GENDER ROLES, SOCIALIZATION, AND HIERARCHY IN AN ALLIED HEALTH
PROFESSION: RADIOGRAPHY STUDENTS' CONSTRUCTS OF SELF AND THE
PROFESSION

By

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ABSTRACT

Diagnostic medical imaging has typically been a feminized profession for decades, however, since the early 1990's, has increasingly attracted more men into the field, where now, the gender make up for diagnostic imaging is near parity. Medical imaging is a dynamic field comprised of ever evolving technology and sub-imaging fields, referred to as imaging modalities, including computed tomography, magnetic resonance imaging, mammography, cardiovascular imaging, and nuclear medicine, to name a few. Diagnostic imaging is now described as where the new "hot" jobs are located, and entrance into the field has continued to grow by more than 11 percent each year. This study is designed, through the interviewing of 39 men and women from two radiography programs located geographically 50 miles from one another, to explore the interest of men entering a feminized field characterized as a "high touch" profession, with occupational characteristics that consist of a broad mix of patient care/technology skills. While there is focus on men entering imaging, exploration of the interests of women entering this highly technical and physically challenging profession is a large part of this study, as radiography is feminized yet does not hold necessarily the occupational characteristics consistent with that of feminized fields. Additionally, this study is designed to determine what male and female perspectives are of the profession, as medical imaging has been characterized as consisting of "subordinates" who work under nurses, doctors and radiologists, occupational characteristics that do not typically attract men.

CHAPTER 1

INTRODUCTION

Statement of the Problem

"Empirical research has established that men are concentrated in occupations thought to require agentic (self reliance, individualism, dominance, ambition) personality characteristics, whereas women are concentrated in occupations thought to require communal (eager to soothe hurt feelings, kindness, being affection) personality characteristics"(Carli and Eagly, 1999; Colley, 1998; Eagly, 1987).

It is 7:30, with an already busy day just starting. As a radiography student, you are on your third day of clinical externship, on your first year semester rotation. You are assigned to do two weeks of portable radiography with a senior male technologist who has been in the field for 15 years. The schedule for the day is hectic, and the senior tech is not in a good mood, already complaining as the two of you make your way to the seventh floor of a busy level one trauma center, complete with the most advanced imaging technology in all aspects of diagnostic and other imaging methods. The veteran technologist is not pleased to be working with students, as they "slow him down," or with the prospect of taking radiographs with the new digital/computerized system, a fact he voiced freely while in the elevator with the heavy portable machine (one of the older machines in the department and scheduled to be replaced next year). While in the elevator, the technologist complained to you that "this new equipment has taken away all the challenges of x-ray, playing around on the computer all day, I don't even like computers." You shrug your shoulders, not certain how to answer this particular technologists, feeling intimidated, as yesterday he lost his patience with you while you struggled to position a comatose patient for a chest x-ray and actually pulled out a

electrocardiograph lead wire. The nurse in charge of the patient lost her temper with you as well, stating, "those techs, they are always messing with my patients, gives me more work to do." You realize, with a sinking heart, as you make your way, that the same patient from yesterday needs a follow up chest radiograph as his physical status has changed for the worse.

It is then that you start to question and doubt your choice of career, with the oftentimes heavy and sick patients, dealing with difficult, cumbersome old equipment, coping with the new changes in technology that has thrown the department into flux, and being "yelled" at by physicians, radiologists, nurses and technologists. Fortunately, the chest x-ray exam goes smoothly with no mishaps and the radiographs are perfect. This time, the senior tech patted you on the back for a job well done, and perhaps, you made the right decision after all. Although progressing through the externship training will be difficult, the future goal of becoming a computed tomography (CT) technologist and making "really good money," will bring positive changes.

Such is the day of a radiography student, just one of many who train in hospitals and free standing imaging centers throughout the nation, and have similar stories to share with fellow students, stories I am privileged to hear, given my current position as Program Director for a Program located in California. Furthermore, though the field is advancing and the technology is constantly changing, the stories of the then primarily female radiographers who trained back in 1977 are strikingly similar to the current students':

> "I remember that the first thing that the new students, when they were in the hospital, the first thing that the new students took on was the portable x-rays. So

then when you became a second-year student you could turn it over to the first year. And you are talking about a 1200-bed hospital and the portables were just incredible. I remember being sent up to the cardiac intensive care and then doing a portable chest x-ray and looking at these patients with their chest open and thinking you want me to touch that patient and then having the x-ray not come out and have to go up to the floor and tell the nurse you have to repeat it. It could be very humiliating." (Gaul, 2003).

Thus, these stories tell the tale of difficult work students experience during training and then as employed technologists, yet, now, in the 21st century, radiography is a burgeoning medical field, described as the new "hot" job (Cullen, 2003; Thottam, 2003) where this medical profession has grown into one of the leading short-term degree programs (two years or less) that lead directly into employment. Additionally, with radiography, there are options of advancing into other imaging modalities (American Society of Radiologic Technologists (ASRT, 2002; ASRT, 2004) where skills can be learned on the job (with additional examination certification), as in computed tomography scanning, magnetic resonance imaging, special procedures/interventional radiography, and mammography, while other modalities require eight to twelve months of additional educational background, training and certification, as in nuclear medicine, radiation therapy and ultrasound.

With an increase in enrollment levels across the country for radiography programs have come waiting lists for entrance, with some lists running as long as two to three years (Ramirez, 2006). According to Ahn (2003) radiography programs across the country have been operating at full capacity as of 2002, and the American Registry of Radiologic Technologists (ARRT) reported a 10 percent increase in first time Radiography examination candidates from 8287 in 2001 to 9080 in 2002 (Ahn, 2003). Most recent,

the ARRT reported an overall increase in first time examination candidates by 11.1

percent over the previous year, with a demonstrated upward trend continuing as of the

past five years (ARRT Educator Update, 2006).

However, radiography as a medical imaging profession has not always been the

"hot" occupation to pursue, where in the past the demand for applicants to enter programs

was not being met, thereby creating a shortage of radiographers with the needs of the

healthcare industry going unmet (Jensen, 1989). A "smaller percentage of college and

university students" applied for admission to these programs, with the "problem

attributed to low pay, high stress, fewer benefits than in other fields, and fear of

communicable diseases" (Jensen, 1989, p. 297-298). However, now, and perhaps

enigmatically, for the past five years the number of applicants has increased, while the

working conditions of radiography have not significantly changed, and, if anything, have

become more hazardous. Throughout the years, there has always been the threat of

exposure to infectious and communicable diseases, however, some diseases have

resurfaced as in Tuberculosis, or emerged, as in Acquired Immunodeficiency Syndrome,

and the hospital born infection that carries with it extreme risk, Methicillin-resistent

Staphylococcus aureus (Saia, 2006; Gurley and Callaway, 2002). These infectious

diseases are constant reminders of the hazards of the job.

Additionally, radiography, consists of similar occupational parameters and,

subsequently, risks, that are also associated with nursing, where there is the threat of

needle (or "sharps") sticks, exposed to blood and bodily substances, and on the job

injuries as in lower back problems that are the direct result of constant lifting and moving

of patients. Different from nursing, there is the continuous exposure to radiation, regardless of radiation protection principles taught in the classrooms and reinforced in the work environment. To offset the radiation exposure, on any given day technologists must wear hefty lead aprons during live action radiography (fluoroscopy), and maneuver heavy portable equipment throughout hospital hallways while conducting out of the department exams (Gurley and Callaway, 2002). Moreover, radiographers must deal with traumatic injuries, Pathologic conditions constitute the main element to this job, as sickness and traumatic injuries are not romanticized or glamorous, and if anything, can be emotionally draining. Dealing with injured or ill patients is difficult, and carries with it mental strain and emotional fatigue. As technology has advanced, so too has the ability for the patient caseload to increase, with the turnaround time for most exams averaging less than 30 minutes (Ballinger, 2004). Finally, in a given day, radiographers might stand on their feet for eight hours or more, thus, it is best to describe radiography as a physically, emotionally, and mentally challenging field to work in (Jensen, 1989; Cockburn, 1985).

While these predominantly community college[1] programs are only two years in length, this does not signify an easy educational path, and the curricula has been described as "challenging," often leading to high attrition rates (Jensen, 1989). In addition to having to complete coursework intense in physics theoretical concepts, radiographic exposure equations, patient care principles, medical/radiographic terminology, anatomy and physiology, equipment operation, medical ethics and other

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[1] In the past, radiography programs were once housed in hospitals, and therefore affiliated with that particular facility. The number of hospital-based programs is slowly decreasing, with the majority of radiography programs housed in two-year community colleges. Some programs are housed in four-year universities, while others are situated in proprietary institutions (JRCERT, 2006).

pertinent topics related to the profession and medicine (Gurley and Callaway, 2002),

students must also complete a number of unpaid clinical externship training hours, where

they are, in essence, utilized as "free" labor, and under constant observation for potential

employment. It is difficult to hold a job while training weekly, completing eight hour

shifts while simultaneously taking challenging courses which can require up to four hours

or more of outside study time, thus these programs are a test of endurance, and to survive

both financially and academically for the required two years is not always manageable.

With the upsurge of applicants into programs across the country there has been a

gradual increase in male applicants, particularly in the 1990's (see Table 1), whereas for

decades this field did not attract males. From the 1920's and forward, radiography has

been comprised primarily of women, thus described as a "feminized field" (Witz, 1992;

Cockburn, 1985; Larkin, 1983; Larkin, 1978), with many programs across the country

consisting of all female classrooms, in particular during the 1960's and 1970's (Gaul,

2003; Greenfield, 1966).

Table 1 IPEDS Data set – Associate degrees conferred in Radiography Programs

YEAR	TOTAL OF STUDENTS	MALES	FEMALES
1986-87	2968	816	2152
1987-88	2906	775	2131
1988-89	2981	803	2178
1989-90	3377	929	2448
1990-91	3763	1072	2691
1991-92	4351	1243	3108
1992-93	5406	1594	3812
1993-94	5966	1871	4095
1994-95	6339	1987	4352

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "completions" surveys (Morgan, 2002; Morgan, 2006).

Therefore, with these facts in mind, it is not necessarily so straightforward to

attempt to describe the gender make up of radiography. What this statement indicates is

that it is common knowledge to researchers and educators that sex segregation of the occupations exists, based on, among other issues, closure to well paying, highly technical occupations for women, coupled with the concentration of women into, by proxy, low-paying, female dominated occupations (Jacobs, 1999). Yet, women have dominated this once male dominated, highly technical, and physically demanding profession for decades (Witz, 1992; Cockburn, 1985; Larkin, 1983; Greenfield, 1966), and now, in the 21st century, more males (ASRT, 2001; ASRT 2004) are entering this feminized profession where patient care and nursing skills are a daily part of the job.

Given this, then, it is of essence to call upon the histories of both radiography and nursing, in order to gain insight towards the inception, formation, growth and feminization of the allied health professions. With the historical reference, we can decipher how both professions have undergone radical changes over time, particularly with the occupational parameters, where the specialty areas have branched off based on technical changes to the medical industry. Recall that radiography as a medical field has been feminized for years, consisting of "gendered" occupational parameters, where women performed the radiographs and attended to the patients, while the male radiologists dictated the radiographs, ordered the exams, and controlled the profession (Croissant, 2000; Witz, 1992; Larkin, 1983; Larkin, 1978; Cockburn 1985). However, the history of this profession is complicated at best, and a story that describes medical dominance, subservience and control, not quite what was envisioned by the independent male radiographers and electrical engineers who "tinkered" or repaired the equipment while providing medical images (Croissant, 2000; Witz, 1992; Larkin, 1983; Cockburn,

1985). Unlike "traditional craft industries as in construction," radiography as an allied health profession is considered a "subordinate field," where the "crafts" of this particular health service is "hierarchically ordered and controlled" by physicians (Brown, 1973, p. 435). The "top occupations" act through a variety of industry wide organizations, as in the American College of Radiology (ACR), and the Joint Commission on Accreditation of Healthcare organizations (JCAHO) to maintain a division of labor to its advantage (Brown, p. 435).

The regulation of radiography brought about significant changes to the profession with the implementation of licensure/certification, control of interpretation of the medical images, and increased demand for nursing/patient care skills. Furthermore, the changes served to created a demarcation between radiographer and radiologists, leading to the eventual change in the gender workforce from predominantly male in the 1900's to female dominated throughout the decades (Croissant, 2000; Witz, 1992; Cockburn, 1985; Larkin, 1983; Greenfield, 1966).

Conversely, nursing too has had to struggle for legitimization of this female dominated profession, where for years the work that nurses perform has been highly undervalued, yet is dichotomously an extremely necessary occupation, where physicians have depended to great degrees on the nurses to be their "eyes," where the powers of nursing observation and close interaction with patients served to guide each physician, who had "no real opportunity for persistent observation" (Witz, 1992; Croissant, 2000; Sandelowski, 2000, p. 70).

Furthermore, nursing, as a feminized profession, has not been considered a highly technical field, instead referenced to and known to be a "high touch," profession that is well known for the patient care aspects. Sandelowski (2000) informs us that nursing "was once a profession primarily associated with body work," (Sandelowski, 2000, p. 44) and nurses attended to the "domestic practice" of patient care, as in the bathing, bed making, feeding and cleaning (Sandelowski, p. 45). Now, the domestic patient care "household chores" have been handed down to the ancillary personnel, as in certified nursing assistants and nursing aids (Sandelowski, p. 103).

With changes in ancillary duties, and advent and increased implementation of technology and information technology, nursing as a profession has changed dramatically. Beginning back in the 1950's nurses began to use devices that changed the nature of nursing "watchful care," where, with the invention and implementation of "machine monitoring" in daily nursing practice, "nursing observation was transformed from a largely embodied relation with patients and devices to an increasingly hermeneutic relation with devices" (Sandelowski, p. 135). As changes to the nursing profession have occurred, so to have nursing specialization areas sprouted as technology has advanced. Specific areas within medical facilities have become semi-independent specialty fields that have serving to create the "semi-professional" nursing specialty areas, as in operating room nursing, emergency room nursing, obstetrics and gynecology nursing, intensive care nurses and so forth, who work with highly technical and computerized equipment on a daily basis (Sandelowski, p. 156).

However, even with implementation of increasingly sophisticated technology, and specialization within nursing, Sandelowski (2000) informs us that nursing is a considered a case among the professions, where the "technologizing" and bureaucratizing of health care failed to "wholly professionalize nursing," (Sandelowski, p. 179). According to theorists, "professional status is said to be enhanced when an occupational group acquires what are deemed higher level skills and more responsibility and when members can delegate" what are considered lower level skills to ancillary personnel (Sandelowski, p. 179). Unfortunately, such actions, as in what occurred with nursing, served to make "nurses vulnerable to substitution by the ancillary personnel," thereby, in a sense, "deskilling" nursing when such "activities were delegated" to the other medical staff members (Sandelowski, p. 179). As these activities were transferred to the ancillary staff, the knowledge and power nurses once had by virtue of their constant presence at the bedside, and their unmediated relationship with patients" diminished, and "deskilled" nurses (Sandelowski, p. 179).

Radiography in a sense and when compared to nursing, has undergone a similar struggle for legitimization, and has undergone extreme transformation based on the changes to technology. Now becoming more and more technologically sophisticated, where once the field was about taking radiographs for diagnosis and interpretation, it is now about the specialty imaging areas, where the advent and implementation of such advanced arenas including CT scanning back in 1985 (Cockburn, 1985; Barley, 1982; Ballinger and Frank, 2003) have proven to yield additional job mobility and higher pay. Other imaging modalities also yield additional job mobility and higher pay, as in special

procedures, MRI, and nuclear medicine, to name a few. Over time, the specialized

imaging modalities, for example mammography, special procedures and nuclear

medicine, require additional training, certification and licensure (ARRT, 2002; ASRT

2004). Thus, it is no longer just about working in diagnostic, imaging itself has changed

and branched off into "semi-professions," that have changed the nature of imaging to a

restructured profession made up of semi-professions that have served to change the

nature of the occupation, by challenging the traditional vertical division of labor, where

now, the semi-professions are more of a horizontal division of labor (Barley, 1996).

Additionally, one has to consider literature on occupations, as this study is

concerned with gender and the occupations, thus, upon review of the literature, we find

that many occupations and professions remain stubbornly sex-segregated (Jacobs, 1999;

Roos and Gatta; 1999; Carli and Eagly, 1999), where the technical and high paying

professions have been "gendered masculine," while those "lower-paying" professions

existing of the nurturing, people-oriented occupational descriptions, are gendered

feminine (Cockburn, 1985; Croissant, 2000). As the professions and technology are

gendered, thereby the composition of the professions has been structured around the

perceived nature of the work, where occupations are either feminized or masculinized,

and more or less suited for different kinds of individuals. Technological professions are

"gendered masculine," while nurturing, helping professions are "gendered feminine"

(Croissant, 2000; Cockburn, 1985).

Occupational demographics reveal how the gender make up for particular fields

as in "patient care" nursing (see Figure 1), and "technical" engineering (Seymour and

Hewitt, 1997, p. 22) have stayed consistently gendered. However, this has not been the

case with radiography, for, on its face, and according to the daily equipment manipulation

involved, radiography is a technical field that should be "masculinized," yet women have

made up workforce as depicted in Table 1 and Table 2. Furthermore, in accordance with

the literature, "typical" males (Jome and Tokar, 1999; Jacobs, 1999; Lemkau, 1984) are

not attracted to feminized professions where the gendered feminine skills (nurturing,

patient care) are commonplace (Jome and Tokar, 1999; Lemkau, 1984). Radiography as

a profession does not hold the occupational characteristics (patient care skills,

subordination, low paying) considered attractive for men, yet, since the 1990's the

population of male technologists has remained consistently at 30 percent, or higher (see

Figure 1, and Table 1).

Table 2: Gender of First Time Examinees – ARRT Exam 1995-2005

YEAR	FEMALE	MALE	TOTAL	%FEMALE
1995	6772	3558	10330	65.6
1996	6407	3020	9427	68.0
1997	6147	2544	8691	70.7
1998	5865	2281	8146	72.0
1999	5634	1961	7595	74.2
2000	5414	1735	7149	75.7
2001	5775	1659	7434	77.7
2002	6362	1804	8166	77.9
2003	7343	2284	9627	76.3
2004	8639	3221	11860	72.8
2005	9228	3972	13200	69.9

Source: ARRT Database, 2006.

As a "feminized" occupation, radiography now holds a large population of males,

where this creates a rather enigmatic point, as to why radiography attracts more males,

over nursing, also, and as mentioned, considered to be a high paying patient care

profession, yet in 1999-2000 males consisted of a small population, under 8 percent (see

Figure 1). The ratio of males to females in both radiography and nursing differ

significantly.

Figure 1 – IPEDS Completions data, nursing and radiography, 1999-00.
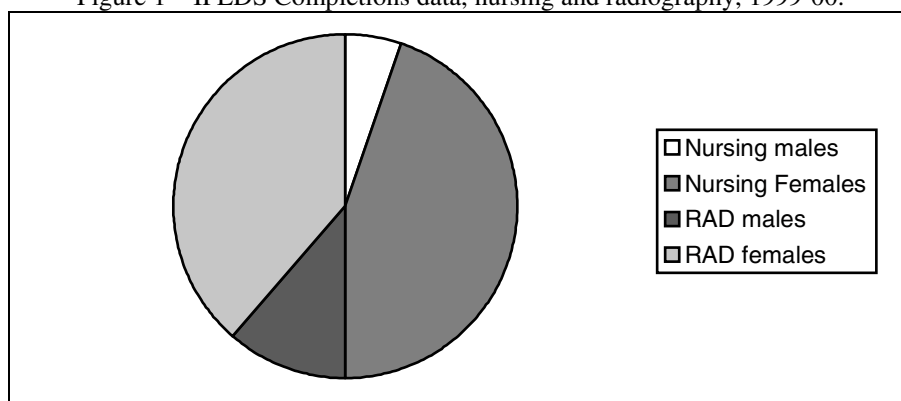
How then, are we to understand radiography with its consistent gendered mix of

technologists, where the daily rigors of the job require the combined skills of patient care

and technical ability? If we consider our gendered roles and those occupations that are

"gendered," it is difficult to understand why radiography has attracted females for

decades, and why it continues to draw a substantial population of males to the field.

