I couldn't tell you what exactly what, but I know the instructor was there that day and I know that I talked to her about it and so we went into another room and just reviewed the whole procedure. And then we have midterm evaluations when we're in clinic where we review what's been going on and get comments from the departments and they tell us what to work on.

Landrum et al. (2000, p. 91) said nontraditional students demonstrate "more satisfaction with college, more enjoyment of school and learning, more agreement with grades reflecting actual learning, and more agreement with professors caring about learning." Throughout Linda's interview she presented a very satisfied picture of her experiences in the clinical environment. She described her instructors as "always willing to help" or "genuinely care about what you're doing" and she had never seen anyone talk negatively about her or another student to others. Linda acknowledged that all instructors seemed to be fair to all the students and she did not perceive any cliques in the clinical environment. She related that the instructors encouraged her to get hands-on experience in procedures when she only wanted to observe, but that encouragement allowed her to get more involved in the exams. Linda stated, "More you'd watch and observe at first and gradually get involved in it. You would have someone there with you. You would do as much as you can and they would assist you until you're ready to do it yourself."

Summary

The four themes that emerged were demonstrated across the three program models. Utilization of the constant comparative method was effective for analyzing and interpreting the data collected through individual interviews, focus group interviews, and

observations. The four themes identified by the data included: (a) learning opportunities and integration of knowledge, (b) trust and fairness, (c) attitudes and socialization to radiography clinical sites, and (d) supervision, evaluation, and recognition.

The student's self-concept could be a dominant influence on their learning perception. Several factors such as learning opportunities, ability, motivation, relationships, or performance did have an impact on the students' learning perception. The type of instruction should differ according to the students involved and the desired level of learning. Knowledge gained through meaningful experiences, along with appropriate and meaningful feedback, were key elements for effective learning.

Similarities and differences were identified and discussed within each theme by the students and clinical instructors across the three program models. The three program models identified many similar issues within the clinical setting, however, not always from the same viewpoint. The students and clinical instructors also reflected dynamics that were unique within their program model. For instance, students in the bridging program model focused on desirable characteristics of a clinical instructor in the theme of trust and fairness. The external and internal program model participants highlighted discussed desirable characteristics of a clinical instructor in the theme of learning opportunities and integration of knowledge.

Identification and development of the four themes facilitated the development of an in-depth discussion of the findings to address specific research questions, as well as recommendations related to the findings with recommendations for future research. Specifically this study addressed the following questions:

1. What impact does learning in a clinical setting have on the professional preparation of radiographers?
2. Is there a difference in the way traditional and nontraditional students experience learning in a clinical setting?
3. Is there a difference in the way clinical instructors and students perceive learning in a clinical setting?

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

The purpose of this study was to examine the place of clinical experiences in radiography programs and to describe how students and clinical instructors in three different radiography program models (bridging, external, and internal) perceived the learning experiences in clinical settings. A practical objective of this study was to explore and describe the perceptions of students and instructors concerning the skills, knowledge, attitudes, values, and social interactions exhibited in the clinical setting. Results of this study may be used to develop and improve radiography education.

Students' and clinical instructors' perceptions of learning experiences in clinical settings were obtained through observations and interviews. The following research questions guided this study.

1. What impact does learning in a clinical setting have on the professional preparation of radiographers?
2. Is there a difference in the way traditional and nontraditional students experience learning in a clinical setting?
3. Is there a difference in the way clinical instructors and students perceive learning in a clinical setting?

Discussion

Four themes related to perceptions of learning in the clinical settings emerged from the data attained through the semi-structured interviews, observations, and focus group interviews:

1. Learning Opportunities and Integration of Knowledge
2. Trust and Fairness
3. Attitudes and Socialization to Radiography Clinical Sites
4. Supervision, Evaluation, and Recognition

These themes emerged in all three radiography program models (bridging, external, and internal). Distinctive emphases within the themes were noted in each model.

Results from these three program models indicated that the clinical environment is variable. "The Constructivism theory may be one viable lens for viewing teaching and learning in health education" (Ubbes, Black, & Ausherman, 1999, p. 67). Students' learning in clinical settings was an active process where they constructed new concepts build on their current or previous knowledge or a combination of both. These students and clinical instructors noted and demonstrated in the clinical settings that students needed to take responsibility for their learning. Learning in the clinical settings required the students to seek experiences that would help them to achieve their own understanding and to challenge themselves with their current skills and knowledge to continue to learn. Each situation may require a different approach because each patient was unique: possessing diverse backgrounds and various medical conditions to be recognized.

It was evident the social culture of the clinical settings affected students' learning. Each of these students demonstrated unique needs and backgrounds. Students' learning was connected with social interactions. Students and clinical instructors emphasized the importance of the relationships between the students and the clinical instructors, technologists, peers, patients, and physicians for an effective learning environment.

Students said they valued their clinical experiences. They realized the contributions from faculty, clinical instructors, technologists, and patients were necessary to help them become proficient radiographers. These perceptions were important. Dreher (2001, p. 43) stated, "Perception is basic to interaction. It is an individual's interpretation of events seen, heard, or otherwise received through the senses. How unique human beings behave in a communication situation depends on their perception of self and others."

What Impact Does Learning in a Clinical Setting Have on the Professional Preparation of Radiographers?

Clinical settings demonstrated an impact on the professional preparation of radiographers. Each of the themes that emerged from the data, mentioned above, included a number of factors affecting student learning. These areas are listed below, under their respective themes. The discussion that follows will be organized around this outline:

1. Learning Opportunities and Integration of Knowledge theme included:
    a) Bridging the gap between theory and practice
    b) Integration of theory to practice
    c) Significance of learning opportunities
    d) Influence of peers on learning
2. Trust and Fairness theme included:
    a) Satisfaction and difficulties in building trusting and fair relationships
    b) Importance of peer connections
3. Attitudes and Socialization to Radiography Clinical Sites theme included:
    a) Implications of the social culture climate

b) Striving for a sense of acceptance and belonging

c) Importance of building positive peer connections

4. Supervision, Evaluation, and Recognition theme included:

a) Enhance self-sufficiency with indirect supervision

b) Successes and barriers in the evaluation process

c) Significance of recognition and feeling valued

Learning Opportunities and Integration of Knowledge

Definition. Learning opportunities integrate classroom instruction with clinical experiences to form a base of knowledge. Learning opportunities can be formal or informal. Formal learning opportunities involve planned curriculum and clinical experiences. Informal learning opportunities arise spontaneously during observation of, and participation with, those already in practice. Learning opportunities include acquiring competencies and being acculturated into the profession. Integration of knowledge can be reflected in descriptive comments and discussions, and demonstrated through application of classroom knowledge in clinical experiences. Integration of knowledge or skills is related to students applying new knowledge or making connections based on prior learning experiences.

Bridging the gap between theory and practice. Clinical knowledge is acquired over time by applying theoretical knowledge to clinical experiences. According to Benner (1984, p. 20), "Beginners have had no experience of the situations in which they are expected to perform. To give them entry to these situations and allow them to gain the experience so necessary for skill development they are taught about situations in

terms of objective attributes." Students in the internal program model initially felt learning to be more difficult in the clinical environment. These students were assigned clinical assignments as early as their second week in the program. Students in the bridging and external models were provided the knowledge base of objective attributes prior to entering the clinical environment. Students in the internal program model were not.

Skilled performance was achieved by combining the principles and theory learned in the classroom with skills acquired from real situations (Benner, 1984). Bridging the gap from theory to practice was accomplished through active experiential learning; actually doing things such as positioning or patient care in the clinical setting. Students in the bridging program model made the strongest connections between didactic and clinical learning. Both didactic and clinical learning were significant and beneficial in the overall process. One student in the bridging model stated, "...learning was just going into the classroom and taking what we learned there and trying to put it into a clinical area." Clinical practice was a place for students to test out what they had learned in the classroom. Another student felt it worked well to, "... mix it up between the classroom and clinic." Classroom learning provided a foundation for clinical practice.

Because of program structure, students in the bridging program model perceived their integration of knowledge to be more effective than students in the internal program model. Student comments in the internal program model more frequently indicated that they felt uncomfortable or were not as prepared for the clinical environment. Most knowledge and skills were acquired concurrently because as a student noted from the

internal program model, "we were in clinic... from like the second week." Students in the internal program model wanted and needed specific theory information prior to entering the clinical environment. These students did not have that opportunity because their clinical work started so soon. They felt unprepared and did not know what to do or how to respond in many situations.