Additionally, there is a definitive lack of research to review on men and women working

in or pursuing radiography, almost as if this profession has remained far too complex or

too low on the hierarchical totem pole for complete analysis.

Perhaps we could offer explanations towards the rising enrollment levels as

relating to the market and changes in the nature of the economy, where lack of

occupational opportunity in some fields drives individuals into other professions, and

such an example is true, as statistics have demonstrated, since 1991, growth in the

technical and professional occupations, with such jobs constituting the largest sector

occupational sector (17 percent) at that time (Barley, 1996). Furthermore, predictions

have centered on the continuous and rapid growth of this workforce where it was

estimated by 2005 this sector will "account for up to 4 percent more employment than

any other sector" (Barley, 1996, p. 11).

Moreover, as achievement of four-year bachelor degrees no longer proves to

provide lucrative employment, professional specialty occupations requiring an associate's

degree rather than a bachelor's degree have been "targeted as the fasted growing

occupations" (Brown, 1999, p. 1). An increasing trend evident in community college

programs is that of "reverse transfer," where graduates of four year programs now return

to community college specialty occupational programs in order to "obtain more

marketable skills" (Brown, 1999, p. 1). As such, and based on evidence of the demand

for entrance into educational programs, radiography can be considered that "marketable

skill." However, other well paying short term fields exist and present comparable

opportunity, as in nursing, therefore, it is deemed pertinent to collect information from

students on why they elected to enter radiography in particular.

Purpose of the Study

With all facts in mind, this then is considered an exploratory study, designed to

interpret why men are interested in this feminized profession, and what attracts women to

this highly technical field. It seems prudent, then, to conduct this exploratory study

through the analysis of those who elect to enter the profession, the students.

Additionally, this is also a study to reveal perceptions on the complex occupational nature

of the profession, to determine if the struggle still exists between the radiologists as the

controllers of the profession with the radiographers as the subordinates. It is with

certainty that one cannot study just males and females in a complex profession without

studying it from all angles, thereby including gender, technology and the profession.

Furthermore, while there is much literature on women working in male dominated fields,

few studies have been conducted on males working in female dominated fields, with most

of the studies being anecdotal in nature (Jome and Tokar, 1998; Lemkau, 1984). To date,

there are no recent qualitative large-scale studies conducted on technologists or students

that consider gender, technology and the profession together. Much of the literature in

existence has focused on student retention (ASRT website, 2006), demographics of the

workforce (ASRT 2001; 2004), and radiography faculty (ASRT website, 2006). This

research on students in radiography programs seeks to explore our possibly gendered

perceptions, commentary regarding the demand for patient care skills, and thoughts about

the professionalism of the field. Furthermore, this study can perhaps shed light on the

type of interactions students and technologists experience with other medical

professionals, in particular the radiologists, and reveal how students describe and view

the technology they work with.

<center>Theoretical Framework</center>

A diverse mix of theories supports the research questions and study. This

compellation of theoretical perspectives forms the basis for the literature review, research

design and analysis. First, because I am interested in student choice, gender roles and

socialization generally, gender identification theory (Spence and Sawin, 1985; Colley

1998; Eagly, 1987), in particular as it applies to student choice in education and occupation, is a useful interpretive framework.

Numerous psychological models exist that have been concerned with describing and explaining masculine and feminine attributes and behaviors. The theoretical and empirical models describe the organization of masculine and feminine characteristics and behaviors within the individual, and how individuals develop these characteristics and behaviors over the lifespan (Spence and Sawin, 1985).

Colley argues that there are gendered dimensions central to our perceptions of gender role appropriate behavior, dimensions comprised of the differences between masculine and feminine (Colley, 1998, p. 19). Masculinity encompasses "attributes including self-reliance, individualism, ambition, dominance, the ability to lead, while femininity is composed of such attributes as being affection, kind, and being eager to soothe hurt feelings" (Eagly, 1987). Our perceptions of male and female characteristics and adult sex differences are attributed to our social roles, and our social roles are in turn influenced by biological predispositions and socialization by parents and peers. According to Colley, social roles have a "proximal effect upon perceptions of gender roles" and that biology and socialization has an "indirect and distal effect upon gender roles" (Colley, p. 20). Males then tend to occupy social roles that are controlling within our society and economy, and females occupy those roles that are nurturing/caring type roles.

Traditional divisions of labor reinforce and influence our perceptions of related behavior, where the occupational role "was a strong determinant of the degree to which

agentic or communal attributes were assigned" (Colley, p. 20). Colley contends that

gender role socialization in any society can be predicted by the work requirements for

each gender, and these social roles with their different attributes provide "stereotypes of

normative male and female behavior" (Colley, p. 20). Role demands and gender role

stereotypes provide and influence different opportunities for learning skills, and subject

choice in education (Colley, p. 21). The socialization process prepares children for their

future adult roles by "encouraging appropriate behaviors and interests," with parents

serving as the models for observation (Colley, p. 20).

       Second, in addition to theories about individuals, I am also drawing on theories of

professions. I am exploring students training in an educational program that is

considered to be a "profession," made up of its own formal set of knowledge, entrance

examinations, continuing education requirements, licensure fees and moral and ethical

responsibilities. According to Burris (1993), "professionals are the agents of formal

knowledge" (Burris, p. 113), and "professionalism has changed as formal education has

changed" (Burris, p. 113). There are no longer the "pre-industrial definitions of

professional work," such as the high power, elitist professions of "medicine, theology and

law," rather; the contemporary professions encompass other occupational arenas,

including allied health fields as in radiography (Burris, p.114). It is important to consider

that radiography, throughout its inception, fits under the rubric of what defines a

profession, "groups who seek autonomous control of various terms, conditions and

domains of work," and establish and maintain licensure, and autonomy (Rhoades, 1998,

p. 20). This sociological perspective of the professions, however, is limiting, and "fails

to take into account internal gradations of professions" (Rhoades, p. 22). Use of a more contemporary sociological insight allows one to review and look inside how professions function internally.

The work of Brint (1994) focuses on how professions are "internally stratified," and professional positions are placed in a hierarchy according to location in markets and organizations. There are divisions that exist among the professions, thus influencing the professional beliefs (Brint, 1994, in Rhoades, 1998, p. 23). Furthermore, according to Brint (1994), the professions are changing from "social trustee professionalism" where the emphasis is on "morals, dimensions of work, and casts professionals as guardians of socially important knowledge," to "expert professionalism," which places "emphasis on the technical dimensions of work and casts professionals as applying formal, technical knowledge" (Rhoades, 1998, p. 23). Application of this contemporary definition of professions is useful to interpret the language students use to describe the training process in diagnostic radiography and the potential for future employment in field. As radiography is also a profession made up of other imaging specialty areas, the contemporary definition of professionalization theory is useful to interpret the language the students use to define and describe the other imaging specialties, where such language could reveal how the imaging modalities are comprised of "expert professionals" trained to use sophisticated and complex technology that is defined by the marketplace, and those who work in the specialty areas would, naturally, command higher salaries.

Significantly, professionalism, as defined by Abbott (1988), lends clarity and direction towards this study. Abbott informs us that the professions are made up of

"interdependent systems," where specific activities define each profession, and fall under "various kinds of jurisdiction" and are at times, under subordinate control to another "group" (Abbott, 1988, p. 2). Such jurisdictional boundaries are "perpetually in dispute," both in "local practice and national claims," where such jurisdictional claims, "furnish the impetus and the pattern to organizational developments" (Abbott, p. 2). Jurisdictional claims are "more-or-less exclusive," and on profession's jurisdiction can "preempt" another profession's jurisdiction, where such movements affects those of the others (Abbott, p. 34). Moreover, according to Abbott, the professions change both structurally and culturally in a "unidirectional" fashion, and "evolve towards a given form" (Abbott, p. 17). Furthermore, professionalization is a "general process without any history of its own," indicating that the professions have been shaped over time by the increased involvement of state entities (Abbott, p. 19). Additionally, Abbott states that the evolution of the professions does not necessarily and explicitly depend on that of other professions, and, the "social structure and cultural claims of the professions are more important than the work professions do" (Abbott, p. 17).

For radiography and the imaging modalities, these "professions" are controlled by the medical community, radiologists and physicians, who determine the imaging parameters, the level of the exams, the protocols, the types of contrast agents administered, the type of training radiographers and imaging technologists should receive, and, significantly, what types of exams the patients should undergo as part of their diagnosis and subsequent treatment. Furthermore, radiography and the modalities are indeed shaped by the state, where some of the imaging modalities may fall under

greater scrutiny and control than another, and the difference among the states varies greatly as well. For example, mammography falls under intense state scrutiny and control in regards to training, credentialing, equipment maintenance and quality assurance in addition to national guidelines. States can differ in terms of educational regulations, credentialing (for example, California requires a separate examination for the operation of fluoroscopy equipment for all entry level and relocating technologists, whereas Nevada does not require their technologists even to be ARRT certified in order to operate imaging equipment) and equipment maintance/restrictions, to name a few. Furthermore, the imaging modalities act interdependently of one another, where credentialing and other defining factors can differ greatly across the board for each modality. The work of radiographers is by and large misunderstood by the medical community, and radiographers are not considered as a profession, or, in the very least, they consider themselves professionals and go through the mechanisms that define professionalization (education, credentialing, continuing education, strict ethical guidelines), however, the work that they perform is generally not understood by other medical professionals, in particular nurses and physicians.

Third, as I am exploring a profession that has historically been dominated by women, I approach this research through use of feminist theory, as feminists share in their view of women's oppression where society, the family and occupations are concerned. In particular, for this study, feminist research on women in the occupational realm have revealed issues of gender stratification, segregation, wage discrepancies, and occupational closure both into and within profession – issues and explanations that have

emerged from historical perspectives on the field of radiography, shedding light on how the profession shifted from a male to female dominated profession.

Use of the feminist perspective on technology is necessary, as the profession of radiography with its array of different imaging modalities is a technology-oriented field – and according to feminists, technology is associated with masculinity and a masculine dominated workforce (Cockburn, 1985). Further explanation towards the consequences of women working within a female dominated profession and the effects this can have on men who elect to work within such fields comes from feminist studies. Specifically, feminist theory on technology embodies various perspectives, including how different types of technology are "shaped by specific concepts of interests" in relation to labor and capital, and also production and control (Wajcman, 1995). Technical skills are also "sex-typed," with the identification of the technical skill being central to male dominance in the workplace (Croissant, 2000; Wajcman, 1995; Cockburn, 1985).

Finally, a feminist perspective of the medical and allied health professions is also useful. I draw on Witz (1992), and her "concept of gendered internal demarcation" that "highlights how processes of vertical segregation within an occupational labor market emerge" (p. 6). This concept explains how male radiographers failed to block females from entering the emerging "formalized routes" into the profession and how women gained access into the training and practice. Conversely, male radiographers "hastened their own demise" out of the field, "because they had acceded to medical radiologists' demarcation strategy of de-skilling" the nature of the work associated with being a radiographer (Witz, 1992). With the increased demand on the part of the radiologists for

radiographers to possess a mix of both technical competence and nursing/patient care skills, women entered the field, thus, male radiographers employed other methods to maintain gendered boundaries and segregate the field (Witz, 1992; 1988). Such methods are what Witz refers to as "gendered strategies of internal demarcation," or "intra-occupational control," where this "sub-type of exclusionary closure" process enabled male radiographers to keep women in lower wage positions (Witz, 1992, p. 189). Use of Witz and her theoretical perspective can determine if closure mechanisms do still exist for women in this profession, and if the gendered/segregated boundaries are in bold definition.

<div align="center">Research Questions</div>

The central research questions are designed to explore three issues: (1) gender and social role in relation to the radiography profession, (2) male and female perspectives regarding the technology that makes up the profession, and (3) if students detect a structured hierarchy in the field consistent with the literature. Thus, the first set of research questions address gender and social roles in relation to the radiography profession:

1.A. How do male and female students explain their interest in a program/profession that teaches and promotes patient care principles?

1.B. Do male students talk about the field in the theoretical gendered terms, terms that imply individualism, dominance, autonomy and leadership?

1.C. Do females talk about the field in theoretical gendered terms, terms that imply nurturance, empathy, and taking care of people?

The second set of research questions explores the male and female perspective regarding the technology of the profession:

    2.A. To what extent do males and females discuss the technology in the field?

    2.B. Do males and females view the technology as complex, or do males and females view the technology as simplistic, mundane, and "push button"?

    2.C. Do males and females define the technology in relation to the patient?

The third set of research questions considers the issues of stratification, closure and prestige within the field:

    3.A. What are the male and female students constructs of each imaging modality located within the profession of radiography?

    3.B. Do males and females define the imaging modalities through use of terms that imply that the imaging modalities are prestigious.

    3.C. Do males and females, specific to their genders, detect any closure mechanisms to the imaging modalities?

<div align="center">Definitions</div>

Throughout the interviews, the students utilized terms and acronyms specific to the language used by those who working within the imaging profession and various modalities, therefore, to lend clarity, a number of terms are depicted here with explanations, in order to guide the reader through the interview data and responses to the research questions.

    1. Radiographers are interchangeably referred to as technologists, imaging technologists, Rad techs, techs, and radiologic technologists. A historical

term, technician, was utilized back in the day when radiographers would obtain the images and repair the equipment. However, the term technician is no longer used.

2. The word "fluoro" indicates working with fluoroscopic studies that are defined as moving picture x-rays, where the inner workings of the body can be viewed through real-time, live action radiography. Students and technologists conduct such studies with the radiologists present during the exams, and most specifically, fluoroscopy is applied to visualization of the gastrointestinal tract. Some terms used to describe the studies are, "UGI" acronym for upper gastrointestinal studies, "BE," acronym for barium enemas (lower gi studies), SB, studies of the small bowel, and BS, or barium swallow, to review the esophageal tract (Gurley and Callaway, 2002). The term "C-Arm" was used to describe mobile fluoroscopic studies that commonly take place in surgery. The equipment used resembles that of a "C" shape, hence the nickname (Gurley and Callaway, 2002).

3. The special procedures imaging modality that encompasses diagnostic and interventional studies on the heart and vessels, is commonly referred to by the students as working in the "cath lab."

4. Digital and computer imaging and imaging picture archiving, now the new wave of imaging technology, largely and rapidly replacing conventional radiography, was discussed as "PACS," (picture archiving and communication

systems, and "CR" (computerized radiography, "DR" (direct radiography) and "digital," the ability to obtain images and manifest such images electronically.

5. The students commented on conventional radiography as "analog" systems, where the "techniques" are what comprise the technical (or "techniques") variables that control the ability to create the image by proper penetration of the patients through manipulation of kilovoltage peak, or kVp, and millamperage/seconds, or mA, time, and mAs.

Limitations

This study collected interview data from students who attended two Radiography programs housed in similar urban community colleges located in southern California. The schools are geographically situated within a distance of 50 miles to one another, hardly representative of all the community colleges and radiography programs located nationwide, thus this study did not necessarily represent the diverse population of students training in RT programs located in suburban, or rural community colleges across the country. Furthermore, 39 students were interviewed, and while their perspectives are valid and warranted, this sample of students again does not necessarily represent the points of view for other radiography students located throughout the US. Studies on community college students demonstrate a student body comprised of women, minority students, and older graduates (VanDerLinden, 2002), where the students in the career-preparation programs, including health related programs, are comprised of a large percentage of students 21 years or younger. VanDerLinden (2002) describes African Americans and Hispanics as representing a "significant majority" of the community

college population. However, this does not necessarily represent the population of radiography students located in the two schools selected for this study.

Furthermore, the methodology utilized for this study, where a select sample of students were interviewed, falls under the category of convenience sampling and purposive sampling, where this research selected a requisite number from cases that are conveniently available. As I was given permission to interview the students in two colleges, they were selected by level of educational process and gender, and of limited numbers from each program. Thus, convenience sampling is considered to be "a matter of catch-as-catch-can," where there is "no way of determining to whom, other than the sample itself," the results can apply to (Singleton and Straits, 1999, p. 158). Moreover, through purposive sampling, where the two groups of students from each program were selected based on educational progress, for example, students just starting their training and students two months away from graduation who have trained in the field for almost two years, this researcher elected purposive sampling based on the assumption that these students would slightly represent the typical population of first year and second year students. However, it is recognized that purposive sampling lends a major weakness, "where use of informed selection of cases requires considerable knowledge of the population before the sample is drawn" (Singleton and Straits, 1999, p. 159).

The data collection method used involved only interviewing, again limiting in scope, as oftentimes with qualitative methods of research it is recommend to use triangulation methods, or "multiple lines of sight" where multiple data collection methods are employed (Berg, 1999, p. 5). Use triangulation allows for "convergent validation"

where multiple methods of qualitative data collection allow for significant measurement

of a single concept of construct (Berg 1999, p. 5). However, this study did not utilize

triangulation methods of data collection, relying only on interview data where a

justification lies with the fact that the time needed, for example, to collect data through

use of surveys or participant observation, did not exist, instead there was only a small

window of time allowed, as the students selected in the second year cohort were

scheduled to graduate in a matter of two months.

In retrospect a negative to interview data does not allow for long term

relationships between researchers and the researched to be formed, and where it is

assumed that the interviewer can manipulation the situation, has control over the a set list

of questions that have been formulated before the interview and which are to be answered

rather than considered, rephrased, discussed and analyzed. The nature of the relationship

of interviewer to interviewee allows for the assumption to be made that the "interviewer

has power of the respondent who is given a subordinate role" (Burgess, 1984, p. 102).

However, use of interviewing methods that allow for the interviewer to respond in a

semi-structured format (Berg, 1995) where much of the responses to the questions are

through conversation format, with the questions serving merely as guide allowed for

alleviation of too much structure to the responses, and served to eliminate some of the

"power" issues, as those interviewed had the freedom to converse, discuss and digress

without limits and a large degree of control, and many students did. Additionally, as

opposed to asking questions, I utilized interviewing by comment methods, where the

respondents were not lead to answer, but answered on their own accord (Snow, Zurcher, and Sjoberg, 1981).

Ultimately, use of other methods can serve to add more rich data to this study, however, the interview data presented is considered, by and large, substantial on its own, as the students had much to say and said it well, lending to lively depiction of information in this study. Furthermore, the interview data allows the reader to gain insight into the minds of students, their career goals and choice of education, their perspectives towards patients, technology and the profession. Such information might not be so rich had it been collected through a quantitative survey method, or sole use of participant observation methods, however, in addition to interviewing, participant observation could have benefited this study, as actions can speak louder than words, in particular where patient care is concerned and daily workplace interactions. Therefore, participant observation methods will be considered by this researcher should there be future follow up studies on students in radiography, or other aspects of the profession, as in technologists.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

This chapter will present seven areas of literature and research relevant to the present study: (1) college degree attainment and employment trends, (2) literature on the characteristics of community college students (3) literature on allied health programs (4) historical studies of the radiography profession, (5) current studies of the radiography profession, (6) literature on gender, labor and sex segregation, and (7) literature on student choice of major. This literature review represents a compilation of the educational world and the occupational world, focusing on gender issues and socialization in regards to student choice of major, individual choice of career, and career attainment opportunities. The literature review also presents some key historical work that focuses on radiography according to the profession and to the changes in training and education for radiography. The present studies focus on radiography, technology, gender, and professionalization.