Students in all three program models initially experienced a sense of uncertainty in the clinical setting. However, students in the internal program model felt that they were expected to participate in procedures before they were prepared with the necessary knowledge base. These students at times had to pretend that they knew and understood more than they actually did. A student in the internal program model said, "A lot of things are kind of handled like we're expected to be doing the job a year ago. So, ...expectations might not always be where the learning curve actually is. And at certain times you kind of have to act like you know more than you really do to get by."

More so than students in the bridging program model, students in the external program model described a disparity between how they felt the clinical environment was supposed to function and how they actually learned. They found integrating their knowledge to be more complex and difficult in the clinical environment because of differences between what was taught in class and what was taught at the clinical site. Technologists often had their own methods that did not precisely conform to what the students had been taught, or with the methods of other technologists. Students had to modify how they performed a procedure depending upon which technologist they

happened to be working with at the time. One student said it, "was a gamble to fit within the method or approach for each position depending upon each individual's preference."

Integration of theory to practice. Students in all three program models recognized a connection between what was taught in the classroom and applying that knowledge in clinical practice. These programs did have an integrated approach inherent in their structures. Classroom and clinical learning experiences were integrated throughout the students' education. This clarified concepts and made connections sooner; as one student from the bridging model noted, "There's just so much information...to learn...Definitely with having clinic it helps to relate all that stuff so you can put that information somewhere instead of just storing it up in your mind."

Students felt a fear of the unknown in the clinical environment. A student in the external program model said, "It's hard. You can only practice so much on patients before you get a real handle on at the hospital and figure out what's going on and what exactly happens and it's scary at first. Oh, it is just overwhelming. You don't know what to expect." Students gained confidence by interacting with and caring for injured and sick patients. Initially, students were nervous when interacting with sick, severely injured, or terminal patients. This type of patient contact facilitated learning, and helped students to appreciate their own health.

The classroom setting provided students with learning experiences to complement their clinical experiences. Students performed procedures in labs, wrote research and pathology papers, had group discussions, and completed projects and case studies. Students accumulated and integrated experiences and knowledge from a variety of

perspectives through several clinical experiences. This promoted active learning with experts in the field acting as role models. Students found it helpful when technologists shared their tricks or tips of the profession. Students were able to see the benefits of a variety of approaches in practice, which they could construct new knowledge to their own preparation as professional radiographers.

In the clinical environment students observed multiple methods for applying knowledge. This was beneficial for learning, but at times a point of frustration for the students. Students were exposed to positive and negative role models. When students thought the technologists and clinical instructors enjoyed their job the students felt they were more approachable and willing to take the time to teach and assist students.

Students appreciated learning a variety of effective methods to help patients. They understood the need for adapting the standard approach for positioning an exam and modifying it to meet the patients' unique medical conditions. Developing critical thinking skills was essential for students as they progressed from their first year to their second year, when they were expected to perform with indirect supervision.

Significance of learning opportunities. The general landscape of radiography is currently changing in a dynamic manner with new technologies becoming available, such as computed radiography. In response to these new challenges and demands in health care, students acknowledge that certain exams and processes need to be reassessed. New technologies also have enhanced other imaging modalities such as computed tomography (C.T.), which is having a definite impact on general radiography. Opportunities to practice certain exams are diminishing in some radiography departments. Students

identified several exams historically done by radiography which more recently were routinely completed with C.T. imaging. Students felt less confident to perform radiographic procedures such as skull series or sinuses since these procedures were typically performed in C.T. The radiography department in the internal program model was remodeling their department by changing a general radiography room to a C.T. scanning room to accommodate an increase in C.T. imaging procedures.

Another obstacle students identified for gaining learning opportunities was not being assigned to later shifts and weekends as often as previous students had been. This seemed to diminish their learning opportunities and their chances to integrate learned skills in clinical situations. Second shift and weekends tend to offer more multiple patient and critical trauma incidents presenting more opportunities for experiencing a greater variety of procedures.

Students in the internal program model specifically perceived accountability for learning to be their own responsibility. The degree of participation in the clinical setting was connected to self-initiative on the student's part. Avoiding certain exams, or sitting in the viewing area while exams were being performed were choices students made themselves. A student stated, "I think that how much effort you put into it is how much you get out of it."

Influence of peers on learning. According to the literature, the first major factor influencing students' learning in the clinical setting was support from clinical instructors. The second was peer support (Campbell, Larrivee, Field, Day and Reutter, 1994). Students viewed their peers to be helpful and supportive in learning and integrating new

knowledge or skills. Peers were a significant resource for learning and building up confidence in each of the three program models. Peers were relied upon as a significant resource for learning and confidence building in all three program models. According to Engebretson and Littleton (2001) the constructivist paradigm is valuable, since it takes into account differences in human perspective and makes available a method to understand and study constructed meanings and assumptions. King (1995, p. 16) states:

> When we are engaged in peer interaction, we discover that our own perceptions, facts, assumptions, values, and general understandings of the material differ to a greater or lesser extent from those of others. When confronted with these conceptual discrepancies, we want to reconcile the conflicts. To do so, we must negotiate understanding and meaning. And this negotiation, this co-construction of meaning, occurs through explaining concepts and defending our own view to each other.

Students indicated that it helped to have peers with them when learning and doing exams. Peers could provide helpful hints, if a student was having an off day. They felt more at ease approaching their peers with questions. Peers also shared what they had learned from an experience with other students who had not yet had that opportunity.

The number of students and the availability of procedures affected peer interactions and learning opportunities. Students in the internal program model pointed out that the effects of peers could be positive or negative, depending on the clinical situation. At times a student may want another student to assist. At other times there may be too many students in the clinical setting for the number of procedures available, which can lead to competition for exams.

Trust and Fairness

Definition. Being treated differently defines the parameters of fairness. Students establish trust with their faculty and clinical supervisors and peers based on being "treated fairly". Trust and fairness reflect in comments and discussions that are open and confident. Student interactions are more effective when they trust that they will be listened to and understood, and responses to them reflect fairness.

Satisfaction and difficulties in building trusting and fair relationships. Issues of trust and fairness were discussed in all three program models. There was minimal concern in this area from students in the bridging model. They perceived themselves to be treated fairly. They trusted the technologists and trusted or developed a special bond with their clinical instructors. Approachable clinical instructors and staff were a positive experience for students in this

Students realized the importance of positive relationships with technologists, clinical instructors, and peers. However, sometimes close relationships became problematic and were perceived to be more significant for success (but not necessarily learning) in the clinical environment than actually learning proper procedures. That is, sometimes student success seemed to be determined more on the basis of personality and "likeability" than on performance and abilities. This was especially true for students attending the external and internal program models. A student from the internal program model emphasized, "I wouldn't say unfair treatment, but I think reputations are gained that you can't change. If you're liked, then you're liked. Even if you screw up you're liked. And if you're not liked, it's really hard. It's a lot harder for some people to get by

than other people." Students who had this perception were hesitant to involve instructors or technologists when they had a difficult choice or problem. Their experience was that when issues were brought to the attention of their instructors or clinical instructors, in the end it seemed to exacerbate the problem. Students then had to deal with constant questioning concerning that problem. This in turn resulted in the student having little trust that they would be treated fairly.

Student perceptions from the external program were of a more stressful clinical experience. They felt they were treated fairly most of the time. But they sensed unfairness from technologists who did not treat them as part of a team. Students thought too much of the responsibility for patient preparation fell on them. For these students, personality conflicts resulted in difficulties relating to fairness and trust. Students complained of cliques at the clinical sites, one student saying, "... everyone has their favorites."

Importance of peer connections. Students in the internal program model expressed some concerns about whom they felt they could trust. They trusted their peers the most, followed by their clinical instructors to be supportive. Some students preferred to ask their peers questions, especially if they thought their question might be considered stupid, as seen by this comment: "I try to think it through myself and usually I can make sense out of something after I slow down and just process and think about it myself. If it's that hard I ask another student that I trust." Students expressed the belief that a reputation gained early was likely to stay with them throughout their clinical experience.

As seen by some of the previous student statements regarding fairness, the issues of personality and favoritism affected peer connections as well.

Attitudes and Socialization to Radiography Clinical Sites

Definition. Attitudes and socialization in radiography clinical sites were examined in relation to interactions displayed by individuals within the clinical setting. Positive and negative attitudes and relationships are associated with feelings of acceptance. The success of their socialization affects the ability of students to assimilate to the clinical setting.

Implications of the social culture climate. When students participate at a clinical setting they become part of that organizational structure. Overall, students realized the impact of their attitudes and behavior upon their successful socialization. These attitudes and behaviors had a positive or negative effect upon potential learning in the clinical setting. Students' ability to recognize positive or negative interactions and their responses were essential for obtaining successful social integration. For example, one student felt, "If you're not having a good experience then you're not going to learn." Another said, "Anytime that attitudes ...towards each other...are comfortable and nice it really facilitates better learning."

Cheney (1983, p. 342) stated, "Identification with organizations or anything else- is an active process by which individuals link themselves to elements in the social scene. Identifications are important for what they do for us: they aid us in making sense of our experience, in organizing our thoughts, in achieving decisions, and in anchoring the self."

The amount of involvement and responsibility of each student impacted how they identified within the clinical setting.

Students attending the external program model perceived the clinical affiliates (settings) had more power in the decision-making process than the college. The clinical affiliates were the ones to determine how students and situations should be addressed. One participant said, "Our teachers and staff need to come together as a whole and make our clinical experience the best that it could be. And I think that they have gotten a little intimidated by their affiliates. And so they don't want to stand up for some of the things that, the problems that we've had or having."

Students attending the bridging program model felt interconnected or linked with their college and the clinical sites. They perceived a collaborative process between the two. They felt the clinical sites were expected to be a part of the educational process due to the organizational structure. A student from the bridging program model shared, "This is a teaching hospital. They should understand that. You know, we're students and they're working at a teaching hospital, so they need to deal with students in a little bit better manner." Students said they were treated with more respect when attending any of the hospitals and clinics that were linked through the organizational structure.

Students from the internal program model perceived they were considered workers. They sensed that being allowed to participate in the clinical setting was, "...the price they had to pay for their education." For example, a student commented, "Workers more than learners, yeah with expectations and pressures that probably shouldn't be there, at least at times."

The clinical environment put students in contact with people with a variety of attitudes and behaviors, which presented students with a wide range of potential methods of interaction. Learning was adversely affected if students were unable to negotiate good working relationships with the technologists. Students in the external program model felt less connected or recognized than did students in the bridging program model. They observed a separation between students and technologists in their social conversations. Technologists definitely set the tone and direction of the conversations and determined who was included.

Students in the external program model talked passionately about the lack of professionalism presented by instructors and technologists. Gossip and disagreements showed a lack of respect between individuals in the clinical environment, which the students found to be unreasonable. During a focus group interview a student elaborated on what should be improved in order to enhance learning in the clinical setting, "I'm most frustrated with the bickering. I mean, I get so sick and tired of hearing them ladies talk and talk about each other. It's ridiculous. I hate it, every bit of it."

Striving for a sense of acceptance and belonging. The importance of a sense of acceptance and belonging in the social climate within a clinical setting was stressed by all the participants in all three program models. Students shared their perceptions concerning their status and value within the organizational structure. Students felt an inequity about their role as student. Social interactions at times were frustrating between students and technologists. Students felt they were considered to be inferior to technologists, at the bottom of the totem pole. Comments from students in the internal

program model perceived attitudes in the clinical environment to be: "the biggest thing is how you get treated," "they're just doggin ya," and "treated inferior."

Students observed that learning was affected by how they were accepted socially into the clinical department. They knew they would need to make personal connections to fit in. Students would act in ways to increase their chances of being accepted with certain individuals. If the technologists included students into their conversations students felt more welcome and part of the team.

Students in all three program models noticed that the various clinical sites were different in terms of student acceptance and inclusion. Personalities at some clinical sites appeared not to match as well with some students and made them feel more uncomfortable. Students in the external model were more anxious about personalities and attitudes than about patient care or procedures. In the internal program model at one clinical site students definitely felt that the technologists treated them as inferiors. Students were expected to do most of the work at that clinical site. A lack of cooperation between students and technologists was identified in that program and it was being addressed as needing improvement.

Personal relationships also had an impact on student confidence. When students were comfortable at a clinical site they were more outgoing and willing to make an extra effort to participate in more exams. Students noted differences in clinical relationships depending upon the site or rotation, "Well at the other site I think that my personality fit better over there so I was more comfortable over there. So that made me strive more and

be more outgoing and you know feel better about myself to do it and to get into an exam."

In a positive and encouraging environment learning was greatly enhanced, since students were more willing to participate in procedures that exceeded their comfort zone. When learners experienced self-efficacy and were able to be self-regulated learners, this improved their ability to transfer their skills to different situations (Driscoll, 2005). Students' felt that if they were not well accepted or a favorite student they would not receive the best possible clinical experiences. For example, "It depends on the tech. I think if you have good communication, and the tech likes you, then they're going to treat you differently" or "I think reputations are gained that you can't change."

Self-regulation, a student's ability to take the initiative for their learning experience, set their own goals, step in, and work on their own, was unique to each student. Students who were aggressive in a positive sense about doing a task and accomplishing a goal, and were successful, had greater motivation and were able to better self-regulate their learning experience in the future. However, students who were not successful in self-regulation were less motivated and positive about their abilities. The impact of success or failure on the student's self-efficacy or motivation depended on several factors, including the nature and importance of the goal to that student, who witnessed the success or failure, and how many successes or failures that student had recently experienced.

Students felt less pressure when staff radiographers and the clinical instructor were approachable. Transitioning from one clinical site to another did provide students

with enriched learning opportunities. However, some students had difficulty assimilating to a new environment. Sometimes students did not want to leave a particular site they had been at for a period of time because they had reached a level of comfort. At other times they were glad to leave a site due to strained relationships or because another clinical site had certain procedures available for students to perform. Students new to a clinical site sometimes felt inferior to students that had just completed their rotation at that site.

Importance of building positive peer connections. Attitudes and the ability to interact with peers in the clinical setting were essential in the clinical environment to facilitate learning and decrease stressful situations. In the bridging program model positive peer connections were helpful in dealing with stressful situations by enabling cooperation and resolving competition for exams. A student realized, "If I have trouble with Tim...working at the same site you know it's going to be a little awkward and a little difficult and not as enjoyable."

Supervision, Evaluation and Recognition

Definition. Supervision and evaluation are descriptions of any discussion, expression or process of written or verbal feedback between individuals or between groups. Recognition can consist of appropriate positive reinforcement of behaviors. This includes expressions of appreciation and motivating comments.

Enhance self-sufficiency with indirect supervision. All participants discussed the positive and negative aspects of supervision, evaluation, and recognition. When mistakes occurred, students appreciated patience and understanding from those who were

supervising them, recognizing that students did know what they were doing. Being allowed to work in the radiography rooms without having a technologist or clinical instructor always watching over their shoulder gave the students a sense of self-sufficiency. This allowed students to think through situations on their own, while still knowing the technologist or clinical instructor was right outside the doorway if they needed them.

Students in the internal program model were positive about the supervision they received from their clinical instructors and radiographers. They described them as patient, encouraging confidence builders who provided supervision and evaluation that enhanced self-confidence and learning. They allowed students to think and try new skills, and provided correction. Students felt valued when instructors included them in procedures and when they shared insights from their experience. This reduced the anxiety students felt when faced with new experiences.

Students in the bridging and internal program models emphasized indirect supervision, which allowed student independence in performing exams. The focus group in the bridging program model commented that supervision by some technologists was intrusive: "I didn't like when that tech stared at me during the entire exam without moving their eyes away from me." Students preferred to have the clinical instructor or staff technologists stand outside the room while they were performing procedures, especially as second-year students. They felt this allowed them more independence, with assistance nearby if needed. This approach to supervision was important because it reduced nervousness and second-guessing. A student explained, "I like to be in the room

by myself and the tech maybe just right outside.... If I can't figure this out then I call them in. But after you go through it all in your own head and there's still something not right, then maybe ask them." Another student stated, "We have a tech in the room with us and some techs will huddle over you while you position the patient and everything. That's kind of nerve-racking."