College Degree Attainment and Employment Trends

The labor market fluctuates and changes to the point that it can pose a dilemma for college graduates. Based on conclusions from his analysis of the job market, Mittlehauser (1998) discovered that the changing labor market has led some college educated workers to end up working in low paying, low status occupations. With 250, 000 college graduates entering the labor force between the years 1986 and 1996 there were some new college level occupations, but there exists an uneven ratio of five

college graduates for every one opening, thus new college graduates may not be able to obtain the college level jobs suitable to the level of education acquired (Mittlehauser, 1998).

However, Mittlehauser's prediction does not apply to the area of the professional specialty occupations including nursing, medical imaging, engineering, and social work, on the contrary, these occupations are among those supplying a higher number of jobs for college graduates (Mittlehauser, 1998). Mittlehauser states that these types of professional specialty occupations, particularly the healthcare occupations, will "account for more than half of all college-level openings" between the years 1996 and 2006 (Mittlehauser, 1998 p. 4), with the growth of occupations in the medical arena attributed to the increasing need for health care, the advancement of technology, and the expanding use of computers (Mittlehauser, p. 4).

Similarly, Brown (1999) comments how the slow growth rate of college level jobs will result in fewer opportunity for job placement in such a disparity of jobs versus that of graduates. With a slow growth rate, professional specialty occupations and service occupations that require an associate's degree as opposed to a bachelor's degree are "targeted as the fastest growing occupations" (Brown, 1999, p. 1). Employers will place more value on graduates acquiring technical certification of skills, lifelong learning and skill development in order to stay abreast of global and market changes. An increasing trend will be that of "reverse transfer," where graduates of four year colleges will return to back to post secondary education, primarily community college programs in order to

obtain more marketable skills. The reverse transfer students will be older, married, already employed in managerial or professional occupations (Brown, 1999, p. 5).

Also studying employment trends, Barley (1996) examines what he describes as the "new world of work," where the implementation and continued growth of information technology is influencing and altering the occupations, with a growth in technicians and professional workers, highlighting allied health workers as in imaging technologists, information that is of essence for this study (Barley, 1996). The two categories of technicians and professional workers have fast become the largest of all occupational sectors, with corporations recognizing the need to adapt their structures "from a vertical pattern of management to one that is more horizontal" (British-North American Committee statement, in Barley, 1996, p. v). The changing of corporate structures ensures that those individuals considered specialists with "complementary expertise," for example, CT technologists, contribute to "increasingly complex strategies and decisions of their organizations" (Barley, 1996, p. 27; British-North American Committee statement, in Barley, 1996, p. v). Such changes to the occupational sector with profound growth in the technical and professional occupations brings new dynamics to the workplace organization and serves to create "occupations within organizations," an example of this being those who operate the special imaging modalities that exist within radiology (Barley, p. 29, p. 34).

Thus, with such changes to the occupations, and the switch from an agrarian society to an information technology driven society, Barley considers the technical occupations to be the "new" crafts and the technicians to be the "new artisans,"

commanding and controlling the "mysteries" scientific procedures as in hardware, software, and data, all materials that belong to a "post-industrial" society (Barley, p. 42).

With the predicted increase for more opportunities within healthcare and radiography, and as radiography programs are situated primarily in two-year community colleges, it is pertinent to review some of the student's demographics, in the next section. As the unit of analysis for this study is radiography students learning in community college based programs, the demographics of community college students from the past and present are applicable.

Community College Students - Demographics

During the 1970's, London (1978) conducted an ethnographic study of an urban community college, "City Community College" where the students were primarily Caucasian, with over 75 percent of them coming from less educated, lower income, blue-collar communities and working class families backgrounds (London, p. 6 - 7). While perhaps dated, London's study is valuable based on the student social class demographics. The social class for radiography students across the nation remains consistent, where not much has changed during the past 30 years with community college student social class backgrounds.

In the 1980's, the demographics of community college students were minority students and older undergraduates, with a large majority of these students being women. Warren (1991) states, "almost 2.5 million women were enrolled in community colleges in 1980," with these women being enrolled disproportionately in programs "leading to occupations low in pay and prestige," for example, "secretarial studies, nursing,

education, health technology, and therapy" (Warren, p. 56). In the 1980's, community

colleges enrolled up to 56 percent of minority students, with the student population

consisting of "African American, Hispanic, Asian and Native American students." The

African Americans make up less of the minority populations, and the Hispanic, Asian and

Native American students making up the larger percentage, with an increase in

"Southeast Asian immigrant" enrollment levels (Warren, p. 57). These particular

students attend English courses and are concentrated in occupational courses that lead to

direct employment (Warren, 1991). The age demographics for community college

students were comprised of students 25 years or older in 1981, with women aged thirty

and older making up a large percentage of community college students, particularly in the

seventies.

Regarding social class, Warren states, that "on the average," community college

students come from families with lower incomes and less educated parents than those of

students in four-year colleges and universities (Warren, p. 61). Out of "the high school

graduating class of 1980, 27 percent of those who entered community colleges were from

families in the top quarter" of the social class index as compared to sixty one percent of

students enrolled in four-year universities, who are from families in the top quarter of the

social class index (Warren, p. 61).

The students who attend community colleges are those who have been described

by faculty as "lost souls," or students who are taking a "second crack" at higher

education, where in their younger lives, they lacked the motivation and drive to perform

well in school, and were thereby rendered unable to enter into four-year universities

(Grubb, 1999, p. 3). Furthermore, community college students are also those who attend

because they cannot afford the fees and tuition in four-year universities, and are unable to

leave their homes, attending college as "commuters." Often called "second chance

institutions," described as returning back to education, community college students are

those individuals who are back in school for one reason or another, individuals who

failed to enroll in school earlier in their lives, "women returning back after a divorce,

individuals bounced out of promising career through no fault of their own, and displaced

workers affected by economic dislocations," including the decline of manufacturing

fields, or other areas (Grubb, p. 3). Those typically disenfranchised by higher education

attend community colleges, and are minorities, as in African American or Latino, who

comprise up to 94 percent of the student body (Grubb, p. 3).

Moving on into the year 2000, VanDerLinden (2002) conducted a survey obtained

from 1999 through 2000 on students from over 300 community colleges. The survey

results reveal the student body as being comprised of women, minority students, and

older graduates. Additionally, VanDerLinden (2002) describes the students in the career-

preparation programs, including health related programs, and business related programs,

to be comprised of a large percentage of students 21 years or younger, seemingly a

change from the past studies. The VanDerLinden survey gives a break-down of student

population, listing 42 percent as being 21 or younger, 31 percent in their mid to late

twenties, 17 percent in their thirties, and 10 percent over 40. Women make up the

majority, at 61 percent, with, according to VanDerLinden, African Americans and

Hispanics represent a "significant majority" of the community college population.

As demographic information on community college students has revealed, quite consistently over the years that students by and large are primarily from working class backgrounds, the work of Weis is relevant to this study. Weis (1990) studied high school ("Freeway") students of working class family backgrounds, which suffered the closing of a steel mill. Of interest for these students, and their parents, based on the reality of the changing nature of their surroundings and the de-industrialization of the occupational sector, education was considered a means to an end, with both the male and female students opting to finish high school and then attend college. The parents of the students encouraged their children to attend college, cognizant that without higher education, opportunity for decent paying employment is difficult to attain (Weis, 1990).

A final point to make is that the high school males rejected and resented the institutional authority, yet tended to look at "schooling in highly utilitarian terms" (Weis, 1990, p. 24). Conversely, the male students exhibited "resentment toward authority" that Weis described as being "linked to perceived institutional control" with an elaboration of a "them versus us ideology which typified the struggle between capital and labor" (Weis, p. 18). The act of resentment towards "institutional authority" was not evident with the females in the study, and is distinctly, Weis states, a "male purview, tied at least theoretically to the historic struggle between capital and labor" (Weis, p. 61). A key point, for within imaging, typified by Larkin (1983), radiography is comprised of a form of "institutional authority," where radiologists control aspects of imaging, and radiographers merely take the images, but have no part in the ordering of or interpretation of the images. The students in this study encountered this, in particular the males, and

perceived a "them versus us ideology" similar to that described by Weis (1990) with the "Freeway" males.

In summary, the compilation of demographic information regarding community college student characteristics has remained, in some respects, consistent throughout the years, however, there are growing numbers of different populations of students, in particular Southeast Asian immigrants, attending community colleges, and where younger students are now enrolled in business and health related professions. These studies also prove that geographically, community colleges are comprised of vastly different student populations, in particular with reference to race, and national origin.

The next section will explore allied health programs, as they have evolved from on-the-job training sites primarily housed in hospitals, into accredited two year programs situated in community colleges, as the increased changes to the profession has brought about significant educational requirements. By shifting into colleges, the professions have had to implement entrance requirements, certification parameters and numerous other significant changes.

Literature on Allied Health Programs

Historical development of the training of allied health personnel shifting from on-the-job training in hospitals to educational training in two-year community colleges and vocational institutions lends reference to the changed nature of the education and profession for radiography, as discussed by Greenfield (1969). In the past many allied health professions including radiography were professions where one could acquire most of the requisite skills through on the job training. However, through the years, this type

of training has slowly changed, becoming more educationally oriented, moving into the educational realm (Greenfield, 1969).

Training of allied health personnel is a more recent development than the training of doctors and nurses, with many allied health-training programs modeled after that of the formal training for doctors and nurses (Greenfield, p. 64). The first workers of the allied health professions were trained on the job, with the formal schooling component entering some time after (Greenfield, p. 65). Greenfield contends that there were "many factors influencing the emergence of formal training among allied health workers" with the most influential being the expansion and growth of the health service industry (Greenfield, p. 67). As the health services expanded, the greater proportion of manpower concentrated in the "nonprofessional and allied health categories" (Greenfield, p. 67). Along with the growth of this type of workforce, came the "desire for economic and social status," with the workers forming various professional organizations (Greenfield, p. 67). Therefore, the desire for status attainment and professional recognition as well as higher incomes "generated the drive for formal academic degrees and accredited programs" serving to certify the worker as a well-trained professional (Greenfield, p. 68).

In his evaluation of allied health training, and with the lack of precise information on the programs and institutions, according to Greenfield, to present "impressionistic data on important aspects of training, such as capacity of programs, variability in length of course, variable coverage of the subject matter, influence of professionally approved educational programs," and staff qualifications is not possible (Greenfield, p. 67). Without standardization across the board for allied health programs, the professional

associations concerned with "raising the quality of the worker," as well as limiting the number of individuals desiring to enter such occupations, "attempt to continually raise the formal education requirements" (Greenfield, p. 77-78). However, the hospital based programs are "more frequently concerned with quantity than quality," and tend to set the formal requirements lower, with a preference being more towards practical training than "theoretical knowledge" (p. 78).

The lack of standardization from institution to institution for the allied health programs exists because of the lack of agreement towards "exactly what tasks should be assigned to different groups of workers," and variation in length of training has not been determined by the differing educational philosophies of each institution (Greenfield, p. 89). In conclusion, standardization would largely eliminate these problems, and can thereby create occupational/educational mobility for "trained workers" by allowing those individuals to "adjust to a variety of particular jobs" (Greenfield, p. 90).

Upon reviewing Greenfield, the late sixties started a the trend towards standardization of radiography programs within community colleges and hospital based programs, coupled with established parameters of educational programs, thereby leading directly to examination and certification. Along with standardization, came the establishing guidelines for entrance criteria into these programs, setting the precedent for radiography programs today. The next section will review the historical beginnings of radiography, and the changes to the nature of the work followed by regulation, control and changes in the workforce.

Historical Studies of the Radiography Profession

Two key historical studies are paramount to this study, the historical case study of changes to the radiography profession, where there came about eventual feminization of the field, and the creation of a structured system with closure mechanisms by Witz (1992), and the work of Larkin (1978; 1983), whose case study analysis revealed the creation of a hierarchical structured profession that served to perpetuate the feminization of radiography.

For Witz (1988; 1992), she utilized a closure theory combined with closure processes in her discussion of radiography, however, in reference to the medical field and other sub-fields, the field of radiography is quite unique, and it "provides a case study in the absence of patriarchal closure" (Witz, 1988, p. 84). The field consisted of a mixed gender composition early on, then eventually shifting to a predominantly female occupation in the 1920s. Thus, the imposition of barriers to block entrance into this occupation by males proved to be pointless, and unlike the medical profession that successfully managed to exclude women from entrance by creating barriers through the credentialing process of education, training and examination, radiography from its official recognition was a medical profession open to women (Witz, 1992, p.173).

However, male radiographers attempted to mobilize a "discursive equivalence between technical competence and masculinity," but did not count on the increased demand by radiologists for radiographers to possess a mix of both technical and nursing skills (Witz, 1992, p. 179). Thus, with both skills required, attempts to label this occupation inherently masculine failed, and in the wake of the inability to close the field

entirely, male radiographers employed other methods to maintain gendered boundaries and segregate the occupation (Witz, 1988, 1992). These methods, as in "gendered strategies of internal demarcation," resulted in intra-occupational control, or what Witz considers to be a "sub-type of exclusionary closure," (Witz, 1992, p. 189) where male radiographers successfully managed to distinguish between the different types of radiography skills (technical versus nursing), "gender" the skills, and evaluate the skills differently (Witz, 1988, 1992). Such forms of intra-occupational control served to issue lower wages for women and removed the ability for women to attain competitive positions within the profession (Witz, 1992, p. 189).

Larkin (1978; 1982) describes the development of the occupation of radiography "in terms of the efforts made by technicians to improve their status and the attempts of radiologists to maintain their control of the division of labor" (Larkin, 1982, p. 60). From the time of inception to overall growth of the profession, a separation of responsibilities developed, inciting a form of "inter-occupational conflict" between the radiologists and the radiographers that has lasted through the decades and on into the present day (Larkin, p. 60).

Larkin lists three issues that launched changes in the profession, (1) detailed definition of the role of the radiographer resulted in delegation of responsibilities and creation of an occupational hierarchy between radiologists and radiographer, (2) a system of medical membership of the radiographers council was developed in order to ensure "medical dominance in perpetuity" and to encourage the employment of "duly qualified assistants" (Larkin, 1982, p. 86-87), and (3) integration of the newly developed Society

of Radiographers into the over-arching medical system resulted in supervision/control by the British Medical Association (Larkin, 1982, p. 87).

To emphasize further, Larkin contends that after the discovery of x-rays by Wilhelm Roentgen in 1895, the medical and lay occupations struggled to control x-ray knowledge and expertise, ultimately leading the two groups into conflict, "particularly as 'craft' and 'medical' components were distinguished" (Larkin, p. 90). Radiographers were placed at a disadvantage, as they were hospital employees who were less able to challenge the reduction in the exercise of their skill (Larkin, p. 91). Because of the conflict, the very nature of the occupation itself changed, indicating that radiographers had come to specialize in the "techniques of the subject" as opposed to its "medical meanings" (p. 90). Textbooks relating to radiography followed suit and emphasized training in numerous stylized postures and positions without reference to the medical uses of x-ray. A combination of "extensive training in the reduced role and the arrival of the National Health Services virtually extinguished overt radiographic reporting whether of the verbal or written kind" (p. 87). Control and the subordination of radiographers was established when a doctor was appointed as the president of the Society of Radiographers(Larkin, p. 87). The radiologists gained power that resulted in the ultimate form of control over the occupation and any professional association affiliated with the field, where the establishment of strict guidelines came about for the societies, education and training programs (Larkin, 1978). Furthermore, membership into the society had to be by "personal endorsement of a radiologist" and that the "basic training must come

under supervision of the medical specialty, with the more prestigious forms of qualification to require individual medical approval" (Larkin, 1982, p. 89).

Ultimately, the field was labeled as an occupation suitable for women, where the "media" advertised radiography as "admirably suitable for women" with changes in the occupational sex balance "consolidated by press reports" (Larkin, 1982, p. 82). For the profession , recruitment of "mostly middle-class women with an enforced short-term interest in the job "buttressed the authority of the predominantly male medical profession and a much smaller group of male radiographers" (Larkin, p. 83). With increased numbers of women entering the field, radiography thus was labeled as a feminine profession, bringing with it "the connotations of docility carried by that term" and lower wages (Larkin, p. 89).

The changes altered the relationship of radiologist to radiographer, where once radiographers had enjoyed the semblance of autonomy and control over their own profession, was reduced to that of the male radiographers "looking up" to radiologists in rapt admiration (Larkin, 1982, p. 90). Female radiographers were required to flatter the medical colleagues of radiologists, and ensure that the radiologists were presentable as far as grooming was concerned (Larkin, p. 90). Thus, Larkin informs us that "unquestioned obedience was combined with elements of a maternal role which placed the social responsibilities of the x-ray department firmly" on the radiographers shoulders (Larkin, p. 90). The next two articles focus on similar issues, however told from the perspective of physicians who endorsed the changes to the radiography profession.

Two historical articles written in the early 20th century by Hernaman-Johnson (1919) and Menville (1934) lend perspective on the formation of radiography and the gradual changes to the profession that affected both the physicians/radiologists and technologists.

Hernaman-Johnson (1919) discussed how there is delegation of responsibilities and duties in the medical profession, in accordance to who specializes in what type of medicine (Hernaman-Johnson, p. 181). He commented that, "at the present day the public divides 'doctors' into two great groups--those who effect their cures mainly by the knife and those who treat their cases by means of medicines . . ." (Hernaman-Johnson, p. 181). Within these two groups, there are practitioners of physical medicine subdivided into divisions such as "radiologists" and other specialists (p. 182).

For the medical practitioner who specializes in the "radiology responsibilities," such responsibilities must be changed and the tasks must be delegated to the "intelligent layman," indicating the radiographer (Hernaman-Johnson, p. 185). The radiologist must no longer be responsible for the "actual production of the [radiographic] plates for if a large number of plates is required, this type of work will certainly be a gross waste of time" for the radiologist (Hernaman-Johnson, p. 185). However, changes in delegation of duties/operation of the radiographic equipment render a problem with the "lay operator" as this individual must not only be controlled in their training, education, and practice but also be restricted from "reporting" or interpreting/ and then issuing diagnosis on the image on the plates (plates were used before film usage became widespread) that they produce (Hernaman-Johnson, p. 185). Interpretation and "reporting" are the sole

responsibility of the radiologist, and must be emphasized in order to put a stop to what Hernaman-Johnson labels "quackery medicine" (Hernaman-Johnson, 1987).

Some fifteen years later, the changing nature of the field of radiology calls for an increase in both "diagnostic and therapeutic x-ray" workers (Menville, 1934). Based on these changes, the radiologist should move away from performing the technical work, and allow for the creation of a "distinct worker" to conduct the technical work (Menville, 1934, p. 230). With increased demand for diagnostic and therapeutic images by the medical professionals, Menville states that it is no longer possible for radiologists to "personally do this technical work" (Menville, p. 230) and there must be a "distinct class of technical workers, commonly designated as x-ray technicians, to do this necessary technical work included in the x-ray activities of the present" (Menville, p. 230).

Because the field requires skilled and properly training workers, not all individuals can perform this type of work and this field now requires a "higher degree of intelligence, a higher degree of mechanical skill, and a more stable temperament to successfully meet the duties devolving upon the x-ray technician than are required of a registered nurse" (Menville, p. 230). The medical profession is now confronted with problems of selection, education, and supervision of this "new group of technical workers who have become a necessary adjunct to the practice of medicine" (Menville, p. 230).

Additionally, Menville suggests that the "experienced roengenologists [historical reference to radiologists] should be in control of and direct the selection, training, and activities of the "new x-ray technical workers," and these workers should be "carefully selected and trained in proper institutions where a definite standard course of training can

be maintained" (Menville, p. 230). Menville recommends the technicians will need to work under the supervision of qualified radiologists and "limit his work in radiography to absolutely the technical application of x-rays" and be registered and organized so that they will be under the control of the medical profession," particularly a specialist of radiology (Menville, p. 231).

In order for the new workers of this technical field to be under the control of the medical profession, an examining and registration board, comprised of properly selected radiologists and other members of the medical profession, must be assembled. This board should also function for the entire North American continent and must "afford the basis of control" over the entire radiography profession, with the members of the new organization possessing the ability to examine the "x-ray technical workers in order to determine if they are worthy and qualified to be registered as such technical workers" (Menville, p. 230). Furthermore, "new x-ray technical workers should then become organized into a national society or association" with membership being one of the requisites necessary for "these individuals to improve themselves" both educationally and professionally (p. 230-231). Establishment of a Registry Board for examination and registration of the "workers in the field of radiographic technology," with the conditions put forth by the newly established "Registry Board must not be ignored" by the medical profession, but encompassed and incorporated in order to maintain standards for this "new profession." (Menville, p. 231-232). Menville's suggestions are now the recognized standards the radiography profession upholds and maintains, with the

American Registry of Radiologist Technologists and the American Society of Radiologic

Technologists.

These studies lent very different perspectives on the changes to the radiography

field, with Witz and Larkin describing how the nature of the profession changed and how,

based on these changes, the field became feminized. Additionally, restrictive and closure

mechanisms were launched to keep women at the bottom level while men had the

advantages for top paid positions. Hernaman-Johnson and Menville discuss the changes

to the profession from the perspective of the physicians, calling for a distinction between

medical radiologist and medical "layman" to be established. Moving from the past into

the present, two studies will discuss how technology brings with it an agenda, and

occasion's change in the nature interactions among those who operate the technology and

those who interpret the images.   Also in the next section demographics on radiographers

and imaging technologists is presented, to lend perspective on where males and females

are concentrated, salary levels and age.

Current Literature on the Radiography Profession

Two longitudinal wage and salary studies conducted by the American Society of

Radiologic Technologists, from 2001 and 2004 reveal much about the salary levels and

gender make up for the diagnostic radiography realm and the imaging modalities.

Conducted through national survey methods sent out to all registered technologists whose

names and addresses are public knowledge, the tracking studies are designed by the

ASRT to keep abreast of the changes over time in the employment, wage, salary and

demographics of radiologic technologists.

From the 2001 study, with a rate of return of 42 percent (29,914 surveys were mailed, 12, 525 were returned), the employment status in 2001 was at 97 percent, with half of the respondents credentialed in radiography. Out of this group, 89 percent were credentialed in radiography, with a high percent in mammography and radiation therapy. The ASRT report that "there was a significant increase in the percentage of technologist from 1997 to 2001 who were credentialed in their primary practice," with an increase in other imaging modalities, for example, MRI, increased from 65 percent to 92 percent, CT increased from 56 percent to 87 percent, and Cardiovascular interventional technology increased from 44 percent to 82 percent (ASRT, p. 17).

The average hourly wage in 2001 was reported at 20.74 an hour, with an increase in salary up by 22 percent from 1997. The average hourly wages for the imaging specialties increased by 20 percent over the past four years, with medical dosimetry, radiation therapy, nuclear medicine, Cardiovascular interventional technology (CIT), MRI and diagnostic medical sonography (DMS) being among the highest average hourly wages (ASRT p. 20).

The average age reported for respondents is 41 years of age, with mammography and DMS having the highest concentration of female technologists. Nuclear medicine, and CIT have the highest percentage of male technologists, with the males "out-earning" their female counterparts in all imaging disciplines. The biggest wage differences occur in medical dosimetry, nuclear medicine, radiography, and DMS (ASRT p. 80). Female technologists employed in Quality management earn the highest wages (p. 80).   The

ASRT reported that the "vast majority of 2001 respondents" to the study are married

females, with the most common degree held being an Associates degree (p. 82).

The ASRT Wage and Salary survey reported in 2004 revealed similar results as

the 2001 study, once again with a rate of return at 42 percent (227,000 surveys sent out,

8,438 surveys were returned). The total of technologists are female (76 percent versus

males at 23 percent) with the average age of respondents at 42.58 years. The highest

level of degree achieved is an Associates degree (46 percent) and has been practicing in

the profession for more than 16 years. Radiography was the most frequently mentioned

certificate, with mammography at 26 percent, and CT at 12 percent. The average salary

increased from 2001 by 19.7 percent. The ASRT reported that nationwide, the full time

annual salary wages increased by 26.5 percent from 2001 depending on specialty,

position, workplace, education, years in the profession, etc, with radiation therapists

earning the highest salaries. In comparison, the most lucrative specialties were medical

dosimetry; the least lucrative were mammography and radiography, earning the lowest

annual salaries (ASRT, p. 7). In retrospect, the 2004 study did not give the male/female

demographics per imaging specialties, whereas the 2001 study did provided this

information.

Carwile (2003) researched radiography programs across the country and obtained

demographics of the various student bodies in order to demonstrate how "slow the

population of radiographers has been to diversify (Carwile, 2003, p. 85). According to

Carwile, in order for significant changes to occur in the workforce to bring about a

diversified technologist population, "educators must recruit and retain students from a

wide variety of backgrounds" (Carwile, p. 85). Carwile addresses the current shortage of radiographers, and how recruitment and retention issues in radiography programs have aided in maintaining the shortage. It is difficult to recruit more males into radiography programs and to retain the minority students within the programs (Carwile, p. 85), lending to the fact that the student population for radiography has remained primarily 70 percent female (Bureau of Labor Statistics, 2001, in Carwile, 2003). Furthermore, the population of radiographers is only 7.5 percent Hispanics and 8.2 percent African Americans (Bureau of Labor Statistics, 2001, in Carwile, 2003).

For the educators of radiography, there must be more concern with the recruitment and retention of a more diverse population of students, with emphasize on the recruitment of more males, African Americans, Hispanics, Asian Americans and other racial/ethic groups into radiography. According to Carwile, this will not only aid in alleviating the shortage of staffing in radiography, but a more diverse staff of radiographers can prove to be more effective in working with the diverse population of patients needing health care. In conclusion, other organizations including the ASRT have begun to address the issue of diversity within the field by developing "career ladders, incorporating multiculturalism into the professional curriculum, and providing minority scholarships" (Carwile, 2003).

Shifting from students and education towards the incorporation of the CT scanner into the radiography work environment, Cockburn (1985) discusses the relationship of technology and power, and how, in the working world, those who possess the technology and technical know-how are typically male. Technology is considered a medium of

power, and those who possess the special knowledge and competence associated with technology are granted a certain "measure of power" (Cockburn, 1985, p. 6). Technology is considered a historical aspect of male power, and in the working world, Cockburn states, "among the haves and have-nots of technological competence, women and men are unevenly represented," indicating that the technological innovator/owner/manager is male, and the semi-skilled or unskilled worker is female (Cockburn, p. 6-7). While women may participate in the workforce nationwide, Cockburn states that women possess only "an all-but-invisible fraction of its technological knowledge and technical jobs" (Cockburn, p. 7).

Radiography as a technical profession seemingly defies the conventional rules, where, according to Cockburn (1985), occupations may fail to fit within the parameters of the technology, power and male association, an example of this being radiography. While it might be assumed that men would monopolize such a technical field, the majority of radiographers are women and this highly technical field is "classified as a feminized field" (Cockburn, p. 12). Radiography involves a higher level of technological knowledge and competence than any other "female-stereotyped work" and it is this fact, Cockburn argues, that "disproves any generated myths of how women are not suitable to perform technological work" (Cockburn, p. 112).

Although radiography requires sophisticated technical knowledge, with women operating the equipment, Cockburn maintains that strategies are taken by those of power within this profession (radiologists, physicists, physicians) to "deskill" or downgrade the technical role women play, thereby generating a profession fit for women--one of low

wages, and requiring little to no technical skill. From her observations of two large radiology departments that specialize in all aspects of diagnostic radiography, complete with the latest technology in computerized axial tomography scanning, the female radiographers who work in these facilities and control the technological aspect of diagnostic radiography are "junior in status to the consultants and the doctors who are responsible for patient management" (Cockburn, p. 116). Furthermore, with the introduction of the scanners and the technological changes introduced to the departments, tensions were created in the relationship between the various groups of professional and technical employees. Thus, the CT scanners entered the hospitals with a "gender ideology" attached, indicating that according to the societal roles, men are "supposed to be in top jobs, or the higher, more technological positions, while women are typically to be in the caring and lower-ranking occupations" (Cockburn, p. 116). The CT scanner, Cockburn argues, can be considered as provoking contradictions because such equipment commands a higher degree of knowledge and technological ability than conventional radiography. However, as women were operating the CT scanners, the technical knowledge required was dismissed both in its significance and its technicalities by the engineers and doctors (Cockburn, p. 117). The CT scanners were viewed and verbally re-constructed by the engineers and physicians to be that of simplistic, push-button technology (Cockburn, p. 117), with this verbal construction serving to undermine and denigrate a highly complex field. Thus, this highly complex technical field was reduced down to "women's work," therefore not associated with (male) technical competence (Cockburn, p. 117).

Taking a different research approach towards the relationship between those who operate the computed tomography scanners and those who interpret the images, Barley (1986) proposed that technology "might occasion different organizational structures" by altering roles and interaction between radiographer/radiologist (Barley, p. 78). The new devices within imaging arenas and radiography "have begun to challenge traditional role relations among radiologists and radiographers," where historically the radiographers occupy the subordinate role, however, such roles might alter based on technical ability, and knowledge (Barley, p. 78).

The new medical imaging devices, or CT scanners, have "begun to challenge traditional role relations among radiologists and radiological technologists" (Barley, p. 78), and under certain conditions, technologies "may actually alter" the organizational and occupational structures of medical work (Barley, p. 78).

Barley used participant-observation methods for one year at two hospitals (labeled "Suburban" and "Urban") that had recently acquired identical computed tomography scanners. Through his observations of the radiology department prior to the introduction of the scanners, Barley was able to establish the organizational/occupational structure of radiologists/technologist. Once the scanners were installed and fully operational, Barley observed the interactions between radiologists and technologists, this time centered on the "new technology" (Barley, p. 84-85).

Thus, Barley developed a number of conclusions from the data and analysis. The first conclusion was the recognition of a paradox, where by treating the technology as "an occasion for structuring" contradictory results were revealed, where "identical

technologies can occasion similar dynamics but lead to different structural outcomes"
(Barley, p. 105). For example, although the structuring processes at each institution
"conformed to the sequential model of reciprocal articulation," and despite the fact that
roles in each department altered and changed in similar directions to one another, one
department (Suburban) became "more decentralized" (Barley, p. 105-106). The second
conclusion, stated in concurrence with the "materialist approach" to discussions of new
technology, is that the materialist "might argue" that the physical properties of the CT
scanners "occasioned structural change by impinging on the organization of radiological
work" (Barley, p. 106). This implies that the technical complications the scanners
presented coupled with the complexity of "its diagnostic signs" loosened role structures
due to the introduction of uncertainty "into a world hitherto well understood" (Barley, p.
106). At both hospitals, the technical complexity of the scanners and the radiologists'
inexperience with the diagnostic aspect of the work impinged on their authority and
"forced them to rely on the technologist" where normally this would not have occurred in
the diagnostic sector of radiology (Barley, p. 106). However, Barley states that from the
perspective of structuring theory, the complexity and consequent uncertainty generated
by the technology are "functions of how the machine merged with the social system" and
are not attributes of the machine itself. At Suburban, the scanner generated more
uncertainty and incited a "greater challenge to professional dominance" because
Suburban employed experienced technologists to operate the scanner with inexperienced
radiologists (Barley, p. 106), whereas at Urban, the "scanners threat was mitigated"

because the department relied on inexperienced technologists coupled with experienced radiologists (Barley, p. 106).

In conclusion, Barley contends that the differences in technical and diagnostic experience influenced the "relative distribution of expertise that constrained the structuring process," but these constraints only partially account for the overall differences revealed in each institution's occupation/organizational structure (Barley, p. 106). Barley argues that if the actors at each site had "negotiated their roles differently," structuring would have developed differently despite the "distribution of expertise" (Barley, p. 106). In short, if all radiologists had been experienced with the CT scanners prior to the inception of the new technology, then the scanners "would have surely occasioned other interaction orders" and formal structures.

In the next section, as the nature of radiography is feminized, yet consisting of males working within this profession, current literature on gender, labor and sex segregation is relevant to this study.

Gender, Labor and Sex Segregation

In the world of labor, the occupations are segregated in terms of being male dominated or female dominated, with the male dominated professions considered prestigious, high paying professions, while the female dominated fields are associated with low status and low pay relative to those fields dominated by men (Lemkau, 1984). According to Lemkau (1984), within our culture, "high achievement and suppression of emotion are the keystones of masculinity," and the man employed in predominately-feminized professions "represents both atypical sex-role socialization, and atypical career

choice" (Lemkau, p. 110). Therefore, being an elementary schoolteacher, male nurse or working in some other feminized profession "hardly epitomizes the male virtues of getting ahead or staying cool" (Lemkau, p. 110). Lemkau argues "boys are socialized to seek high status employment, and to measure their masculinity by the size of their paychecks" (Lemkau, p. 110-111). The female professions are low paying, low status, when compared to male dominated professions, a concept that is difficult to associate with men who work in female dominated professions. Furthermore, Lemkau asserts that boys are "socialized to eschew the world of feelings in favor of a more cerebral approach to life," while women approach their professions and their world through emotional sensitivity and nurturance (Lemkau, p. 111).

According to Lemkau (1984), "for those whose "interests lie in desegregating the U.S. labor force," and to overcome occupational sex segregation, men and women must "transgress the boundaries traditionally defined for their sex" (Lemkau, p. 111). An understanding must exist regarding career choice and gender, and this understanding can serve as a "basis for interventions to increase the range of career options considered by young people" thereby possibly alleviating occupational segregation (Lemkau, p. 111).

Unfortunately, research conducted on men who work in atypical occupations is lacking, and while there is some existing research consisting primarily of anecdotal articles and case studies, men who work in female dominated professions have not been studied and compared/contrasted with their more "traditionally employed male peers" (Lemkau, p. 111).

Lemkau asserts that given the "violation of normative sex-role expectations entailed in any atypical career choice," atypical career choices in men would also be correlated with socialization and personality factors that are indicative of lower sex typing, similar to what was discovered for "occupationally atypical women" (Lemkau, p. 111). In particular, it was expected this would be discovered among men in atypical careers when compared and contrasted to their male counterparts in typical occupations (Lemkau, p. 111).

Through random sampling Lemkau surveyed two groups of 50 men who held bachelors degrees and were working in careers she classified as career-traditional and career-nontraditional to assess their "male normative roles and gender-role conflict" (Lemkau, p. 112). Using an assessment tool based on masculine-related constructs as in (1) masculine ideology, (2) masculine gender role conflict, and (3) homophobia (Lemkau, discovered that men who work in female dominated professions "appear to have personality and background factors in common," and are different as a whole from men who work in traditional or male dominated professions (Lemkau, p. 120).

Similar to the women Lemkau studied in previous research (Lemkau, 1979, in Lemkau, 1984) it was discovered that for the men, "the psychological importance of the sex composition of one's chosen occupation is confirmed" (Lemkau, p. 120). According to the survey results, Lemkau found that men who work in atypical occupations are part of a pattern of "low adherence to traditional sex roles," demonstrating sensitivity, were highly or positively influenced by women where their choice of career was concerned,

and reported emotional strain or distance from their fathers. Such influencers did not emerge for the men in typical careers (Lemkau, p. 121).

According to Lemkau, the data also suggests that the men in the atypical occupations "more frequently experienced a major stress in the family" (e.g. sibling death, divorce of parents) that may have been "emotionally sensitizing for them, providing counter pressure to the socialization toward masculine emotional suppression" (Lemkau, p. 121). Lemkau discovered too, that more than half the males in the study were cultural minorities, and were from working class or lower class families, which suggests that "concerns for upward mobility may have motivated disadvantaged youth to enter" the female dominated professions, which can be permeated quite easily, a fact consistent with other research conducted on this area (Lemkau, p. 121). Lemkau closes her discussion stating that future research is necessary with larger samples from other geographic locations and to be conducted on men in "other than white-collar employment" (Lemkau, p. 121).

On a different path, Jacobs (1999) argues that throughout the year's men and women have worked in different jobs and in different types of organizations, with the differing distribution of men and women across positions within occupational structure being referred to as the "sex segregation of occupations" (Jacobs, p. 125). Sex segregation has remained a "defining element of the American occupational structure" but has declined in recent years. However, it remains persuasive within the occupations, contributing to the earnings gap between men and women and helps define choices in occupational positions for men and women.

Jacobs states that there are three distinct aspects of sex segregation, with the principle dimension that is the focus of much of the research is the "degree to which men and women are distributed unevenly across fields" (Jacobs, p. 126). Women would have to change occupations in order "match the occupational distribution of their male counterparts, and while the level of men to women in the labor force has declined in recent years, the level of women entering and working in male dominated fields has not changed much (Jacobs, p. 126).

A second aspect of sex segregation is the "crowding of women into a limited number of fields, and Jacobs states that crowding is an indication of the extent of opportunities for women (Jacobs, p. 126). While the majority of fields are now formally open to women, some occupations, such as engineering, remain by and large, "male preserves." The concentration of women into a small number of distinct occupations is an indication of the social restrictions women have experienced over the years (Jacobs, p. 126). An example of this is women receiving bachelor's degrees in teaching during the 1960's, or in one of 6 other fields, including English, fine arts, nursing, history and home economics. Men were more widely dispersed across the range of specialties, and this dispersion of men and women across the field's influences the relationship between supply and demand and financial potential of a field. Women earned less than men because they were crowded into these limited number of occupations, and these narrow sets of jobs were defined as "women's work," with an excess supply of women to work within this narrow parameter of occupations, "limited women's bargaining power and subsequently lowered their wages" (Jacobs, p. 127).

Some recent trends regarding sex segregation and occupations have been the entry of women into high profile jobs including physicians, lawyers, and the media, with a widespread sense that most fields are "equally open to men and women" (Jacobs, p. 131). However, Jacobs asserts that the change in the sex segregation of the occupations is "slower than popularly believed," with a number of female fields remaining predominantly female (p. 131). Male dominated fields (firefighting, police, electricians, plumbers, transportation) remain dominated by males, and Jacobs states that "despite all attention paid to women's entry into a few small" high profile fields, many of the large occupations remain dominated by males, with female fields still dominated by females (p. 131). While men and women do share their occupations with one another, with women representing 46 percent of the labor force, but the average man is employed in an occupation made up of 70 percent men and women remain "crowded in a more limited set of occupations than men" (Jacobs, p. 132).

A final point to emphasize is the discrepancy in wages for men and women. Studies have concluded that female dominated fields command lower wages, with two explanations being most influential regarding the wage gap, that of "crowding and culture" (Jacobs, p. 135). These two points of view discussed by Jacobs raise interesting points regarding wages, first, crowding "holds that restricting women from entering large numbers of occupations results in large numbers of women being available to work in female dominated fields including child care, retail, and restaurant service industry. By restricting women to these areas, serves to reduce wages and reduces women's earning potential in male dominated fields. The second point of view holds that our culture tends

to devalued women's work, with much of what women do as being "invisible," or marginalized. Occupations that are high on feminine values such as the emphasis on nurturing are devalued and accorded low wages, and unfortunately, the wage gap does not seem to be closing (Jacobs, p 135).

Roos and Gatta (1999) state that it is a "social truism that women earn less than men." Dating back to 1955 when researchers first began to track the female to male earnings ratio, into the present day this disparity in salary persists regardless of race/ethnicity, educational category, life cycle, and within detailed occupational categories (Roos and Gatta, p. 95). Through analysis of existing data and census micro data for 1970, 1980 and 1990, Roos and Gatta (1999) examined how the earning ratio for men and women differs among the detailed occupational groups, and discovered that among full time year round workers in 1990 the gap in earnings persisted for both male and female dominated occupations.