A major concern was a lack of instructor availability to address student questions and issues in the clinical setting. This perception was more evident in the internal program model. Students wanted someone who had the time to concentrate on their personal learning needs. These students felt their clinical instructors were too busy with other work. Comments from the internal program model revealed these frustrations: "I kind of wish there was somebody to go to more often in the clinic... I wish there was somebody always there that was willing to take those kind of questions and had the time to do that." And, "The clinical instructors are fine but they have so much to do outside of clinic they're really not there a ton. They're there as much as they can be. They have so much paper work and stuff that they're not truly, truly, truly a clinical instructor cause it's not like they're always in clinic with you."

Successes and barriers in the evaluation process. Students wanted and expected frequent, honest feedback about their performance. Most of the time students experienced feedback that was timely and helpful. How students were treated in the clinical environment did make a difference in their ability to take in information. Constructive criticism was critical for students to develop and to succeed. Open and supportive feedback from the technologists and clinical instructors enhanced student

confidence and learning. When clinical sites were busy, there was a negative impact on the amount of feedback students received. Students in the bridging model noted that when the clinical setting became hectic technologists were not always able to provide feedback. However, their clinical instructor did follow through.

Students felt that evaluations focusing on one or two isolated events were inadequate representations of their performance in the clinical environment. Students realized that feedback reflected the student's ability and knowledge level. Instructors in the bridging model were the most helpful in guiding students in new situations. They also reviewed procedures with students just before competencies were attempted on patients. In the external and internal program models students felt their clinical performances were often evaluated on the basis of personality issues and not on their performance. This perception was not as evident in the bridging model. The general consensus was that evaluations emphasized what students did wrong more often than their successes. Technologist expectations for students were not always made clear.

Students wanted to learn from their mistakes through constructive criticism from the supervising technologist. However, at times students felt that technologists were not interested in teaching them. Students received feedback stating what they did wrong but without suggestions for correction. One student explained, "I think that if we're doing something wrong, instead of just saying something bad, let us know what it was and...how to fix it."

The tone and attitude with which evaluations and supervision were given varied to a greater degree in the external model than in the bridging and internal models.

Supervisor attitudes affected student encouragement and learning. Negative attitudes were displayed, such as technologists shrugging their shoulders or totally ignoring a student's question or request. If a mistake occurred during an exam, some technologists shifted the blame onto a student even though they were responsible for supervision.

Significance of recognition and feeling valued. Recognition or lack of recognition can affect student performance in the clinical setting. Student motivation and enthusiasm were inspired when they received positive recognition from technologists, clinical instructors, patients and their peers. Students liked to feel that they made a difference in somebody's life.

In the external program model, approval from clinical instructors and technologists gave students the confidence to try new and difficult exams. Students valued hearing verbal feedback such as, "good job," from technologists or clinical instructors. Students in the bridging model appreciated recognition from patients. A student stated one of her best clinical days included gratitude received from a grateful patient: "At the end of it she thanked us very much for taking care of her... She was really thankful that we helped her out and she was really pleased with everything...It just make my day just thinking that we actually do something for the people."

Students in the internal program model felt recognized if they were included in exams or procedures that were not considered routine. As one student said,

> Watching somebody who does things well motivates me. To be able to say, wow that exam went really smoothly and I noticed that they did this to make it go better; that motivates me. When a patient leaves the room and feels happy about their experience there; that motivates me. Obviously there are negative motivators too. I did that really bad, and I don't want to do that again.

Recognition was essential for students in the bridging program model and they emphasized feeling more recognition if they were perceived to make a valuable contribution within the clinical setting. Students' sense of value in the clinical environment varied depending upon their perception of their ability to contribute in the clinical setting. Students perceived their value in the clinical setting being connected with their how much they were able to contribute depending upon their knowledge, how many people were at the clinical site and the number of patient procedures. A student from the bridging program model indicated he felt more valued when assigned to second shift and less valued when assigned to a special rotation, "I feel more like I'm valued if I'm capable of doing a lot more. If there's so many more people it seem like your value is less. Just because there's less you can do."

Students in the external and bridging models felt they were valued in the clinical environment because of the work they performed. However, the technologists did not always appreciate them. For students in the external model this was due to what they felt was a lack of positive feedback and excessive negative feedback. One student said, "As a group we are valued but not appreciated in the clinical setting...You know, we do a lot of work, and I know we're learning, but we still do a lot of work, and I think that we should be recognized a little bit more even though we are students." Students in the external and internal models felt less respected than those in the bridging program model. Students in the external and internal program models felt taken for granted. A student stated, "I think most of the time we are taken for granted. They look at it as our...the price we have to pay to get the job." It was expected that students would perform the more mundane

tasks. These expectations contributed to student perceptions of not being respected by technologists.

Is There a Difference in the Way Traditional and Nontraditional Students Experience Learning in a Clinical Setting?

There is an increasing diversity of students interested in careers in radiography. This study examined how six traditional and three nontraditional students experienced learning in a clinical setting. The results of this study showed that there was relatively little difference in the learning experience of traditional students (under 25 years old) and nontraditional students (over 25 years old). The under 25 year old students attending these radiography programs did not fit the typical traditional student profile described in the literature. With more nontraditional students enrolling in higher education the distinction between the two groups may come to be blurred (Schuetze & Slowey, 2002). Two of the four traditional students were either married with children or single parents. One of the three nontraditional students was married. None of the students, traditional or nontraditional, lived on campus. Students considered traditional might also have the same needs as adult nontraditional students when these traditional students have a more distant permanent residence (Klein et al., 2001). While the two groups valued many of the same things in the clinical learning environment, there were three differences: (a) significance of motivation, (b) importance of personality interactions and peers, and (c) importance of instructional approach.

Significance of Motivation

Traditional students had extrinsic motivations for continuing with their education more so than nontraditional students. These students emphasized finishing the program and

getting a high-paying job. These motivations were seen in traditional students' desires to obtain praise and recognition from peers and instructors.

Nontraditional students had intrinsic motivations for continuing with their education. They were attracted to the profession because of opportunities for service and personal interaction. Intrinsic motivation was manifested in a desire to learn new things, and in an appreciation for new experiences and meeting new people.

Importance of Personality Interactions and Peers

Personality and interaction behaviors were more important for the nontraditional students (Keller et al., 1991). However, these behaviors were important for the traditional students as well. There was a difference in the way traditional and nontraditional processed personal interaction in the clinical setting. Attitudes and responses of traditional students tended to be more general, with less responsiveness to the uniqueness of individual situations or personalities. This was especially true in situations they viewed as negative. Nontraditional students were more likely to approach each individual and situation on its own merits. They were able to evaluate the outcome of each situation independently with regard to its effect on their learning.

Traditional students indicated that peer interactions and support were more significant for them than did nontraditional students within and outside of the clinical setting. Traditional students depended upon peers to provide them with emotional or cognitive support in the clinical setting. Peer interactions appeared to have minimal influence on the clinical learning experience of nontraditional students. As one student

said, "...I don't know if they really impact it." Nontraditional students performed with a more pragmatic attitude, in and out of the clinical setting.

Importance of Instructional Approach

Academic and clinical performance for these two sets of students was not as dissimilar as might be expected, because of entry qualifications for radiography programs. According to Shanahan (2004, p. 445), "Significant effect of mature age on academic performance was negated when entry qualifications were added." The enrollment qualifications for radiography students are competitive due to limited space in programs. All of these participants had previous educational experience prior to acceptance into the program.

Traditional students wanted practical application to real problems. They valued instructors who were enthusiastic and prepared them to apply their knowledge in the clinical environment. This traditional student noted concerns with supervision, evaluation, role modeling, and attitudes in the clinical environment:

> There is one of them that really shouldn't be an advisor because that person is never there. So really when it comes for them to fill out our midterms I don't think that they are really qualified. The people keeping...things to themselves like our technologists...they talk about other students in front of you... And it's kind of like, well what's the point of me coming to you if I have a problem but then you can't fix it or you can't attempt to fix it.

Nontraditional students indicated the need for practical applications as well. Instructors and staff technologists were seen by nontraditional students to be encouraging, open-minded, and willing to teach. One student found these individuals to be knowledge and able to instruct in practical methods. This nontraditional student was very satisfied with her experiences in the clinical environment. She described her

instructors as, "they're always willing to help," or "genuinely care about what you're doing."

Is There a Difference in the Way Clinical Instructors and Students Perceive Learning in a Clinical Setting?