For their study Roos and Gatta (1999) elected to review a broad selection of occupations including the higher paying, higher prestige managerial occupations and the lower paying, lower prestige unskilled occupations. Among the female occupations they reviewed nursing, and dental hygiene and the male occupations included law and medicine. The list of occupations includes a considerable range, and throughout the comparisons, regardless of whether the ratio of male to female workers is relatively low (as in air traffic controller) to the higher ratio of female to male workers (as in nursing) the women again earned less than the men. In sum, Roos and Gatta state, "in none of the occupations we selected did women earn more than men" (Roos and Gatta, p. 102). The

data yielded that earning differences exist "both within as well as across occupations" (Roos and Gatta, p. 102).

Similar to Lemkau, Williams (1992) conducted research on men in feminized professions including nursing and teaching, and discovered that within these occupations, men encounter structural advantages that serve to enhance their career regardless of the gender makeup for field. According to Williams (1992), the societal assumptions where men possess an inherent propensity for leadership serves to create pressure for them to enter into administrative-type or leadership positions within the feminized professions (Williams, p. 256). From her study, Williams discovered that men receive preferential treatment in female dominated fields because "they are men," and are channeled into what are conceived as more "masculine" specialties within the profession. Williams argues that within the feminized professions a tracking system exists with men "tracked" into leadership/higher level administrative positions, and better paying and more prestigious specialties, thereby creating a distinct advantage for men over what women encounter within their "own" dominated professions (Williams, p. 257).

As indicated by the literature, the professions are gendered and so too is the nature of work performed within (Croissant, 2000). According to Croissant (2000) the gendered professions and the gendering of technology and technological work" carries with it implications for "work, wages and occupational trends, such as the feminization of a profession, meaning and teaching about technology" (Croissant, 2000, p. 174).

Within the contemporary society, the professions and technology are "gendered" which has "implications for the composition of the professions and the experiences of

men and women" working in them (Croissant, 2000, p. 173).   Croissant claims that the issues surrounding the technical-professional and women working within are "rooted in perceptual problems cause by culture," and that women are perceived by others (and themselves) as incapable of contributing to technical work. According to Croissant we perceive the highly technological professions to be "gendered masculine," and interpret the workload as suitable for males and not females (Croissant, p. 174). By interpreting work to be suitable for a specific gender, we place the work into the context and categories of being associated with masculine or feminine, thereby "fitting" the individual into this category of masculine –feminine according to occupation, ultimately placing a level of difficulty to the occupation and technological skills required (Croissant, 2000).

Not only are the professions aligned with a level of difficulty considered suitable for one gender over the other, but, so too, is education, were we also associate and "map" educational subjects from a gendered perspective (Croissant, 174). For example, the subjects that are correlated with masculine are seen as being either difficult, interesting, or "about things." Those subjects labeled as easy, boring, and "people oriented" are associated with feminine (Croissant, 2000). This mapping of scholastic subjects to male/female in turn perpetuates the gendered premise we hold about occupations, thereby "gendering the occupation" (Croissant, 2000). Thus, from this gendering of the professions and occupations, come the negative aspects, negative in the sense for women, where there exists internal gender-stratification where earnings are affected, as are the

opportunities for advancement and promotion rates (Croissant, 2000; Roos and Gatta, 1999; Williams, 1992; Williams and Villamez, 1993; Walby, 1988).

A number of theorists discuss technology as having a close association with masculinity, and that these technological "models of masculinity" can change over time, as can the "models of femininity" (Croissant, 2000, p. 181). These models are what Croissant calls "contemporary contradictions," in the sense that women possess "fine motor skills" to operate technology, as in sewing, but are considered to lack in the focus, patience and skills "to engage in detailed scientific work" (Croissant, p. 181). It is because society attaches meaning to things, or objects, such as technology, and in doing so, Croissant states, "we should consider gender and technology to verbs not nouns." By becoming verbs, gender and technology then become something we perform (Croissant, p. 182).

We "perform gender" in our everyday lives, from simple actions of choosing our clothing, to complex actions as in selecting a profession. Through our "performance of gender" we continuously divide the world on the "basis of sexual differences" (Croissant, p. 182). Similarly, we perform technology, and those who use technology perform technology, therefore, when we gender technology this presents a distinction between the masculine and feminine of that specific technology, providing a frame of reference for "appropriate technological and masculine identity association and expectations" (Croissant, p. 182).

There exists, then, a disjuncture between women and technology in the sense that there is a gendered ideal of "masculine tinkering" derived from the traditional

occupations from the blue-collar world, a world women did not have access to, as in car repair, carpentry, electronics, and construction (Croissant, p. 183). Croissant argues that women do "tinker," however, it is feminized "as arts and crafts, cooking, or gardening," The difference between the male and female "tinkering" is based on our long standing cultural perceptions, which in turn lends a distinction in our performance, from "working with" to "working on." For example, the male action of "repairing a car is performed as working on technology," while the female action to "fix dinner is performed as working with" (Croissant p. 183). This distinction between "working with" and "working on" defines technology as well, where technology becomes "low technology" by the simple act of defining it according to those who work "with" or "on" the technology (Croissant, p. 183). Moreover, the working with/working-on distinction embodies specializes skills, purportedly commanding more complex skills, is associated with masculine, and thereby regarded as "more valuable." Croissant claims, "it is the working on that requires a different skill set, is perceived to be a masculine venture and considered to be more valuable" (Croissant, p. 183).

In essence, as technology is so defined by the "working with" and "working on" distinction, and where such distinctions shift technology into "low technology," so to, this alters the complexity, where low technology is now "push button" work, no longer valuable, and not associated with masculine (Croissant, p. 183). Interestingly, with female dominated radiography, the irony exists in that this highly technical field that commands at the very least two years of education, with the opportunity to complete advanced study/additional certification in nuclear medicine, ultrasound, and other

modalities, has by and large been regarded by the medical and scientific communities as "push-button" technology that can be learned in six weeks (Cockburn, 1985, p. 125). This push button technology is so equated because it is related to our gender and because women's work is subsequently devalued, so to, is the work that is performed (Cockburn, 1985; Croissant, 2000).

To conclude, this section demonstrated how within the working world the occupations are gendered, with the negative connotations applying to women. Furthermore, The occupations remain stubbornly feminized or masculinized, however, women are capable of performing technical work, however, the distinction remains between working with and working on, that serves to keep technology masculinized and women out of those distinct fields, with the exception of radiography. The next section will present male and female student choice of subject and major, where also a distinction between masculinized and feminized subjects exists, that ultimately influences the professions.

Male and Female Student Choice of Subject and Major

Research on students in community colleges has primarily focused on the nature of the students in terms of cultural background (London, 1978), academic performance (Weiss, 1979; McGrath and Speer, 1992), and the "new, non traditional type of student" who attends community colleges (Cross, 1991, Warren, 1991), there is little information for community colleges that focuses on sexual inequality within college majors for the two year educational sector. It is essential then, to review research from four-year

universities, as it is considered relevant to student choice of subject/major and experiences in their chosen educational programs that lead to employment.

Researching sexual inequality within college majors, Hearn and Olzak (1981) were interested in whether sex differences at entry into specific college majors lead to "major related behaviors that serve," in conjunction with the departmental organizations, to "reinforced the system of sexual inequality that is present in society (Hearn and Olzak, 1981, p. 196). A large body of research exists that "suggests" that gender based differences are prevalent when it comes to the relationship between education, occupation, self-concept, satisfaction, and aspirations (Hearn and Olzak, p. 196). Furthermore, evidence exists on the gender differences across both college majors and occupations, with women distributed into college majors that "may be less marketable than those of men" (Hearn and Olzak, p. 196).

However, with evidence in existence, there is still the need to question why women, as a group, tend to major in areas that offer fewer rewards in the occupational stratification system (Hearn and Olzak, 1981). Are women concentrated in these areas because of subject preference based on "earlier socialization," and perceptions of the occupational structure, or does the organizational structure of higher education serve to actively reinforce "sex-typical majors and occupational choices" (Hearn and Olzak, p. 196)? Through a series of several hypotheses, Hearn and Olzak proposed that students, in their choice and evaluations of college major departments, will "react positively to supportive internal organizational features and rewarding links to the external socio economic systems" (Hearn and Olzak, p. 195). They also proposed that men and women

attach differing weights to internal and external features in selecting and reacting to college departments, and that, "organizationally, favorable internal characteristics will rarely be coincident with favorable external characteristics" (Hearn and Olzak, p. 195).

Students chose college majors based on "intrinsic" criteria, with intrinsic being founded on personal growth, satisfaction, and expression, and are influenced by faculty. Hearn and Olzak assert that there is evidence revealing that women, in selecting their educational environment, place greater weight and are more attuned to the personally supportive environment, while men place more weight on rewards, achievement, and status attainment (p. 197). Hearn and Olzak hypothesized that (1) major departments with closed occupational ties to larger socioeconomic systems and higher status will be less supportive of their students than other departments, (2) women are more likely than men to select majors with favorable "internal departmental characteristics," and will therefore house a higher percentage of women, (3) women are more likely than men to chose college majors that produce "lower status rewards," and majors with higher status rewards will be lower in the number of women, (4) men are more likely to choose college majors with close links to the occupations that are considered high in status, certification and yield greater economy, and, thus will house a higher proportion of men, and (5) women "receive greater satisfaction than men from the supportive internal characteristics in their department" (Hearn and Olzak, pp. 197-198).

The results revealed support in consideration of the hypothesis regarding the interrelationships and impacts of departmental features, and the sex composition of majors and sex differences were strongly related to the "internal environment in expected

patterns." Males opted for negative or unsupportive social climate departments that conferred higher rewards, and women opted for those departments that are more supportive but conferred lower rewards (Hearn and Olzak, p. 202). According to Hearn and Olzak, a strong correlation exists between women "encountering more supportive departments" that lead to lower to payoffs" upon graduation (Hearn and Olzak, p. 203). Additionally, Hearn and Olzak discovered that women were more likely to major in vocationally specific programs, where this is consistent with the literature that lower-status people tend to enter those programs that hold "close linkages to lower paying occupations" (Hearn and Olzak, p. 203).

On the intrinsic internal factors, men and women responded well to overall supportive faculty and good grades, however, further analysis revealed that good grades might have been mediated through supportive personalized interactions with faculty members (Hearn and Olzak, p. 203). The results revealed that for men, closely linked majors tended to limit satisfaction levels, but for women, "the positive effects of higher status rewards occurred only in those areas that are closely linked to specific occupations, and only with the critical sustaining role of supportive individual faculty members in those areas" (Hearn and Olzak, p. 203).

While the results tentatively reveal that women might be satisfied in male dominated areas, such results "hint" at the fact that even in those particular fields, women are more sensitive to "social aspects of their experiences than men" and without warm supportive faculty lending individual interactions with the students, ambitious women

may "sort themselves (and be sorted) into traditional majors that provide low rewards upon graduation" (Hearn and Olzak, p. 203).

Also interested in student choice of subject/career, Jome and Tokar (1998) conducted research on men who pursue female dominated educational programs and careers. They utilized three masculinity-related constructs which have received little attention in the literature, (1) masculinity ideology, (2) masculine gender-role conflict, and (3) homophobia, and surveyed two groups of 50 males classified as career-traditional or career-non traditional, with the participates being undergraduate and graduate students pursuing majors that are either female dominated (the nontraditional) and male dominated (the traditional) (Jome and Tokar, 1998, p. 120 – p. 123).

Jome and Tokar argue that while numerous studies exist on women pursuing and entering male dominated professions, few studies have "illuminated the distinguishing characteristics of men who choose non-traditional careers" (Jome and Tokar, p. 120). In support of this study, Jome and Tokar state two specific reasons behind the importance of gaining better understanding of men who pursue female dominated professions, first, movement towards a "more gender-balanced labor market" involves occupational selection of both males and females, and with the influx of women entering male-dominated professions, men will be forced to consider female-dominated professions (Jome and Tokar, p. 121). Second, women who pursue male dominated professions are considered to be improving in their career status, while men who enter female dominated professions are often discouraged as these occupations are devalued, lower in status and salary. Men are ridiculed for working in such professions and exhibiting "gender-

inappropriate" behavior (Jome and Tokar, p. 121). Thus the purpose of Jome and Tokar's study was to extend understanding of men who choose such non-traditional careers by examining "psychologically meaningful individual difference variables meant to differentiate these men from those who have opted for more traditional careers" (Jome and Tokar, p. 121).

In support of this study, Jome and Tokar state that previous studies that have focused on men who work in nontraditional careers are seen as harboring personality and behavioral differences that distinguish them from males who work in traditional careers, yet such studies have revealed few differences in personality and behavior (Jome and Tokar, 121). However, and similar to Lemkau's (1984) study, Jome and Tokar did discover one consistent emergent factor, that men who worked in or pursued non-traditional careers "self-reported lower masculinity scores, higher femininity scores, higher androgyny scores" (Lemkau, 1984, in Jome and Tokar, p. 121) and held less traditional gender-role attitudes" (Hayes, 1989 in Jome and Tokar, p. 121). Thus the "notion that traditional gender role influences choice of a traditional career is consistent and it is reasonable to speculate that individual differences in men's gender role orientation might contribute to their willingness to pursue the non-traditional careers" (Jome and Tokar, p. 121).

According to the constructs that have been revealed by past research, Jome and Tokar hypothesized that (1) men who pursue traditional or male dominated careers would "endorse the masculinity ideology to a greater extent than would career-nontraditional men," (2) men who pursue traditional careers would endorse to a greater extent, based on

fear of femininity, four dimensions -- success/power/competition, restrictive emotionality, restrictive affectionate behavior towards the same sex, and work/family conflictions, and (3) men who enter traditionally masculine careers would "endorse homophobia to a greater extent than the men who sought nontraditional careers" (Jome and Tokar, p. 123).

The results of Jome and Tokar's study supported all three hypotheses, and more specifically, they discovered that men pursuing traditional careers "endorsed antifeminist and toughness norms, reported difficulties concerning restrictive emotionality and restrictive affectionate behavior between men," and demonstrated a higher level of homophobic attitudes than did men pursuing nontraditional careers (Jome and Tokar, p. 129). Jome and Tokar claim that these results are "consonant with reports in prior literature," however, there are limitations to the study, limitations including homogeneity of the population surveyed, and that these men might not actually enter the field they are studying" (p. 130). Ultimately, Jome and Tokar state that the masculinity related variables are useful in understanding the career choice process for men (Jome and Tokar, p. 131).

Also interested in student choice of major Seymour and Hewitt (1997), conducted a longitudinal study on undergraduate students leaving or switching from sciences, math and engineering, opting instead to finish their undergraduate education in other programs. This study provides perspective on gender issues and reveals the differences between male and female interpretations of their experiences in these three areas of study. Perhaps the most telling fact of the study is why women under-participate in the sciences,

and what men stated about their experiences in the sciences. Regarding issues of gender, Seymour and Hewitt reviewed the prior findings of female students experiences and low level of persistence in the sciences. Such studies once assumed that women switched out of the sciences primarily because of low grades and low level of confidence in mathematics, however, this is an assumption, as women have proven to be academically as able as their male counterparts, in some cases demonstrating higher than average performances academically (Seymour and Hewitt, p. 236).

The findings of other past studies led Seymour and Hewitt to consider the connections between high academic ability and smaller numbers of women entering the science, math and engineering. Seymour and Hewitt discovered that the female major switching decisions are influenced by many different factors including a (1) high degree of competition, (2), lack of academic advice and assistance, (3) disappointment of the faculty pedagogy, (4), and prejudicial attitudes from the white, American male professors towards the female students (Seymour and Hewitt, p. 239-240).

Of importance, Seymour and Hewitt discovered that gender differences do exist, with the male students concerns towards their education being of a different venue. For the males, they were more inclined to place career goals above personal satisfaction, while females expressed greater concern towards finding cohesiveness to their career goals, personal priorities, and educational aspirations. Thus, for the male students, they expressed a willingness to shift majors primarily as a means of improving career prospects (Seymour and Hewitt, p. 236).

Of interest, Seymour and Hewitt found there to be no data to support the former assumption that women would be more likely then men to switch from science, math and engineering majors because they had "less natural aptitude," demonstrating stronger aptitude for the non-SME majors. Furthermore, Seymour and Hewitt did not discover data to support the assumption that women switch into non-science disciplines as these areas are more "suited to their abilities and/or temperament" (Seymour and Hewitt, p. 237). When compared to men, greater numbers of women switched from the SME majors based on intrinsic interest in other majors, the desire for a better overall educational experience, and the "career options and/or lifestyle" (Seymour and Hewitt, p. 237).

Of importance, Seymour and Hewitt discovered that when they compared the male/female student reasons for dissatisfaction with the SME majors and their influencing decisions to switch, women were twice as more likely to switch and pursue careers that offered a "greater prospect of more humanitarian or more personally satisfying work" (Seymour and Hewitt, p. 237). These findings are instrumental, as radiography is math/science intensive in the curriculum, while simultaneously offering "humanitarian work," as in patient care, dispelling myths that women do not prefer math/science intensive coursework and but do desire to work with people.

Summary

In summary, the compilation of literature represents an overall rounded perspective on the past and present issues surrounding the radiography profession, community college student population, student choice of career, the gendered

occupations, and so forth. With each study that has been depicted in this literature review, such studies direct the analysis of each student's responses, thereby lending validity to the emergent themes as correlations are made towards some of the existing literature.

Furthermore, the existing literature serves to guide the research questions, and each set of research questions are guided by the various literature included in this study. For example, the first set of research questions specifically explores the student's choice of radiography as a major, and why they elected to enter this profession. The literature on student choice of educational programs and choice of careers, for example, the study conducted by Seymour and Hewitt (1997) reveals where influencing factors regarding student decisions to switch educational programs can be strongly related to our gender roles, where the results of their study revealed how female students are twice as more likely to switch and pursue careers that offered the prospect of conducting humanitarian or personally satisfying work (Seymour and Hewitt, 1997). The other studies depicted also revealed differences among males and females in choice of major and career, lending validity to the research questions attempting to seek out such differences among the male and female students in this study, where they eventually go upon graduation, and why.

Additionally, studies on student demographics and characteristics guide the first set of research questions, where the preexisting knowledge on student culture, ethnicity, and socioeconomic status, as in the work of London (1978) and Warren (1991), that are vital to guide the research questions where a comprehension of socioeconomic status for community college students is vital for the interpretation of the students backgrounds,

most likely crucial influencing factors for their choice of major/career.   Furthermore,

Grubb (1999) informs us on the educational and personal background of students, also

considered vital information to guide the interpretation of the responses to the research

questions, where students will be working on a second career, or have been "bounced

out" of their former occupation, thereby seeking new careers, regardless of the type of

work involved. Many students might desire a quick fix in terms of education, and elect

an educational program that will place them into direct and fairly lucrative employment,

correlating directly to radiography, where many students fit those characteristics

described by Grubb (1999) and the others depicted in this study.

For the second set of research questions addressing students and technology of the

profession, the work of Cockburn (1985), and Barley (1982; 1996) are instrumental.

Cockburn (1985) addresses male and female differing perceptions regarding the

technology of diagnostic and CT scanning, and how the technology is "deskilled," in

accordance by who operates it. Barley (1982) describes how technology occasions

change, highly instrumental as the students are working with new state of the art

technology as in digitized/computerized equipment.   Moreover, Barley (1996) also

directs the research questions where it has been demonstrated how the world of work is

changing, and technological advances are redirecting, restructuring and redefining

occupational parameters.