Clinical instructors identified four of the same educational opportunities and barriers in the clinical setting as the students: (a) learning opportunities and linking theory to practice, (b) importance of effective interpersonal relationships, (c) supervision and evaluation approach, and (d) sense of acceptance and belonging in the clinical setting.

Learning Opportunities and Linking Theory to Practice

Clinical experiences were viewed as extremely valuable in all three program models. Clinical instructors were committed to their profession as radiographers, and accepted clinical instructor responsibilities. The three participants in this study had a strong sense of mission to guide, instruct, and assist students in their goal to become radiographers. The clinical instructor from the bridging program model commented, "My goal is basically to allow the student to have the best clinical experience as possible." The clinical instructor from the internal program model noted, "I want to create techs that have initiative and that like what they do so that they're happy personality-wise. Their personality makes them happy being there. And then technically I want them to be the best that they can be."

Clinical instructors understood the need to keep students focused on task by engaging them in a variety of daily learning opportunities. They conveyed knowledge, addressed issues that needed improvement and provided effective assessment. The

clinical instructor in the bridging program model facilitated instruction by clarification, linking theory to practice, and guiding students to make connections. She asked students leading questions in a very encouraging and calm manner, "So what can we do?" or "What do you think about your image and collimation?" The internal program model instructor emphasized the importance of clinical experiences: "It's all about experience, and ... you get experience...by being in clinic. So, I think, you can't have too much clinic."

Within the broad context of the objectives, the students could take initiative in pursuing their individual learning goals. Clinical instructors guided the students with their choices. How students and instructors interacted did have an impact on patient care. The clinical experience could be overwhelming for new students attempting to connect with previous learning. The clinical instructor in the external program model realized how unfamiliar these new concepts were to students entering the clinical environment. When students made mistakes she wanted them to learn from each encounter and not to avoid procedures with which they'd had a bad experience.

Students became very comfortable and confident with routine exams due to the repetition of those experiences. But in situations with few patients or procedures that were performed infrequently, learning opportunities were limited which diminished possibilities for integration of new knowledge in different situations. The clinical instructor in the internal program model noted that some technologists did not allow students adequate time to adjust and learn. "You know they're there to learn and they don't know everything and the techs just need to remember sometimes what it's like to be

a student... We've got great ones, we got bad ones and we got ones that are great one day and horrible the next."

The clinical instructor in the bridging model realized the number and types of injuries that patients presented affected students' learning opportunities and integration of knowledge. A lack of patients was detrimental to student learning. Learning opportunities and integration of knowledge cannot be accomplished without patients. Authentic learning situations were essential for students to acquire the knowledge and skills necessary to become competent and proficient. The clinical instructor from the bridging model emphasized:

> Patients are the most; they need to have the exams that they need to learn....They can simulate it on another students or instructor until the cows come home, but it's not ever going to be like doing it on a real patient....Basically, if they're having the exams that they need they're learning, and as they're doing them they're becoming more confident and comfortable.

The clinical instructor in the bridging program model was observed in the clinical setting engaging students in active learning. She created learning opportunities to integrate knowledge when there were few patients. The instructor specifically focused on skills that were least likely to be available, such as a skull series.

Importance of Effective Interpersonal Relationships

There are a variety of ways for instructors to encourage student learning, self-discipline, and self-esteem. The curriculum, instruction, and assessment should allow for collaborative instruction and shared responsibility. Clinical instructors realized the importance of encouraging students to participate in as many exams as possible with a variety of patients and situations. Clinical instructors noticed students in the clinical

environment were not always treated fairly. Students who were perceived to be more capable and aggressive in their learning style received more positive attention from the technologists and clinical instructors. Students with passive, but effective, learning styles were judged to be lazy, lacking initiative, or unmotivated.

Motivation was related to self-regulated learning. Learners used cognitive abilities, learning behaviors, and emotions to accomplish learning goals (Driscoll, 2005). Clinical instructors noted, for some students, several failures did not appear to have any negative effects on their self-efficacy or motivation for learning. For others, one failure diminished or destroyed their confidence. They struggled to sustain a positive attitude toward learning. Students varied in their self-perception and degree of sensitivity.

Several technologists made positive assumptions if students were able to quickly comprehend and perform exams. If technologists perceived students to be aggressive in performing exams, then the students were considered to be learning. Certain technologists did not appear to have the desire or patience to share their knowledge and understanding with students. Some technologists apparently held grudges toward some of the students. Selected students would receive more positive attention than other students. The clinical instructor in the bridging model explains:

> In the clinical setting some of the techs aren't very understanding and I feel that sometimes they treat some students with more priority and give them more attention...They're going to be giving more exams to the more aggressive student than to the more shy student. Or sometimes there are some that just have a grudge. If you do something they don't like they're not liking you for the rest of the two years, and unfortunately that impacts.

A clinical instructor in the internal program model wanted the environment to be supportive of the students' learning styles. If a student made a mistake this instructor felt they should not be labeled with a certain reputation and be treated unfairly. For this instructor, an ideal clinical setting is, "one where students are able to...get in the rooms and do exams and feel comfortable after doing them...and have confidence...that they're not going to be criticized every step."

Clinical instructors emphasized the importance of effective interpersonal relationships in the clinical setting. They strived to have exceptional interpersonal skills. A positive learning environment can be attained through effective social interactions between students, staff technologists, clinical instructors, physicians, and patients. The importance of being tactful was emphasized when interacting with others. The clinical instructor from the internal program model stated, "I've definitely honed my counseling skills. Oh my goodness. Letting stuff hit you and roll off your back you know, you get really tough skin when you're an instructor... And tact, whooo! I had to gain some tact here."

Being open-minded and willing to work through situations helped to ease tensions in the clinical environment. In certain situations sensitivity and understanding were essential to achieve a positive outcome. Attitudes influenced the students' ability to function and learn. The clinical instructor from the bridging program model said she could tell by her students' behaviors whether they had positive or negative attitudes. She stated, "If they're just not wanting to do anything then they're not having a positive attitude. And then, the positive attitude, they're, it's kind of corny to say, but they're

basically shining. You know, enjoying the clinical experience." Clinical instructors found that it was difficult in some instances to be discreet and nonjudgmental while working with a variety of personalities.

Supervision and Evaluation Approach

Clinical instructors identified their role as being a resource for the students: the contact person to supervise, evaluate, advise, and resolve a variety of issues that arose in the clinical setting. They informed students of their clinical responsibilities and provided them with direction and feedback. Clinical instructors helped students become critical thinkers and apply learning in real life situations. Their goal was for students to develop throughout their clinical experience. Communication and the culture of the learning environment were critical for collaborative instruction and shared responsibility consistent with the constructivist approach.

Each student had his/her unique learning experience, so different techniques were required in order to assess student learning. Clinical instructors attempted to adjust their approach to supervision, instruction, and evaluation depending upon the abilities of the student. They encouraged students to be adaptable and flexible in diverse learning situations. Students were asked to reflect on their performance many times throughout the day. As the program progressed the clinical instructors changed from task-based questions to critical inquiry questions. Students attained more independence and responsibility for their performance as they become more proficient. Students were able to "perceive situations as wholes rather than in terms of aspects" (Benner, 1984, p. 27).

Clinical instructors expressed that second year students wanted less direct instruction. Being allowed to think through exams on their own helped them develop self-confidence and critical thinking skills. When clinical instructors or technologists took time to instruct, provide feedback, and offer positive recognition students felt valued. By being accepted and valued, students gained confidence and were less anxious, which contributed to a more successful learning experience.

The quality of interaction between students and technologists and clinical instructors was sometimes inconsistent. Clinical instructors expressed frustration with some technologists that would alter how they performed procedures when they were supervising or working with the students. A clinical instructor explained:

> It's really hard for us as instructors and educators to do our jobs when the techs are constantly saying, "Well you should...Why do they have to do it like this? Why can't they do it like this?" ...If really they would just let the students do the things the way that they learned or just go with how we have things set up. They think about themselves as a tech and...don't understand why we're doing it that way...Then the students see that and say, "Well, why can't we do it that way?" You know they're not reinforcing what they're learning in class.

Clinical instructors realized students wanted and needed to know what was expected of them. They attempted to give students feedback on a daily basis but this was not always possible. Many of the technologists did not provide adequate or timely feedback. Students pointed out some just did not want to teach them. They preferred not to have students involved as they performed procedures. The need to carefully match students with instructors and technologists willing to provide instruction, supervision, and evaluation is important for collaborative teaching and learning.

Sense of Acceptance and Belonging in the Clinical Setting

Clinical instructors observed that students' social acceptance into the clinical department affected their learning. Instructors concurred with student perceptions that they were at the bottom of the totem pole beneath the technologists. There is a need for better cooperation between students and technologists. Students, especially in the internal program, believed they did most of the work. Clinical instructors saw that the culture of the clinical setting is vital to the success of the learning experience. Clinical instructors perceived that some technologists were troublesome for certain students, which hindered them from having the best possible clinical experience. For example, a clinical instructor said if there is a personality conflict a technologist, "can shun a student to where they don't even talk to them or deal with them."

Clinical instructors recognized that technologists were not always patient with students when they made mistakes. The learning environment became stressful for students when technologists were not positive and supportive. Clinical instructors recognized that tensions in the environment decreased students' ability to collaborate with the technologists. Students then felt they were not part of the team. The learning experience could be enjoyable for both technologists and students if technologists had positive attitudes about sharing their expertise and inviting students to participate in procedures. The clinical instructor from the external model noted:

> I think part of it is because everybody learns at a different level. The students that are...more accelerated...I guess they're looked up to because they've learned it quicker and grasped things a lot quicker. And, the other students that...are capable but they're just not there yet. Therefore, you have technologists that, oh she's really good and don't worry about her, and, ah, I've got to stay away from

her today or him today. They're driving me crazy because they don't know what's going on.

Clinical instructors wanted to be positive role models. They wanted the clinical environment to be a place of integrity, respect, self-regulation, caring, and acceptance. As noted by the clinical instructor from the internal model, "As an instructor you're ninety percent counselor, I swear, and ten percent teacher." A pivotal social issue was differing perceptions of acceptable behavior. Fairness was one such issue, especially in the external program model. The clinical instructor commented, "Sometimes I think it is very unfair how students are treated." Certain technologists disrespected students if there were personality conflicts, as the clinical instructor from the external program explains: "If they are working with a student and they don't care for the student, they feel they can talk to them any way they want... They're not as respectful as they could be."

Summary

This study examined perceptions of learning from students and clinical instructors in the clinical setting. Emergent themes included: (a) learning opportunities and integration of knowledge, (b) trust ad fairness, (c) attitudes and socialization to radiography clinical sites, and (d) supervision, evaluation, and recognition. Several implications were identified from this study.

Bridging the gap from theory to practice was accomplished through the students' experiential learning that actively engaged the subject matter, such as procedures or patient care. It appears that the bridging program model was more effective than the external and internal program models in this regard. Students from all three program models recognized the need for connection between what was taught in the classroom

and practical application. Clinical experiences were perceived to be extremely valuable in the learning process. The importance of attitudes and a sense of social acceptance in the clinical environment was noted in all three program models.

The clinical learning environment was a complex social context for students, clinical instructors and technologists. It was a time of transition for students; to synthesize knowledge and skills in a working situation (Chan, 2002). Each clinical setting presented new and varied learning opportunities for student to integrate knowledge in a variety of situations. Each individual and clinical setting was unique as they presented particular values and belief systems. Personality conflicts were identified as being particularly difficult to overcome, often related to communication. Clear communication could be difficult to achieve due to differing perceptions of attitudes, language use, or actions. This was further complicated by the fact of differing cognitive processes for encoding new information.

Clinical settings provided many resources to enhance learning opportunities. Students were allowed to participate in real procedures and patient care activities so they could apply knowledge from their lab and classroom experiences. Learning opportunities and integration of knowledge in the three program models allowed for creativity, and reflective and critical thinking. Learning was dependent upon the clinical environment, interpersonal interactions, student history, available opportunities, educational goals, and course requirements. Students and clinical instructors encountered many challenges that encouraged learning and required professionals to seek more effective learning measures.

Every teaching and learning style could be used to make learning more efficient, effective and valuable. However, care must be taken in the planning stages to utilize the best method for each learning opportunity for each student. It was a challenge for instructors to bring the artistry and science of teaching together for optimal learning. Assessing what went well and what required improvement was the responsibility of both clinical instructors and students in order to bring about a successful learning experience.

Students and clinical instructors said anxiety levels did affect performance. Some students performed very well with a variety of clinical instructors, technologists, and physicians. However, some of these same students noted that being placed with certain technologists or clinical instructors resulted in unsuccessful attempts at procedures they had previously performed well. The students felt uncomfortable, unsure of their abilities, and anxious with those individuals. Students tried to avoid certain technologists, physicians or clinical instructors. Certain technologists did not like instructing or supervising students, producing an undesirable learning situation.

Fortunately, there were few and infrequent high anxiety experiences. These clinical settings are the *real* world of health care professionals. At times there are life and death situations when tensions do run high. Therefore, these experiences may be beneficial for students in preparing them to cope, perform, and remain professional in situations they will face during their careers.

The curriculum theory chosen within a program model will determine how and why decisions were made regarding curriculum change, planning, implementation, assessment and outcomes. These five items are interconnected. As the curriculum is

assessed and evaluated, specific changes affect all parts of the curriculum. "The final goal is to have a curriculum that is derived not only from theoretical knowledge but also from clinical knowledge from the practice setting" (Benner, 1984, p. 273). Constructivists propose that students construct knowledge to make sense of their own practical understanding of their experiences. Individuals react within their environment through their perceptions (Blais, 1988).

Recommendations

This study indicated that various factors in the clinical environment affected the quality of learning perceptions. Students and clinical instructors in the bridging, external, and internal program models recognized the importance of (1) learning opportunities and integration of knowledge, (2) trust and fairness, (3) attitudes and socialization to radiography clinical sites, and (4) supervision, evaluation, and recognition. Specific recommendations for practice related to learning in the clinical setting include; (a) placing an emphasis on a constructivist/integrated curriculum and instructional approach, (b) taking consideration of common educational approaches, (c) taking consideration of attitudes and socialization of students into the clinical settings, and (d) enhancing learning opportunities and integration of knowledge.

Placing an Emphasis on a Constructivist/Integrated Curriculum and Instructional Approach

A constructivist/integrated curriculum and instruction approach would enhance students' learning as they prepare to be radiographers. This conceptual framework is superior because it offers better preparation and a more meaningful program for radiography professionals, for two reasons. First, it allows for a seamless connection

between theory and practice. Second, this approach lends itself to working effectively and successfully with a broad diversity of patients. The role of the radiographer (R.T.) continues to change to meet new demands in the workplace. "Future roles for the R.T. will be less about information learned and more about accessing the knowledge needed... the way R.T.s learn has shifted from having to 'learn everything all at once' to needing to learn how to learn'" (Lipman & Powers, 2006, p. 265).

Clinical instructors should acquire a wide repertoire of methods, and strategies to connect and communicate with students. Students need diverse, intricate, and irregular examples to be prepared for novel problems and solutions. "Our ability to draw on previous knowledge in new situations is also very much influenced by how it is organized" (Prawat, 1989, p. 318).

The organizational structure of the three program models was influential in student learning. Giving students a conceptual framework prior to the clinical experience provides a knowledge base to enable them to participate, meet expectations, and make meaningful connections within the clinical environment. Engebretson & Littleton (2001) present a constructivist-based model that includes social values and beliefs to accommodate the health care system and the social context. The three radiography program models expressed the attributes of this model in the four themes presented in this study. This constructivist-based model's assumptions include:

1. Health care occurs in a social context. Thus, the general culture and the cultural heritages of the person interacting in any health care process influence any health care encounter.
2. Self –determination is a foundation for health care interaction. This recognizes the agency of the client in any encounter.

3. Health care is an interactive process requiring the participation of both client and health care provider.
4. Both client and provider bring expert knowledge to the interaction. (p. 224)

Clinical education is a complicated process for both students and educators. A constructivist/integrated approach includes characteristics of learning through collaborative effort. These characteristics also show that the process is important to the learning outcome. Educators should be aware that potential knowledge is unlimited, and that motivation is within the learner. There ought to be various methods and viewpoints in the learning process. Learners need to define their individual learning goals. Learners must be active in seeking meaning and making connections based on experiences and the environment. The constructivist approach takes into account that the learners have to make learning meaningful for themselves (Driscoll, 2000). These characteristics of constructivism are valuable for the broad diversity of learning required for students in the clinical environment. This will make available to students the knowledge, skills, and collaborative ability necessary to be successful as professional radiographers.