Addressing the third set of research questions, the historical work of Hernaman-

Johnson (1919) and Menville (1934) created the foundation for this particular set of

questions, and where the student responses served to remind us that, over the years, little

has changed between radiologist and diagnostic radiographer, as technologists are still playing the role of "intelligent layman" responsible for producing the images (Hernaman-Johnson, 1919, p. 185), with the radiologists responsible for the interpretation of images, and delegation of imaging protocols.

Of vital importance, the historical case studies of the profession of radiography presented by Larkin and Witz also serve to create a strong framework for the research questions. In particular, student responses did indeed revolve around the age old "rivalry" between male technologists and radiologists and the subsequent patriarchic treatment given to both the female and male technologists.   Moreover, the responses to the questions revealed, in particular for the female students, the intra-occupational closure mechanisms so described by Witz (1992).

The literature on gender, labor and sex segregation, and also the ASRT statistics/demographics on the profession provided the substance to guide the third set of research questions, as student responses revealed a microcosm of labor inequity and sex segregation existing within the imaging profession, with women being channeled into lower paying areas, excluded from higher paying management areas, men in a feminized field being treated as "tokens" (Williams, 1992). Such literature on the larger occupational structure and consistent inequities that surround labor provided a vital foundation (Roos and Gatta, 1999; Jacobs, 1999).

Overall, the choice of literature in this study shaped not only the research questions but guided the analysis, and proved of vital importance as the themes emerged and connected to the various literature, and the findings depicted here reflected past

findings from the literature, lending validity to findings, and allowing for some of the research questions to be addressed. The foundation of this study was built by the compilation of various literatures.

CHAPTER 3

METHODOLOGY

Design

The design of this study is based on field research, through use of a qualitative

methodological approach. The goal of field research, according to Singleton and Straits

(1999), is not to be personal, but is defined as "scientific research, in order to build a

general or abstract understanding of social phenomena" (Singleton and Straits, p. 320).

To conduct qualitative studies, field researchers "have developed special skills and

techniques for observing, describing" and comprehending everyday life in any context

(Singleton and Straits, p. 320). As I studied a small sample of people who are nested in

their context, are considered, and reviewed from an in-depth perspective, use of

qualitative methodology is decidedly optimal.

This is a dual case study where an explicit sampling frame was utilized, guided by

research questions and theoretical framework, as, according to Miles and Huberman

(1994), multiple case studies can eliminate the issue of generalizing. With a small

purposive sampling data set, the "choice of cases is made on conceptual grounds, not on

representative grounds" (Miles and Huberman, p. 29). For this dual case study, the

interview data of 39 radiography students selected from different levels in their

educational progress, 10 second year and 9 (one student declined just prior to the

interview) first year radiography students from one college, and 10 second year and 10

first year students from the second school, was obtained, with the two community

colleges geographically located within 50 miles to one another. Because I am interested

in what students perceive about their surrounding, career interests and self-identity according to gender roles, this justified collecting data through qualitative methods. Furthermore, this type of research methodology and data collection is relatively rare for the type of college programs and the students within. The studies of radiography programs and the students or faculty within have been obtained by use of quantitative methods, as in survey data. Furthermore, longitudinal studies and data collection/interpretation of the profession itself have been conducted through use of survey methods as well (ASRT, 2001; ASRT 2004).

The intent was not only to be original in design and presentation of radiography students, but decided upon as the words of those interviewed wholly comprises the data and deserves to be presented in its true context. Moreover, this study was modeled after other key studies where the interview data of students was presented, as in Seymour and Hewitt's (1997) combined quantitative and qualitative longitudinal study on why students leave the sciences, and Winslow's (1995) case study on senior girls attending a Catholic college preparatory school, where she sought information on the girls in terms of their future decisions towards attending post-secondary education. Thus, through the words of the students, interview data reveals much about student identity, and, in particular, for this study, why male and female student enter a historically feminized, professional allied health occupation as in radiography.

In addition to interview data, descriptive statistics were used to supplement statements and comments regarding salaries, gender levels in the radiography educational arena, and gender levels in the radiography medical arena. A pilot study was conducted

prior, where practice enabled me to test the use of interviewing style and format, setting the stage for the projected 40 interviews to be conducted on students from the selected institutions/radiography programs. As part of a pilot study, one hospital administrator was interviewed, along with five first year students and one recent graduate from my own program. The nature of the pilot interviews was to allow for familiarity with use of a semi-structured interviewing format (Berg, 1995), and "interviewing by comment" method (Snow, Zurcher, and Sjoberg, 1981). These two types of interviewing methods were utilized for this study.

Over a period of five and a half months, beginning in February 2004 and ending in June 2004, I traveled to the different institutions, visiting one campus on three different occasions from February until mid June. I visited the second radiography program campus once, and then traveled to four clinical affiliation sites associated with this particular radiography program on different days from the beginning of February through mid April. This visitation schedule was based on student availability, and conducted in two to four hour segments. The second year cohorts for both programs were approaching graduation at the end of May, and the first year cohorts for both programs had only just started their clinical externship rotations and were still very new to their training environments.

<u>Choice of Colleges</u>

The 39 first-year and second year students are from two RT programs housed in public urban community colleges located in Southern California and within 50 miles of one another. The two institutions in this study are referred to under pseudonyms, the first

is "Beach City College" (BCC) and the second college is called "Inland Community College" (ICC).

I began my search for students to interview beginning back in May 2001, electing to study these Programs and the students from BCC and ICC for some specific reasons, (1) I originally had sent out a contact email to seven Radiography program directors from programs located in Southern California that are geographically close to my home city. Reasoning was based on (1) convenience of location in terms of travel time to and from the campuses and medical facilities, and (2) out of the seven directors contacted, the two Program Directors from BCC and ICC were the only individuals to respond to the email. These two directors expressed interest in my project and were open to the interviewing of their students. Interestingly enough, out of the seven directors contacted, the BCC program director has a Doctorate degree and, at the time, the ICC Director just completed working on a Master degree. Through our communication by email I derived that both Directors were cognizant of my educational endeavor and goals having accomplished their own educational pursuits, with the BCC program director commenting via email, "good luck finishing your dissertation, it's a real chore" (Goodson, 2001).

To gain more information on these specific programs, I reviewed the general academic entrance information available on their websites. In accordance with rather strict national standards, these two programs are representative of radiography programs across the country, being comprised of the recognized Joint Review Committee on Education in Radiologic Technology (JRCERT) accredited curricula. Some basic program information on the two programs listed in the *American Medical Association*

Health Professions Career and Education Directory (2001) indicates that BCC is a 30 month long program and ICC is 24 months in length. BCC awards an Associate of Applied Science degree and ICC awards a Certificate of Achievement (AMA Health Professions and Career Education Directory, 2001). However, the Certificate of Achievement does not necessarily indicate broad changes in radiography program curricula; rather the two different certifications influence transfer of credit ability and general education requirements to higher-level institutions.

For admission requirements, BCC requires that students complete reading and mathematics proficiency examinations, provide evidence of physical and emotional fitness medical examinations, and demonstrate completion of three prerequisite courses. The selection process is influenced by date of the application, number of program required science and general education courses completed, and application responses to the required application procedure (BCC Curriculum Guide, 2001). ICC admission requirements are that students have passed Math 125, Physics 10 and Physiology 126A and 126B with a minimum of a grade of C. A complete record of health from evidencing physical and emotional health is required.

At the time of gathering the general data on BCC and ICC, I learned that both programs have female Program Directors, female Clinical Coordinators, and various male and female adjunct faculty teaching different radiography core and non-core courses on a part-time basis (Goodson, 2001; Spires, 2001). For example ICC has six part-time faculty members who teach various courses and visit the students at their externship sites on a weekly basis (Spires, 2001). The ICC Director would go and visit students in the

clinical site (Spires, 2001), and the BCC Program Director had a considerable amount of class contact hours with the students (Goodson, 2001).

<div align="center">Choice of Subjects</div>

Interview data was gathered from twenty radiography program students from the first year and second year cohort of BCC and twenty radiography program students from the ICC first and second year cohorts, thirty-nine students in all. While arranging the interview schedules via email correspondence, I inquired from both Directors about class sizes and learned, at the time of inquiry, that there were 26 first year students and 26 second year students for BCC (Goodson, 2003), with ICC consisting of 22 first year students and 15 second year students (Spires, 2003).

These particular cohorts were interviewed based on the rationale that the first-year students are in their second semester, which is their first semester of clinical rotations. Thus, these students have little experience of the profession having just embarked on their clinical training and are learning the nuances of the hospital, the departments, coping with patients and working slowly on furthering their skills learned in the classroom. The second cohort was in their final semester, scheduled to graduate at the end of May 2004, and preparing to take the ARRT national certifying examination. The second-year students were elected based on the rationale that they were almost ready to enter the workforce and have trained as students for over a year, nearing the completion of the California required 2000 hours of radiography clinical training (Department of Health Services Radiologic Health Branch, 1983).

A second rational for electing to interview the second year cohorts is based on the fact that during this final portion of their training, these particular students at this point in time had elected to observe other imaging modalities and medical specialty areas, thereby forming their opinions and making decisions about what, if any, imaging modality areas to enter in the near future. In comparison, the first years students learn about other imaging modalities in the classroom on a limited scope, and at this point of time in their training the first year cohorts come in contact with the staff of such areas infrequently and their knowledge base is limited at this time in their training, however, both sets of students are exposed to the various imaging modalities to some extent, and certainly worthy of obtaining information from both cohorts.

Moreover, both cohorts are influenced by the technologists, managers, radiologists and other staff they train among, with the second year students are more apt to be influenced at a greater level as they become prime candidates for direct employment at the facilities they have trained at. At this advanced stage in their training they learn to develop mentors from such key individuals including the department managers, lead technologists and the technologists who work in the imaging modalities/specialty areas. For the second year students, this information appeared to be commonplace, as they would mention key people who had influenced their graduation/future decisions at a greater level than the first year cohorts. The first year cohorts, on the other hand, were highly susceptible to faculty influence than the imaging modality technologist, as they did not spend their time rotating through these areas at such an early stage of the externship training.

Sampling and Data Gathering

Subjects

Utilizing a series of interview questions based on the research questions, data was obtained through purposive sampling (Berg, 1995) and use of a bi-modal distribution, indicating that interviews were conducted on the first year and second year students, who were in different stages of clinical training. I had also elected to attempt to interview an even number of male and female students per cohort, however, this did not occur. Originally, the intent to interview even numbers of male and females was indicated via email to each Program Director, with the idea that they were to communicate my study to each student and allow students to volunteer. I had requested five males and five females from each cohort, and the ICC Program Director obliged and arranged the interviews for me according a schedule she put together, arranging the days, and time slots for each student. The BCC director let the students volunteer on their own, possibly not communicating my requests for a balanced ratio of male to female students from the second year and first year cohort. Interestingly, the majority of the students who volunteered from BCC were males.

From the outset, forty students were to be the interview subjects, with there being thirty-nine students who volunteered from BCC and ICC, twenty from each Program, broken down as 10 interview subjects from the first year and second year cohorts.   For the BCC program I interviewed seven male and two female first year students (one student refused to be interviewed at the close of the final interviewing session), and four male and six female second year students. For the ICC program I

interviewed five male and five females per cohort, with one student in the second year cohort who interviewed with me twice.

<div align="center">Time Sequence - Interviews</div>

It was originally thought to interview the BCC students on the campus, but this proved to not be convenient to the Program Director as she informed me that it was difficult to assemble a large group of students on the campus on the same day (the ICC Program Director assembled up to eight students per scheduled time, demonstrating perhaps more flexibility and willingness on her part to assist with the study). For BCC, I journeyed to the campus on Friday to interview students, however, only an hour was granted to me, allowing enough time to interview two students prior to the start of class. With the prospect of limited campus time for interviewing on the horizon, and concluding there were 18 students to interview, there was not enough time on Friday to interview a larger number than one or two students. The timeframe for completion of the interviewing would not be possible, therefore I requested via email correspondence (see Appendix B of this study) to the Program Director permission to travel through out the city and surrounding area to interview the students while during clinical training. She agreed to this and sent a list of facilities, indicating how many first year students and second year students were training and on what days. She also sent contact clinical instructor information, and telephone numbers. I telephoned six medical facilities, and was successful in making first time contact with four clinical instructors who agreed to my conducting interviews during the clinical hours, and we arranged a schedule that spanned from the beginning of February through the end of April. I traveled throughout

the city via use of map quest and visited the four medical facilities[2] affiliated with the

school, hoping to catch a sufficient number of students (who also had volunteered to be

interviewed) to interview during the time allotted.

It was fortunate that the clinical instructors in charge of the students were friendly

and willing to help, with the majority of them arranging meeting room space for the

interview times and allowing me adequate time to meet with each student. Three of the

clinical instructors were interested in the study, were conversational, and made it a point,

regardless of how busy they were, to give me tour of their radiology department and

facility, often asking many questions about my education, current position and plans for

the future. As a former technologist, and now turned educator, my time is spent visiting

the students at hectic medical facilities on a fairly regular basis, thus I was somewhat at

ease during the visits and familiar with the imaging departments, thereby allowing for

comfort towards my surroundings. In addition to familiarity with the hospital physical

surroundings, I was primarily at ease with each student, given my own occupational

background where contact with students takes place daily.

For ICC I visited the campus on three separate Fridays, on February 4th, April 30th

and June 25th, where the Program Director assembled groups of first and second year

students together on the same day, issuing a prearranged schedule for each student

follow, which each student dutifully followed, and they waited in the classroom for their

turn while fellow classmates were interviewed ahead of them.   The interviews went

smoothly and as planned, with the assistance of the Program Director playing the lead

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[2] Two medical facilities were visited twice, in order to capture a large sample of first and second year
students training on the same day.

role in such consistent orchestration. Upon each visit, I spent time with the Program Director, discussing Program issues and sharing advice with one another, thus establishing a valuable relationship where we were on common ground. In contrast and when compared to my meeting the BCC Program Director, we established a first time meeting relationship as almost more of a student to Program Director interaction, where we did not share common ground.

While visiting both campuses, there was opportunity to observe the college campus surroundings and program resources. The BCC campus is situated in the center of the city, and spread out across a number of blocks, merging in with the city environment. Parking was difficult to find and I could not seem to locate a designated parking lot nearby the building where the Radiography classroom was housed. While walking across the campus after locating the building, I noticed some buildings needing repair, and with the building I entered with its open-air hallways seemed in need of renovation. Once in the classroom I encountered the Program Director explaining a well known but complicated physics concept to a student on the blackboard, upon introductions she explained that there was an hour prior to the class starting. As I set up for the interview, I took note of the unlit, large classroom, filled with books, long tables and old radiographic equipment consisting of a large, cumbersome radiographic control panel, and battered looking tube/radiographic table. Clearly the equipment had survived the constant student use and most likely still takes adequate radiographs (radiographic equipment can last for years if maintained properly), however, in accordance with the changing technology, needed to be upgraded.

The ICC campus was situated within the city as well, but more enclosed, with an obvious campus entrance point and parking spaces. The Program Director had arranged for a visitor-parking permit, with the designated lot close to the building. The campus was clean, neat, modern, with the buildings well labeled as well as a map to guide. The students on this campus were a broad mix. The building was enclosed, with wide clean hallways, and a professional staff who guided me towards the Radiography classroom. The classroom was well lit, neatly organized, filled with desks and bulletin boards across the walls, with student achievements tacked on each available space. The Program Director, clad in a lab coat, greeted me warmly, and then showed me to the unused small meeting room where I would be conducting the interviews in private.

Interviews

For BCC, prior to my arrival, or at times during my visits to the hospitals, the students were informed about my presence and interview requests, the project was explained to them briefly by the Clinical Instructor, and then they volunteered. Interestingly, the students were eager to be interviewed, and I mused that the time they spent with me was time spent away from the busy departments with the influx of patients. As I traveled to each facility I met with the students on an individual basis in various locations and tape-recorded each interview, supplemented by handwritten notes. I met with students in various locations, a small office (one office that had an electric generator intact above the desk, adding a noise dimension to the interview, thereby causing me to sit close to the students in order to not miss words or sentences), and staff lunchrooms, where it was fortunate to not be peak lunchtime, and we were allowed privacy. I also met

with a number of students in a meeting room, where we were requested during one interview to vacate the room for a scheduled meeting.

For the ICC cohorts I met with each student individually, in what appeared to be a meeting/storage room, allowing for privacy, and a familiarity with the surroundings. The students waited in the radiography classroom according to a prearranged schedule, at the close of the interview I instructed the student to send along the next interviewee whose name was on the schedule, and each student arrived in sequence.

With each student from both of the programs I attempted to establish a rapport by explaining to them who I am, what I do and what I am attempting to accomplish. I arrived dressed in casual, common student attire – jeans, sweater, or t-shirt, in order to establish an almost "student to student" environment, as opposed to a program director/professor to student structure, which, I theorized, might cause the students to be more nervous than necessary. I did not want to meet the students with a division already created prior to the start, knowing that this type of pre-established relationship might hinder the interviews, as students would be reluctant to open up with me, considering me an authority figure similar to their own program director. I also assumed that if they considered me as a program director, they would be less inclined to communicate with me.

The students were often nervous, but learned to relax as we talked in a casual format, where stories where shared and humor was interjected into the dialog on a frequent basis. It was towards the end of interviews that the majority of the students

wanted to ask me questions, which would then prompt them to talk freely, often after the tape recorder had been turned off.

Overall, from both Programs I encountered students who were friendly, positive of the training they have received thus far, and optimistic towards their future in radiography. The students were interested in my educational goals and career trajectory, and were respectful of my project. At times I gave students advice about studying for the American Registry Radiologic Technology National examination, using my experience and my own students as a reference. I also gave advice regarding pursuit of other imaging modalities, using my career path as an example, encouraging them to not let go of their goals and future aspirations.

Data Production

The individual interviews were conducted through use of a "semi-standardized interview format"(Berg, 1995). The semi-standardized interview format "involves the implementation of a number of predetermined questions," to be asked of each interviewee in a systematic and consistent order (Berg, p. 33). According to Berg, use of this method of interviewing also allows the interviewer the freedom to digress, and to probe beyond the given responses to the standardized questions (Berg, p. 33). Berg states that the questions used in a semi-standardized interview "can reflect an awareness that individuals understand the world in varying ways" (Berg, p. 33). Use of "unscheduled probes" can enable researchers to "approach the world from the subject's perspective" which is considered valuable because hidden issues and emotions might possibly be revealed through this method (Berg, p. 33). Through use of this interviewing format the

ability to prompt the students to reveal thoughts and perspectives emerged, and ultimately, the majority of students digressed freely, specifically during the last question and at the end of the interview.

Each interview started out with responses to general questions, including gender, age, family background, family/individual education, and family/student work history. Each interview question was asked in systematic fashion; however, students were allowed to talk freely and without interruption.

For each interview, and to guide the process, in addition to a semi-structured format, I utilized the "interviewing by comment" method (Snow, Zurcher, and Sjoberg, 1981) where comments are utilized as opposed to questions. According to Snow, Zurcher, and Sjoberg, interviewing by comment is helpful in eliciting verbal information from those being interviewed as it "facilitates the process of discovery" (Snow, Zurcher, and Sjoberg, p. 286). Snow, Zurcher and Sjoberg argue that "there is an elective affinity of sorts between interviewing by comment and the discovery process" as comments are less likely than the questioning format to frame answers "nor mobilize concern with self-preservation and normative properties" (Snow, Zurcher and Sjoberg, p. 291). Interviewing by comment is an appropriate means to gather information about "certain acts, events and relationships" (Snow, Zurcher, and Sjoberg, p. 291) and I found this method particularly useful, as I desired to gain information on the relationship between the students and specific individuals in the medical arena, and assumed that students would be less likely to discuss sensitive issues through basic responses to questions. It is also reasonable to assume that students would be less inclined to state their observations

and perspectives on status, hierarchy and closure mechanisms within imaging

departments through use of interview questions, therefore, in order to gain information to

sensitive issues and perspectives I employed three main types of interviewing by

comment methods, (1) puzzlement, (2) humor, and (3) the replay (Snow, Zurcher, and

Sjoberg, 1981). Puzzlement enable me to seek clarification when statements did not

make sense, or were unfinished, humor allowed the respondent to relax and enabled me

to indirectly explore sensitive issues or statements, and the replay allowed for

clarification of statements that were unclear, vague or ambiguous. Ultimately, all there

methods of interviewing by comment served the purpose well throughout each interview,

in particular with replay allowing for clarification without leading the students.

Data Analysis

Background Information

The background information of each student was recorded and placed into a series

of tables, one table per cohort (see sample table below). This information was used to

organize the background information of each student, and to review gender, ethnicity and

socio-economic status in relationship to the interview statements made by each student.

The tables allowed for organization of each student in accordance with their "ID coding,"

as in BCC S1, through S10, BCC F1 through F9, ICC S1 through S10, and ICC F1

through F10. The tables provide a reference for each student in the appropriate cohort,

listed by Ethnicity/race, ID code, age, immigration status, occupational status, education

of parents, and gender, and served to help keep the student information organized and

conveniently located for continuous reference.

TABLE 3 – DEMOGRAPHIC DATA PER STUDENT COHORT (SAMPLE)

ETHNICITY /RACE	ID CODE	AGE	IMMIGRANT	WORKING CLASS	PARENT'S EDUCATION	M	F

Prior to the interviews I was not certain what I would find in accordance to the ethnicity and working class of each student, however, based on London's (1978), Warren (1991) and Grubb's (1998) literature, I theorized that the majority of the students would be working class adults or students originating from working class parental backgrounds. Without being familiar with the geographic location of the colleges, I was not entirely certain what the racial backgrounds would be for the students, however, given a review of the literature, I theorized that each program might reveal similarities in student body, given the relatively close geographic proximity, and the student body would be in accordance with the demographic data found in Carwile's study (2003). In Cawile's study, she reported that the majority of students in radiography programs were female, but were not comprised of enough Asian, Hispanic, or African American students (Carwile, p. 85).

<u>Interviews</u>

Each interview was tape recorded with the permission of the respondent and transcribed verbatim. After the transcribing I utilized content analysis for the interpretation of data (Berg, 1995). I coded the interview text in order to look for

connections to the research questions and previously identified themes.   I use what Berg

describes as "the smallest element" counted in content analysis--words (Berg, p. 181).

When searching for words, generally one is counting or looking for the "frequency

distribution of specified words or terms" (Berg, p. 181). In addition to counting or

looking for the frequency of specific words, I reviewed in what context the words were

utilized in sentences and phrases, for example, how the words are used to describe

technology, indicating how complex the technology might be to learn, how interested the

students were in the technology, and so forth. From the words and phrases I identified

common themes for the male students and the female students, and identified common

themes per student cohort. The themes were identified to each set of research questions

and placed within a "research question category." Unique themes that did not necessarily

"fit" under the research questions were identified and categorized outside of the research

questions, and associated to the members of the cohort or to an individual student.

  For research question(s) one I looked for terms that imply our gender roles, and

how often these terms emerged.   I looked specifically look for stated words that

correspond to "our gender roles," or words that Colley (1998) and Eagly (1987) use to

describe masculine and feminine attributes. These are words that, for males, describe one

as being a (an) "individual, leader, dominant, and self-reliant, and for females these are

words that express "empathy, kindness, and nurturing" (Colley, 1998; Eagly, 1987).

From these words I then searched for themes in connection to gender roles, and how

often these specific themes emerged throughout the data. For example, did the female

students weave into their interview question responses comments regarding patient care,

as in nurturing patients and children, providing comfort, and being conscious of the status and well being for each patient. For the male students I searched for words and themes implying independence, autonomy, and "being the provider." For example, did the males mention monetary gain or occupational independence in their responses to the interview questions, and how often and in what context did they discuss the patients. Ultimately and for both genders, I theorized that while they might both discuss their patients, the language used would differ greatly.

For research question(s) two I counted the frequency of how often technology is mentioned among the male and female students, and looked for what words were used to describe the technology. Many medical imaging departments are in transition, changing over from conventional film/screen imaging methods to digital/computerized imaging, a process that has changed imaging techniques and methods, in a sense, almost "dummying it down" as imaging techniques, or the brainwork, has been eliminated. I was interested to find out the perspective students have on the new imaging methods, and what their thoughts were on the comparison between the conventional methods versus the DR/CR methods. In particular, and in accordance with Cockburn (1985), radiography has often been described as "push button machinery," the kind of work that any one, most specifically women, can conduct. Technology is also considered a mechanism of power – masculine related power (Cockburn, 1985), so I was interested in how the technology of radiography was described in relationship to other imaging areas, in particular those areas that contained more male technologists than female technologist. I was interested to discern how the students described the technology in relationship to the patient, and the

frequency with which technology was mentioned in relationship to discussions of the patients. The various imaging technology is used for the benefit of diagnosis and treatment of disease and pathology, and I was curious to discover if the students describe the technology in such a manner, and were aware of what imaging technology and their own upcoming profession existed for.

For research question three I looked for words associated with social mobility, prestige, power, stratification and closure. Words associated with closure, for example were elected based on the work of Witz (1991), where she describes closure mechanisms being put in place for females as a form of intra-occupational control. According to Witz, males could not keep females out of radiography, but could prevent them from achieving higher status/higher pay within the field. Thus, by relating the concept of intra-occupational control to this study, I looked at the language in order to decipher if women are discouraged from entering high technical/high paying imaging modalities as in CT scanning or interventional radiography, or if males are discouraged from entering ultrasound, a feminized imaging modality (ASRT, 2001).

Also from these words I deciphered themes related to the language of professionalism, themes that indicated if students considered the fact that they were about to enter a lucrative and highly respected profession -- a profession based on ethics, morality and autonomy, as oftentimes the professions are defined. I was interested in how students described each specific imaging modality, also using the language of professionalism, a language that, according to Rhoades (1998) includes internal stratification, and hierarchical structure according to location in markets and

organizations. I reviewed the statements about the other imaging modalities to see if the students discovered any divisions among the imaging arena, where those technologists who work within such possible "hierarchical" imaging modalities are considered professional according to the conventional and contemporary sociological insight on the professions.

<div align="center">Data Presentation and Interpretation</div>

I present the interview data according to each cohort, dividing the material into two chapters with Chapter 4 presenting the findings for each individual BCC cohort, with a summary of the differences/similarities across each cohort. I present the ICC cohorts in a similar fashion in Chapter 5. Chapter 4 contains the emergent theme for the BCC second year and first year cohorts, and similarly, Chapter 5 reflects the themes for the ICC second year and first year cohort. For both chapters, the emergent themes are arranged systematically, although this does not indicate that the same themes emerged for all the groups, however, in the interest of enabling the reader to compare and contrast the main subject themes and the data within, the chapters are formatted in a similar manner. Interpretation of the interview data is organized according to each set of research questions, again per cohort. A summary of BCC and ICC cohort findings is presented at the end of Chapter 5, where I compare BCC first year to ICC first year, presenting differences and similarities across the different school cohorts, doing the same for the second year cohorts.

CHAPTER 4

FINDINGS

The BCC Second Year and First Year Students

Introduction and Demographics

Just as the occupational and education history of radiography is complex, the voices of the students revealed unique, and at times, complex responses. The responses from the students were not necessarily "black and white," and therefore, difficult to be placed into neat categorizations in accordance with our presumed gender roles and the given theoretical perspectives. Moreover, what was projected based on some of the literature and, in particular, gender role theory, did not necessarily fully emerge, whereas other distinct themes did. Such distinct themes, as presented in this chapter and the following chapter, were addressed by feminist theory on technology, feminist theory on occupational closure, and professionalization theory. Furthermore, themes were revealed from the different cohorts that were related to the socioeconomic status of the students, their cultural backgrounds, ethnicity and national origin. Additionally, within the themes, emerged conversations and information related specifically to the institution, association with faculty, and student level of education and training.

Additionally, the student demographics provided noticeable differences when comparisons are made with the students enrolled in the BCC College versus the students in the ICC College. Of interest although the colleges are only 50 miles apart geographically and are situated in large metropolitan areas, the students differed in their socioeconomic status, ethnicity, and national origin. One cohort, the BCC first years,

were a younger group, primarily in their twenties, with one student in his thirties (see

Table 4). To note, the BCC cohorts "matched up" to the community college

demographic studies from the 1970's (London, 1978), 1980's (Warren, 1991) and the

1990's (Grubb, 1990). While both institutional cohorts are mentioned here, the following

section will concentrate primarily on the   demographics of the BCC second and first year

cohort prior to moving into discussion of the themes. The ICC second and first year

student demographics are discussed in detail in Chapter 5.

From the BCC second year students, the majority of the students were born in the

United States, with parents having born here as well (see Table 4).   Out of the 10

students, one student, S6 came to the US from the Philippines (see Table 4). For both the

cohorts, their ages and socioeconomic status were highly comparable to one another. For

the BCC second year cohort, there are four African American students, one Caucasian,

two of Hispanic origin; one student a second generation immigrant from Mexico, the

immigrant from the Philippines and one student of Puerto Rican descent (see Table 4). A

second similarity to the BCC first year cohort is the age range of the students, where the

majority of the students are in their early to late twenties, with one 34 year-old female

and a 39 year-old male. A third similarity is with socioeconomic status, with both

cohorts demonstrating students who hail from working class individual/family

backgrounds, with the parents having had little to no college education. There was one

exception, the student S1, a 39 year-old Caucasian male comes from a family where there

is evidence of an earned higher level degree from the parents and siblings, However, S1

was once a former machinist by trade until suffering an injury, and achievement of the

Associate degree in radiography is his first and only college level degree. Interestingly

his father has a degree in electrical engineering, his mother a degree as a registered nurse,

where she is director at a large medical facility, his brother is a secondary school teacher,

and his wife is a registered nurse.

Similarly, the mother of S6 had achieved a degree in medical assisting from a

college in the Philippines, and her brother and sister possess college level degrees (see

Table 4).

TABLE 4 – DEMOGRAPHIC DATA – BCC SECOND YEAR STUDENTS

BCC 2 YEAR ETHNICITY/RACE	IDCODE	AGE	IMMIGRANT	WORKING CLASS	PARENTS EDUCATED	M/F
CAUCASIAN	S1	39	N	Y	BOTH	M
AFRICAN AMER.	S2	22	N	Y	N	F
MEXICAN	S3	22	N	Y	N	M
HISPANIC	S4	23	N	Y	N	F
AFRICAN AMER.	S5	25	N	Y	N	M
FILIPINO	S6	27	Y	Y	MOTHER	F
AFRICAN AMER,	S7	26	N	Y	N	M
PUERTO RICAN	S8	25	N	Y	N	F
AFRICAN AMER.	S9	34	N	Y	N	F
HISPANIC	S10	27	N	Y	N	F

For the first year cohort, there are two African Americans, two Caucasians, one

Hispanic student, two second generation students from the Philippines, one second

generation Vietnamese student and one first generation Vietnamese student, F7, (see

Table 5). The demographics of the first year cohort demonstrate ages of students in their

early to late twenties, with one male student, F7, 30 years of age. The BCC first year

cohort is a considerably younger group of students The social class description for this

group proved to be no different from the second year cohort, with the majority of students

from working class backgrounds, and their parents are of working class background

having had little to no formal college education (see Table 5).

TABLE 5 – DEMOGRAPHIC DATA – BCC FIRST YEAR STUDENTS

BCC 1 YEAR ETHNICITY/RACE	IDCODE	AGE	IMMIGRANT	WORKING CLASS	PARENTS EDUCATED	M/F
AFRICAN AMER.	F1	20	N	Y	N	F
FILIPINO	F2	23	N	Y	MOTHER	M
CAUCASIAN	F3	22	N	Y	N	M
CAUCASIAN	F4	26	N	Y	N	M
VIETNAMESE	F5	21	N	Y	N	M
FILIPINO	F6	21	N	Y	BOTH	M
VIETNAMESE	F7	30	Y	Y	N	M
AFRICAN AMER,	F8	27	N	Y	N	M
HISPANIC	F9	22	N	Y	Y	F

Interestingly, the BCC student ethic/racial demographics are in contrast to the statement made by Carwile (2003) where she referred to the racial diversity for the allied health care professions, including physical therapy, nursing, occupational therapy and radiography, as being "discouraging" (Carwile, 2003, p. 87). This is in contrast with the BCC first year and second year students who are from diverse ethnic backgrounds, with, surprisingly, few of them being Caucasian (8 percent), an interesting off set to the demographics cited by Carwile (2003).

Thus, the demographic information of the BCC second and first year cohorts could be distinctive and related solely to the geographical location of the institution. It is highly likely, and as proven by the differences between the two institutions, that different populations of students will be located in programs related to their environment, for example, a RAD program situated in a rural environment, would likely house students who make up the population of the general area. Furthermore, when a comparison is made between the BCC second year cohort to the first year cohort there were similarities across the cohorts (see Table 3 and Table 4), with age, socioeconomic status, and national origin, however, when the BCC cohorts are compared to the ICC second and first year

cohorts, major differences occurred, were the majority of the ICC students (6 out of the 10 students for both cohorts) were immigrants from various countries (see Table 6 and Table 7 of this study).

While differences occurred among the cohorts, the students in this study were from working class individual and family backgrounds (see tables 2 and 3). Their social class backgrounds compare to the students in Warren's (1990) study of student community college demographics in the 1980's, Weis's (1990) study of working class high school students, and London's (1978) study of urban community college student during the 1970's. However, while the students in London's study were primarily Caucasian, at least 75 percent of them were from less educated, lower income, blue-collar communities (London, 1978, p. 6), and came from working class families (London, p. 7). To conclude, the family and individual working class structure for both the first year and second year cohorts remain similar, some 20 to 30 years later, to those students depicted in by Warren (1991), Weis (1990), and London (1978),

Findings – BCC Second Year Students

Introduction

The BCC second year students shared candid and vibrant commentary during the interviews, where they had much to share about their future endeavors, their reasons for entering the program, the field of nursing, the patients, professionalism and the changes to the field that are certain to keep occurring as the technology continues to move more from manual work to automated, "informated," state of the art computerized equipment. Overall, they were enthusiastic about their future, nearing graduation, and clearly spoke

with the knowledge of students having accomplished some 2000 hours of radiographic clinical externship training. For these students, many of them spoke with as confident technologists, having already been initiated into the labor force as they gained higher skills, experience and confidence.

The BCC second year cohort shared also the positive and negative aspects of their training, the hospital environments, working with other medical staff, the interaction with physicians and doctors, and how technology is changing the profession, not necessarily in a skilled method, where the new technology is changing the level of skill required, "dummying" down the skills required to take radiographs on patients. However, the students commented on how the new technology was state of the art, fascinating, and that their chosen field provides for exciting and interesting working days, with the constant influx of ill and injured patients, and the fascination of what the technology reveals.

<u>Employment Ability and Upward Mobility</u>

From the BCC students, who were one month away from graduation at the time of the interview process, a common theme emerged as prominent, and was mentioned a number of times throughout the majority of the interviews – the students entered the radiography program because of reasons of employability where social and occupational mobility could be achieved, in addition to job security. For example, according to S1 (male), radiography will continue to provide jobs in the future because "there is never a shortage of who is going to hurt themselves." S2 (female) stated that she entered the radiography program because she wanted to work in a medical environment where "there is always work" available. S7 reiterated a similar point regarding employment in

radiography. "Well I just-I just was trying to find something that-uh-that I knew that I never-someplace where I'd always work-always in the medical field. There's always a medical field. There's always a job in the medical field." It was a positive point to S7 that accomplishment of a short-term 2-year associate degree in radiologic technology will enable him to achieve his occupational goals and financial stability in such a short period:

> "Well the positive thing about being in the program is-uh-knowing that there's a career that I can come out and not having to worry about looking for a job and it's a career that I already know that once I graduate I know I will be able to find a job pretty much anywhere. That's the most positive thing I like about the program because. I know I wasn't a school person and I know like many people that go through school that get bachelors and you know sometimes they can get masters and they don't have a job as soon as they get out. So that's one of the things that was important to me is to find a career that I could come out and just automatically start making a living. Not having to worry about that."

S10, whose mother worked in a hospital prior to going on permanent disability, made this point about observing, throughout her life, her mother always being employed in a hospital and states, "…seeing her work in the hospital and you know you can always-always find a job available at the hospital, so the medical field I knew I wanted to do."

In addition to the job stability that will come upon obtaining employment in radiography, the second year students also perceived the profession as a field that will enable them to "achieve occupational and financial mobility" by allowing them entrance into other, higher paying imaging modalities, as in CT scanning and nuclear medicine, to name a few. For example, S2 referenced to radiography as a career that will provide her with the "ability to train and work in other areas and make more money." S2 was influenced to enter the program by her friend who is a radiographer, and this friend has "a nice house and a nice car." Similarly, S3 commented that radiography would provide

him "with something higher, and there is a better job that I can go to, as far as other modalities…radiography is a job that's good for opportunity." S3 was referencing to the various imaging modalities, in particular, computed tomography and MRI, as the imaging modalities that will bring more money and social mobility. S4 had the same point of view regarding radiography; "you're able to branch out into different majors if you want to. You can go to MRI, you can go to CT. If you are ever sick of anything you go a different route…" For S4, radiography as a career offered flexibility and variation, allowing for personal growth, and alleviation of possible occupational "boredom." S5 considered radiography to be a money making career that "opened a few doors" allowing him to "…make money, make good money…" where he was influenced to enter radiography from his friends who informed him "they are going to say you will make a lot of money…"

Like the other students, who spoke about making more money, S5 desired financial stability, another indicator for his entrance into the program, "so far as like…solidifying something financial for myself, I thought about that too so…" S6 (female) decided to enter the program in order to learn about the other imaging modalities, and cited a positive point about the program as enabling her to gain more knowledge in other modalities, "That-um-I can get into other modalities, which is good. Um-um-there are more options...I want to further my knowledge toward modalities…and, um-get paid more."

According to these students, about to graduate and enter the workforce, they entered this program with similar goals in mind – to make "more money," "achieve

financial stability," by obtaining advancement into the various higher paying imaging modalities. For these students, working in radiography is certain to provide job security and stability because, according to S1, "there will always be sick people," and "people who require medical attention."

The BCC second year students expressed the desire to accomplish financial stability and achieve the things in life that money can buy, an interesting point about these students who come from working class backgrounds. This point correlates to a study conducted by Weis (1990), where she interviewed working class background students attending high school ("Freeway High school") located in a primarily working class city where the nature of the industry had changed, forcing factory closures and prompting massive layoffs, a city suffering from economic decline based on the "deindustrialization" (Weis, 1990, p. 3-4). The working class male and female students in Weis's study expressed that their goal was to graduate from high school, go on to college, and eventually obtain some form of higher paying employment upon completion (Weis, p. 21-22, 57-60).

Obtaining occupational mobility was paramount to the students, furthermore, and as mentioned, the students hailed from working class parents who were the direct recipients of de-industrialization and occupational changes, with a steel mill closure. Weis's study revealed that these students were heavily influenced by their working class parents to leave the city and go to college, in order to eventually achieve the occupational mobility that college was depicted as providing (Weis, p. 152). The parents in the study commented how "you need a college education, especially now in Freeway, because

there isn't going to be any opportunity if he just goes to work" (Freeway high school student parent, in Weis, 1990, p. 158). To the parents of the students, opportunity represented only upon completion of college, or the armed forces and then college (Weis, p. 158).