Taking Consideration of Common Educational Approaches

The three curriculum theories presented; Tyler's prescriptive approach, Walker's descriptive approach, and Eisner's critical-exploratory approach, would be beneficial during different stages of the clinical experience. Students want and need to know what is expected of them. Novices typically require a more prescriptive approach because they have minimal experience of the situation in which they are expected to perform (Benner, 1984). Tyler presents a rational and logical approach to the behavioral tasks to be measured. As students gain more theory knowledge to complement their clinical

experiences, more critical thinking skills are required. Students in the three program models felt that learning in the clinical settings was better when they were allowed to think through situations independently or with their peers. Knowing they had support from the clinical instructor or technologists when needed provided them the confidence to think critically and complete a variety of procedures.

The critical-exploratory theory is an ideal approach for a high percentage of clinical experiences because this type of education is variable and students need to process information in a dynamic way. Students are in an environment where they will have to process and evaluate a variety of views and values. Sometimes there are numerous practice methods available to achieve the necessary outcome(s). Clinical education is a complex process involving instructors, patients and students. Eisner (2002) emphasizes interaction between teachers and students, which can provide both with more ownership of the curriculum.

Instruction should utilize objectives and assessments to meet the goals of constructivism. Moving from behaviorism, with its learning based on specific desired goals, to constructivism, where learning is determined by the student's previous knowledge and experience requires instruction to be changed to support student needs. For example, instruction would provide complex information from real life to challenge student thinking and relate this to previous experience. This would mean that objectives would become less defined. Students should discover new viewpoints from a wide diversity of individuals with different backgrounds.

The curriculum approach can provide options for the diverse needs of clinical education. The curriculum should be designed with various factors in mind, including student interest, societal needs, subject, and technical advancements. Eisner's approach is the most valuable since clinical education is both an art and a science directed toward those factors. His belief in educational imagination allows students to develop critical thinking skills (Eisner, 2002). This is important since clinical education requires meaningful outcomes. In clinical education there should be flexibility for both instructors and students. Eisner's approach allows such flexibility of reflection and enactment.

Taking Consideration of Attitudes and Socialization of Students into the Clinical Settings

When students participate in various clinical settings it is important to realize the effect that a particular environment will have on each student. Brandon suggests that the environment is "a major transmitter of values... It is an environment that can have a profound impact on souls. No one can remain unaffected by how he or she is treated...nor by the ethical behavior witnessed in associates and superiors" (as cited in Montgomery and Decaro, 2001, p. 2).

Students were motivated to learn when they perceived learning to be in their best interest. Students were motivated to learn in the clinical setting when they perceived themselves as capable and competent. Learning was enhanced when they could ask open-ended questions in a non-threatening atmosphere. Student motivation was affected by the extent to which technologists or clinical instructors provided individual instruction and accommodated student-learning styles. The level of belonging and acceptance

students sensed also affected motivation. Fennimore and Tinzmann stated, "by emphasizing the connection to their own experiences and attitudes, the guidelines, when implemented, would validate students' experiences and enable them to become competent 'knowledge workers' in the various disciplines" (1990, p. 15).

Students received supervision and instruction from different technologists, clinical instructors, preceptors and physicians. Technologists vary considerably in their acceptance of, and instructional approach to, students. Students sometimes found that success depended on personality issues and being accepted more than learning procedures. Clinical sites should implement mentoring strategies for technologists aimed at consistency in instruction, supervision, and evaluation. Clinical education professionals should help students restructure their thinking by resolving dissimilarities and reaching shared understanding; a key principle of constructivism (Cobb, 1998).

Enhancing Learning Opportunities and Integration of Knowledge

Authentic pedagogy, which is congruent with the constructivist paradigm, is integrated throughout these students' learning experiences in their respective program models. Students apply knowledge learned in classes and labs to skills in their clinical rotations. Students do not just observe their mentors and instructors. They are actively engaged in radiography procedures and patient care alongside professionals in the field.

Assigning students to later shifts and weekend rotations would be beneficial to optimize learning opportunities and integration of knowledge. On other shifts, opportunities were limited for students to engage in multiple trauma cases since these types of procedures were more prevalent during these shifts or rotations. Currently

accreditation restrictions limit these rotations, requiring specific objectives for the use of late or weekend shifts. Even with these specific objectives those rotation assignments are limited.

With the changing landscape of radiography, certain formerly routine procedures are less available than in the past as learning opportunities. New technologies are enhancing general radiology and other imaging modalities such as computed tomography (C.T.). Radiography programs need to address this new environment. C.T., Magnetic Resonance Imaging (MRI), Nuclear Medicine or Diagnostic Ultrasound is replacing certain procedures. Educators in radiography need to continue to evaluate the curriculum to address new learning opportunities. This may include adding content and clinical experiences from other imaging technologies into general radiography. To meet the needs of society, students, and patients a more inclusive imaging base should be considered.

Recommendations for Future Research

Learning perceptions shared by students and clinical instructors can enhance the quality of radiography education in the classroom and in clinical practice. Students, clinical instructors, radiographers, and faculty can benefit from identifying challenging learning opportunities. This study presented constructive information and insight from the perceptions of students and clinical instructors. This study was accomplished when these students were in the middle of their second year of their respective program. A longitudinal study would be beneficial, following radiography students and clinical instructors through the two year program of study could have the potential to provide a

greater understanding of the complex learning environments for connecting theory to clinical practice.

A qualitative study of clinical instructors' and technologists' professional experience and educational preparation for this process would also be valuable. Technologists should be included in the investigation since their role is instrumental in the students' learning process. Do they have the necessary skills and knowledge to facilitate student supervision, instruction, and evaluation while balancing patient care and negotiating interpersonal relationships?

Also valuable would be a study of differences and similarities between traditional and nontraditional students in radiography programs. Such a study should consider criteria other than age to define the traditional or nontraditional student. Knowing more about students, faculty, clinical instructors, and technologists will help identify potential barriers in the learning process.

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APPENDIX A

STUDENT INTERVIEW GUIDE

During the next hour you will be asked questions related to your views on your clinical experiences and learning. Demographic data will also be asked. There are no right or wrong answers. I am basically trying to find what attributes and interactions are shared by students like you who are participating in different clinical environments. A semi-structured interview outline will be used as a principal strategy for the data collection. If at anytime you feel you want to add more information than the questions call for, please do so.

Opening Questions

1. Describe your best clinical day.
2. Describe your worst clinical day.
3. What interests you most when you are in the clinical environment? Why? Examples?
4. What interests you least when you are in the clinical environment? Why? Examples?
5. Why did you select this specific program (certificate, AAS, AS)?
6. Do you value your clinical experience? Why?
7. What attracted you to radiology as a career?
8. What would you like to see changed in the clinical environment?
9. What made the greatest impact on you as a student in the clinical environment?
10. What do you want to accomplish in the clinical environment?

Content Knowledge

1. How did you learn radiography?
    - What skills or knowledge did you acquire prior to your clinical experience?
    - What skills or knowledge did you acquire during your clinical experience?
    - What skills or knowledge did you acquire concurrently in the classroom and during your clinical experience?

2. What did you learn in procedures class and/or in patient care class that was applied in the same or different method at the clinical site?
    - How did your ideas about procedures or patient care change as you participate in the clinical environment?
    - Did you feel prepared to participate in the procedures that you have completed in class? Provide an example.
    - Did you feel prepared to participate in patient care activities? Provide an example.

3. Which experiences are you more confident in your abilities to perform? Why?

4. Which experiences are you less confident in your abilities to perform? Why?

Relationships

1. Do you feel comfortable or part of the clinical department that you are assigned? Why?

2. Do you feel that you are valued in the clinical setting?

3. What are desirable qualities or characteristics of clinical instructors, and radiographer that you admire, find most helpful? Describe a really good instructor, then radiographer.

4. Do peers impact your clinical experience? How?

5. Do you feel that you are treated with respect at the clinical site?
    - Do clinical instructors or staff talk negative about you or another student to others?

6. Do you feel the clinical site has approachable clinical instructors and staff? Examples.
    - Do you feel intimidated by staff, instructors, physicians or patients?

7. Do you feel all students are treated fairly? Examples.
    - Do you perceive any cliques at the clinical site?

Communications

1. Who do you communicate with most often at the clinical site?

2. Do you understand how to use the various technologies to communicate in the clinical setting? Can you provide some examples?

3. How are attitudes at the clinical sites communicated to you?

4. Do you feel that you were prepared to effectively communicate with the patients that you provided care?

6. Do you feel the staff and clinical instructors are professional in their communications with you as a student? With other medical professionals?

7. Do you feel the clinical instructors and staff listen to you?

Approach or Philosophy to Instruction

1. What facilitates your learning in the clinical environment?
   - Are the instructors or staff open minded and flexible as you are learning and participating at the clinical site?
   - Did you feel there was a desire to teach and encourage you to understand? How? Can you think of an example?

2. What is detrimental to your learning in the clinical environment?

3. How are you provided instruction in the classroom? In clinical? Provide examples.
   - Were you told step by step how to apply the information? Provide examples.
   - Did you watch and model what was done? Provide examples.
   - Were you placed into the situation to participate and allowed to consider the best approach? Provide examples.
   - Were you provided with multiple perspectives and multiple ways of applying what you are learning?
   - Are you encouraged to participate (hands on) in procedures and patient care or observe? Can you provide examples?
   - Was it a combination of approaches to instruction? Provide examples.
   - How were procedures or patient care presented to you at the clinical site?

4. How did you learn to apply new skills or knowledge at the clinical site?

5. Do you receive feedback? How? By Whom? How often?

6. Do you identify your own learning goals?

7. What motivates you as a student to learn?
   - Are you motivated to learn by becoming more confident in you your knowledge or by rewards from an expected result?

8. Do you feel that you are accountable for your learning? (ownership, metacognition) Why? Why not?

9. When you have a problem or a difficult choice to make as a student, how do you go about solving it? What do you do? To whom do you go? Could you provide an example?

12. What type of instruction, supervision or evaluation do you prefer when participating in the clinical environment?
   - Did or do you fear making a mistake or needing to repeat an exam? Why or Why not?
   - Do you think you have too much or too little supervision? Why?
   - Do you feel the clinical instructors, radiographers or physicians perceive you more as a worker or as a learner? Why?

Ending questions for the interview:

Would you be willing to allow me to observe your clinical interactions in your clinical setting?

What have you learned from this interview about your experiences in the clinical setting?

APPENDIX B

CLINICAL INSTRUCTOR INTERVIEW GUIDE

During the next hour you will be asked questions related to your views on your clinical experiences and learning. Demographic data will also be asked. There are no right or wrong answers. I am basically trying to find what attributes and interactions are shared by clinical instructors like you who are participating in different clinical environments. A semi-structured interview outline will be used as a principal strategy for the data collection. If at anytime you feel you want to add more information than the questions call for, please do so.

Opening Questions

1. Tell me about your role as a clinical instructor.
2. What do you want to accomplish in the clinical environment?
3. Describe your best clinical day?
4. Describe your worst clinical day?
5. What would you like to see changed in the clinical environment?
6. What makes the greatest impact on you as a clinical instructor in the clinical environment?

Content Knowledge

1. As a clinical instructor what knowledge and skills are needed?
   - What skills or knowledge did you acquire prior to you becoming a clinical instructor?
   - What skills or knowledge did you acquire during your experience as a clinical instructor?
2. What characteristics do you have that you think others may identify you as a knowledgeable clinical instructor?

3. How did your ideas about procedures or patient care change as you participate in the clinical environment as a clinical instructor?

4. Which experiences are you more confident in your abilities to perform? Why?

5. Which experiences are you less confident in your abilities to perform? Why?

6. Did you feel prepared to instruct, supervise and evaluate students as a clinical instructor? Provide an example.

Relationships

1. What are desirable qualities or characteristics of students, and radiographers that you admire, find most helpful? Describe a really good student, then radiographer.

2. Do peers impact your clinical teaching? How?

3. Do you feel comfortable or part of the clinical department that you are assigned?

4. Do you feel that you are valued in the clinical setting? Are clinical instructors valued by administration, your peers, and by the students?

5. Do you feel that you are treated with respect at the clinical site?
   - Do students or staff talk negative about you or other medical professional to others?

6. Do you feel that the clinical site has an approachable staff and other medical professionals?
   - Do you feel intimidated by students, staff, physicians or patients?

7. What rewards or recognitions do you receive as a clinical instructor?

8. Do you feel all students are treated fairly?

Communications

1. Who do you communicate with most often at the clinical site?

2. Do you understand how to use the various technologies to communicate in the clinical setting? Can you provide some examples?

3. How are attitudes at the clinical sites communicated to you?

4. Did you feel that you were prepared to effectively communicate with students and patients that you have provided care as you are teaching?

5. Do you feel students are professional in their communications with you as a clinical instructor?

6. Do you feel other medical professionals and staff listen to you?

Approach or Philosophy to Instruction

1. What facilitates the students' learning in the clinical environment?

2. What is detrimental to the students' learning in the clinical environment?

3. How do you define an educational clinical setting?

4. How do you provide instruction in clinical? Provide examples.
   - Do you provide instruction by telling students step by step how to apply the information? Provide examples.
   - Do you have students watch and model what was done? Provide examples.
   - Do you place the student into the situation to participate and allow them to consider the best approach? Provide examples.
   - Do you encourage students to participate (hands on) in procedures and patient care or observe? Can you provide examples?
   - Do you use a combination of approaches for instruction? Provide examples.
   - Do you provide multiple perspectives and multiple ways of learning? Examples?

5. What type of instruction, supervision or evaluation do you prefer when participating in the clinical environment? Provide examples.

6. How do you encourage students to apply new skills or knowledge in the clinical setting?

7. How do you provide feedback to the students? How? How often?

8. What do you value about teaching clinical and learning?

9. When you have a problem or a difficult choice to make as an instructor, how do you go about solving it? What do you do? To whom do you go? Could you provide an example?

10. Do you think the radiographers at the clinical setting are open minded and flexible as students are participating and learning?

11. Do you feel the students are treated more as a worker or as a learner? Why?

12. Do you fear making a mistake or needing to repeat an exam with a student? Why or Why not?

Ending questions for the interview:

Would you be willing to allow me to observe your clinical interactions in your clinical setting?

What have you learned from this interview about your experiences in the clinical setting?

APPENDIX C

STUDENT DEMOGRAPHIC DATA RECORD

Date of interview_____ Location of interview_____

Time of interview_____

Participant code number_____ Age of Participant_____

Gender of Participant_____ Ethnicity_____

Married_____ Single_____

Program type: Certificate Community College Private

Terminal award granted from program: Certificate AAS AS

Number of peers in program_____

Prior educational preparation:

APPENDIX D

CLINICAL INSTRUCTOR DEMOGRAPHIC DATA RECORD

Date of interview_____ Location of interview_____

Time of interview_____

Participant code number_____ Age of Participant_____

Gender of Participant_____ Ethnicity_____

Married_____ Single_____

Program type: Certificate Community College Private

Terminal award granted from program: Certificate AAS AS

Number of students in program_____

Prior educational preparation:

Total number of years experience in radiology:

Total number of years teaching in radiology:

Teach only in the clinical setting: yes_____ no_____

Other teaching responsibilities (please specify):

APPENDIX E

FOCUS GROUP INTERVIEW GUIDE QUESTIONS

1. What do you like most about your educational program?
   - Experiences? Events? Interactions?

2. What aspects of your clinical experiences have had the greatest impact?
   - How were you involved? How did you feel? What did you learn?

3. Can you relate connections between your classroom experiences and your clinical experiences?

4. How do you feel your clinical setting affects your learning?
   - Can you identify areas of personal and/or professional growth?
   - Have you thought about leaving this profession?
     - Why did you stay?
     - Did certain individuals or events influence your decision to stay? Why?

5. What have you found to be most frustrating in the clinical setting?
   - Can you identify the point of frustration? What can be done to improve learning in the clinical setting?

6. Are peer connections in the clinical setting important?
   - To what degree? More important than clinical instructors? Positive or Negative?
   - Are peers treated fairly? Can you describe some peer interactions? What were some problems and how were they approached? By whom?