Worth reflecting upon, the second year (and first year) students from BCC came primarily from working class backgrounds, and during the interviews explained that their reasons for entering this short term program centered primarily on obtaining work in diagnostic radiography and the other well paying imaging modalities. To the BCC students, radiography represented a means to achieve a brighter, well paying future, regardless of the nature of the work required for this field. In other words, the students opted to enter a "high touch" profession, regardless of whether they preferred this type of work to other occupations obtainable through attending two-year institutions, considering this profession to provide economic security and occupational mobility.

The BCC second year students did not, during the interview, state reasons for entering to be based on helping ill and injured people, notably, the patient care aspect did not emerge as a justification for entrance into this field, indeed, discussions about the patients emerged almost as an afterthought. And one cannot separate the patient from the occupation, as radiography is far more than just working with state of the art imaging equipment and medical technology. It is pertinent to emphasize that this is a complex issue, and what might have been anticipated to emerge, in particular from the female students did not, however, it is also unjustified to state that the BCC second year students did not desire to help ill/injured people and did not exercise proper patient care

principles. A primary interest for the BCC second years was to achieve financial stability and occupational mobility, much like the students in Weis's (1990) study.

Furthermore, students who come from working class backgrounds typically enter two-year institutions in order to achieve a short-term education that leads directly to employment (Shavit and Blossfield, 1993, in Winslow, 1995). Studies on the two year and vocational sectors have demonstrated that working class students use this educational route as short term programs and vocational training opens up the employment opportunity in a wide range of occupations, where postsecondary technical education lends considerably higher wage earnings to the graduates who have earned a credential or degree, when compared to those individuals with no education beyond high school (Hollenbeck, 1993, in Winslow, 1995). For the BCC second year and first year students, radiography was visualized as a means to an end, and an attainable program, in particular when compared with nursing, as the next section reveals.

<div align="center">Patient Care Skills and Nursing</div>

Occupational mobility and financial stability were the student's primary motivating factors behind entering the radiography. Interesting, radiography is a high touch, patient centered field, similar to nursing and it was assumed that "taking care of people" would emerge as one of the primary reasons for entrance into the program/field, but this did not occur. However, what did emerge with this group was their prior interest of entering nursing, and not radiography. However, these particular students opted out of nursing for various reasons, reasons primarily centered on how difficult the nursing program, with demanding academic coursework or that there were too many prerequisites

were needed prior to entrance. Nursing was often described negatively, or from a

"demeaning" perspective, where nurses merely attend to the "cleaning" and nurturing of

patient for eight hours a day, a misnomer, as the profession of nursing, has, over time,

changed in the academic, professional and technical aspects (Sandelowski, 2000).   For

these students, they referred to nursing often during the interviews, with seven out of the

ten students having either entered nursing or considered entering into the nursing

program, As mentioned, the students in this cohort did not discuss nursing with high

regard in terms of the actual work; rather, it was referenced to as a profession where

nurses tended to the "dirty side of patient care" as in the blood, feces and sickness

associated with patients.

Furthermore, these students envisioned nursing as a "high pressure, high

commitment" and difficult, rather unglamorous profession, where very sick patients had

to be attended to around the clock. S1, for example, who had been encouraged to enter

nursing by his wife (a nurse), described nursing in such a manner:

> "She [his wife] always told me that I should go into medicine, of some sort, and I
> always told her no I want to be a machinist, I don't want to work with sick and
> broken people…"

For S1, he described nurses as having to take care of patients on a different level than

radiographers do, where radiographers are undervalued in comparison to nurses, and

nurses, while higher in the medical field chain of command, on the other hand, are the

"housekeepers" of patients:

> "We [radiographers] work every bit as hard as nurses do, I live with one so I
> know how their day is, they have 5,6 patients that they have to take care of on a
> daily basis where they are working with the same person, but they are lifting and
> they're cleaning and doing things…"

Similar to S1's comments referencing to nursing as consisting of difficult, time consuming "housekeeping" chores, S7 had this to say about nursing and patient care:

"I was going to go into nursing, and um-I discovered that inside the field that its not really-wasn't-I really didn't think I was going to be able to hang with being a nurse. So, I found-um- once I got hired here through an internship, I was doing the ROP. And-uh-I got hired to do-uh-radiology and transport…And um-I got to see how everything worked and I got to see-pretty much the people that I-that I worked with or used to work here and still people that work here now pushed me to get into the program and that's how I started out. I didn't want to deal with the-um-the, how should I say the-um-the-uh-all the dirty jobs of a nurse. Um-just like the-uh-taking care of-you know-um-of the feces… And different stuff like that. I just wanted to-uh-be at work in a cleaner environment. Not too-not much as-uh-not so much labor."

For S6, she had considered nursing, but transferred out and into radiography because "nursing was too competitive, too stressful for me…" and while she wanted to pursue a career in the medical field, to her, nursing was not the right choice. Not necessarily her decision, S6 entered nursing based on suggestions from family members:

"Oh, actually, well more from my family in-they-um-didn't pressure me-pressure me, but its like why don't you try nursing blah-blah-blah and I'm like okay well, you know, my mom did it. And Maybe, you know, I'd like it and um also major factor is honestly the salary, but that's, you know, that should be the least, but I just, I don't know my mom did it and my sister is also in nursing. So I thought I'd try it."

S6 admitted that while the salary nursing offered was adequate and thus influenced her decision to enter the nursing program factor prior to radiography, S6 did recognize and comment how salary should not be the first consideration for entering a "patient care" profession, and, according to her, it should be the least important consideration. However, and as mentioned, S6 recognized that both nursing and radiography require

patient care skills, but, according to S6, the amount of time spent with patients defines the

difference between the patient care skill sets required for both fields.

A few of the students expressed interest in the medical profession, as in S2, who

wished to pursue a career in the medical field, but did not want to "do nursing."

According to S2, radiography did not require the same set of patient care skills as nursing

does, which is why she elected to go into radiography. On the same career track as S2,

S8 wanted to "do something medical" however, not nursing, because the nursing program

was "a little more intense" and required "direct supervision of patients":

> "Uh-actually I didn't know what I wanted to do at first, but I went to the career center at the school and I just started looking at things I knew, something in the medical field because I already had gotten my AA, but I didn't know what else I wanted to further up on. So I just started looking and it was between registered nurse and the radiology that's, um, program. I just heard that, well (laughs); I had heard that the registered nurse program was a little more intense. Um-I just-I knew that I wanted patient care. And I knew that it wasn't-I was going to add interaction different with patient. Probably my care, but at the same time not so like under my direct supervision."

S9 had trained as a certified nursing assistant and worked in a convalescent home

prior to entrance into radiography. A more "natural" transition from the certified nursing

assistant program is into nursing, however, S9 opted not to pursue a nursing degree

"because I didn't want to really get into nursing probably, which was, um, for the best…a

lot of stress, lot of blood." S9 considered nursing stressful and according to her, there

existed with the nursing field this high level of exposure to blood was on a more

consistent level than radiography. According to S9, she informed me that while the

occupational hazards of the job in radiography contains exposure to blood, especially

where trauma or surgery cases are concerned, she did not consider the exposure to blood

to be as predominant, and remarked during the interview that the "blood part" of radiography "turned out to be not so bad…"

Once again first considering nursing as a career but opting out, S10, started in the program, but did not pass the math proficiency test:

> "Um-it was kind of a fluke kind of because I was in the nursing program before, but I was dismissed from the program because I didn't pass my math proficiency test that they give there each semester. So I had to re-enlist my name back in the nursing program, but I didn't know how long it would take them to call and let me know that they, you know, admitted in the program. So I decided to put my name also in the medical imaging program. Not knowing what it was, what they did or anything, just went in blind, but to me I think I made the better decision of doing this. Yeah, yeah because I was doing clinical when I was in the nursing, but, uh thinking about it back on it now, it's a lot of work. It is a lot of work. And I think it can just wear you down after awhile. So, this is more dynamic I think too."

To S10, nursing requires more studying, more laborious training, and is what she considered a "static profession," while radiography is the dynamic field.

As stated, seven out of the ten students either entered nursing or considered entering the nursing program, opting out to enter radiography. These students envisioned nursing as "high pressure, high commitment" where nurses attend to "sick and broken people," eight hours a day.

According to the students, nurses take care of patients on a long-term basis, "changing them" and tending to the "unpleasant aspects of human nature" while radiography was described as "dynamic," offering more opportunity, and providing relief from boredom in the job, for example, S10 remarked:

> "Just that it's different every time. I mean you're not-your not stuck in one place doing just strictly routines. I mean, you're doing fluoro, your-your doing portables. So it's not the same thing all the time. So you're doing different things."

S4 made similar comments about radiography as a dynamic field, "…that you're able to branch out into different majors if you want to. You can go to MRI. You can go to CT. If you're ever sick of anything, you can go to a different route. That's what I like. You have ability to move and the ability to move around. I like that." Similar to his classmates, S3 considered radiography as a dynamic, moving job, where mobility is key as radiographers travel about the hospital, obtaining radiographs, "…I like-I like to kind of be out you know moving around…You know, I like to do x-ray and all this." He considered some procedures in radiography to be too confining, and liked the fact that radiography offered the option of doing portable work, surgical procedures, orthopedic clinic, and emergency room imaging.

With radiography as a dynamic field in the sense that every day on the job brings something new or different, either through contact with various patients throughout the day, the differing forms of patient care involved with each patient, or obtaining the various imaging exam needed for diagnosis of each illness, where S8 commented:

> "…no two days are exactly alike. So, whether for example right now (laughs) we were doing a exam, it was different because we were going to inject the contrast through the-um-nasal gastric, and I didn't know how to do that and…"

Last, S1 considered radiography to be a vibrant field based technology, and how the technology enables one to image and visualize the body and the various functions:

> "…it always fascinated when I got the x-rays back, like it was man, how did they do that, and how did that come out the way it did. I had a couple of MRIs on my ankle and that was probably the one, that was really really neat, and I definitely want to learn how to get into this field. It still fascinates me, it's so interesting to take a radiograph and look at it and start naming exactly what this person did, and you know I have hurt my ankle a couple time and now I know how you feel."

Thus, these students considered radiography as a profession that offered occupational mobility and relief from boredom on the job, where with nursing there exists the enactment of the "same old thing, day in and day out." According to these second year students, radiography offers to them much more than nursing could have offered, had they elected to stay with their original educational and career options.

Interestingly the perceptions held by these students regarding the work nurses perform is not wholly accurate. Now, in the 21st Century, while nurses do attend to patients, it is not as depicted. For example, nursing as a profession over the years has changed as much as radiography has changed, with specialty areas within nursing emerging as technology has continued to advance and nursing skills change conjunctively (Sandelowski, 2000). With a "plethora" of healthcare providers claiming to care for patients coupled with increased democratization of healthcare functions, the work nurses once performed, tending to the in-depth patient care aspects, as in changing linen, bathing patients, and so forth, is performed by certified nursing assistants and nurses aids (Sandelowski, 2000).

In retrospect and, when compared to radiography, nursing was not seen as a profession offering upward mobility or much opportunity, again, a misnomer, as nursing does offer various specialty areas and leadership roles/management (Sandelowski, 2000). From these students, it was discerned that nursing as a profession presented itself to them in a negative fashion, due, most likely to the fact that some of the students could not either enter based on poor entrance scores, or could not handle the academic rigors of nursing. For example S10, among others, who was unable to pass the math proficiency

examination required each semester, presented a "bitter" and negative attitude towards nursing.

Additionally, two key issues emerged out of the dialog with each student, and initially mentioned, the first issue that emerged was that the "the patient" was seldom mentioned as an interest for entrance into this profession, and the students did not express that their desire to work in radiography was based on helping and assisting sick and injured people. It might be assumed that entrance into such a program that commands a high demand for patient care skills and revolves around "the patient" would constitute the driving interest for pursuit of radiography. Furthermore, during the interviews, a number of questions were asked of the students in attempt to prompt dialog about interest for entrance into the program, without leading the students to discuss or reference to patients (see Appendix A), and throughout the interviews, attempts were made to bring the interview discussions back to student interest for entrance into the program, where ultimately, each student's reasons for entrance into the program emerged and eventually stated clearly, although seldom based on the desire to help or work with sick/injured people.

The second issue that emerged revolves around the language used when the students discussed the patients (some students mentioned the patients more than others) the students utilized a language seemingly devoid of compassion, a language that described patients as the "object" or "the case" to be imaged – an object or case that could make a student's day difficult. For example, S1 stated:

> "…being able to get out there and do any exam that comes up without having too much difficulty doing it and hopefully there will be difficult cases, I like to get

case aren't just out-patients coming in for a foot x-ray. It is more of an intellectual battle when you go in you say ok someone clearly has a broken ankle and it is laying lateral on the gurney, how am I going to get that AP shot, without sending that person through the roof, the problem solving aspect, that's always a fun day."

S1 preferred the radiography "cases" that presented a challenge or an "intellectual battle" when attempting to image seriously injured patients, as opposed to the ambulatory or outpatients who generally are mobile. Furthermore, the students referred to patients as "easy," "hard," or "difficult," for example S2 described her interactions with patients as negative and said "…When you just get difficult cases, or difficult patients, that it's hard." While she did not specify what "difficult" constitutes, she considered difficult patients to be "hard," and she also did not share the same enthusiasm S1 did for attempting to obtain radiographs on the hard or challenging patients. However, while negative points in the training process for S2 were the difficult patients, she expressed a positive perspective, where the patients, are cases to learn from:

> "All the negative experiences I've been through or that I have had I just learn from them, correct them and learn how to move on from it, just being able to learn so much is positive for me and being about to witness all the different, you know people come in with gun shots either stab wounds and mean just being able to work around that or work with that, I not going to look at is as positive but it's positive cause it is a learning experience for me, and I think I learn more here than at a small facility because small facilities don't have trauma and don't have big E.R.s you know you don't get to see much."

Thus, according to S2, the injured patients are part of the learning process and aid in furthering her education in spite of injuries and illness.

S3 informed me that he preferred an "easy day" in radiography where he encountered "easy patients," and later on in the interview stated that the female students in his class are interested in training and working in computed tomography and magnetic

resonance imaging, because "there is less patient manipulation you know, there really is in those kinds of modalities here. You aren't pushing patients as much and lifting."

S4 informed me during the interview that she entered radiography because she "enjoys people," and explained, "I enjoy looking at the fractures and bones and just looking at anatomy." Additionally, for S4 the patients are "really sweet" and in turn she has good days at her facility because "Uh, Often the patients are really sweet here. They are. Yeah they're nice. I never had any trouble with anyone here, the mostly male patients. I think that's why. (laughs) Mostly male patients [sic]. Yeah. They are good patients."

Perhaps the one student who referred to patients with compassion and recognition and stated that he is there to "help the patient," was S5, who discussed how upon entering the clinical training, he learned that he was there to take care of and help patients:

> "Uhh, not until I started my clinical I started to see, I started to learn about my patient care and people I could help. So…And when I'm in the hospital, you know, I try to put myself in their shoes if I was in the hospital I would want someone to help me the best way they can, so, being that we shoot x-rays we deal with patients all day I try to just help them the best way that I can. First coming into the program it was more of a financial, you know, thought but now it's like, okay, we're helping people. We're helping patients."

He emphasized that patients add a positive note to his day:

> "Um, I don't know, I say that probably the best positive experience is just dealing with patients…Dealing with certain patients. Knowing that you're helping them, you know, they-they look to you. You know they look to you for help, so, and you know you've helped someone, and it like gives you a better feeling inside that you helped someone, so at the end of the day you can smile rather than say Wow, I worked 10 hours, rather than complain you know that you helped some people, you know, in that process of an 8 hour shift, so…. for me that's more-it helps me get through the day sometimes…"

However, in a discussion regarding a good day on the job training, S5 did have this to say about uncooperative patients:

> "Um-a good day for me would be a day with a minimal repeats, you know, the patients that aren't too difficult to position. Um-patients that are willing to work with you and cooperate. I mean that's a good day for me. That's all I ask for. But it's very frustrating sometimes. You have-uh-patients that are uncooperative or just hard to position and just don't really want to work with you. I mean we got to see that obviously learn to deal with that, but sometimes it's frustrating."

Thus according to S5, and the other students, patients who are cooperative are the best patients, however, the day can be frustrating when the patients are "difficult" and uncooperative. While to S5, during his course of training learned that he is for the patients and helping people is large part of the job, it would, naturally be less difficult and pleasant if all patients cooperated. Pleasant and cooperative patients emerged as a common theme not just for the second year students, but for the first year students as well, with a number of them expressing similar perspectives towards their patients.

S6, expressed an awareness of radiography requiring patient care skills similar to nursing and how she would treat her patients as she would want to be treated:

> "…You also have to treat them, you know, like-in nursing-um-I try to cover my patients. And um that's the same. Yeah we just treat them, as we want to be treated. They're sick and if I'm sick I want to be treated well. And you know and know what the person that's telling me knows what they're doing."

However, other than this statement, S6 did not discuss or mention the patients throughout the rest of the interview. Similarly, during discussion with S7, a definitive absence of reference to patients existed, and the patients were mentioned in regards to nursing, even when prompted. His response to the question "what do you consider to be a good day in radiography, did present a slight reference to the patients:

"Good day for me? Is when all my exams go-go well. Uh, somewhat swift, no repeats. Um, that's pretty much a good day. I usually do have-everyday is pretty much a good day. Yeah some days are off days, but, um, usually everyday is pretty good-pretty good day regardless if, um, you know, I'm shooting well x-rays or I may have a off day sometimes just-its just the way I am so."

Patients are, in a sense, the exams, and exams are described in relationship to shooting x-rays, either having a "good day," or an "off day."

For S8, her mother, a certified nursing assistant, emphasized the patient care aspect:

"Um-she would tell me both the positive and the-you know- the downfalls of her being attached to her patients and…She doesn't like to see them in convalescent homes. She always tells me that to work in a hospital it has to be vocation not just because of the salary that you're getting paid because its not, you know, that doesn't matter. You-she would always tell me that you see people with their degrees yet they don't even give the empathy if not the sympathy you know…Probably it should come from within you know."

To S8 she was taught the value of how to work with patients, and did comment that she is "a people person" where she considered her current vocation as "making a difference in the patient's life." Stating, "well, to know that, you know, I'm taking the x-ray I'll show to the radiologist. So the radiologist is going to make a difference…Finding out what they're [patient's] diagnosis is." She also explained that she liked the "hands-on" component of the program and being able to apply what she has learned from the textbooks and classroom lectures:

"…how different it actually is being in the hospital than reading in the textbook. You know you see pictures of patients not-um, you know, not-can't hold a position right, then you have to be creative and…"

Thus, S8 did recognize the hardship patients have to endure in attempts for radiographers to obtain the images, and expressed empathy towards patients during the

more difficult and uncomfortable exams, and how the images should be obtained without

"…causing discomfort to the patient."

S10 was motivated to enter the medical field from observing her mother work in a

hospital and this influenced her decision to enter first nursing and then switch over to

radiography:

> "Um-like I said like seeing my mom work in a hospital she used to take us with her every once in a while to her job and visit the people and hospitals have always been one thing that has stuck, you know, in the back of mind as I was a little girl. Um-meeting with people, uh, the patients especially. I still see some that I-you know-see over and over and they remember who I am. Which is good. (Laughs). I like that. Who's the one-you know-that did my hand or something-you know. It's just funny to see them like this sometimes."

For S10, I was interested to determine her perspectives on if she had elected to

stay in nursing, where she commented:

> "You know what, I-I don't know um. I guess I probably wouldn't be because I am-when I-while I was in the program I um-I don't know, it felt kind of uh-I guess a little out of place I guess. Um-I just like, you know, helping out the patients, you know, its not that-I don't know it was kind of uncomfortable."

Unfortunately, S10 did not elaborate on what this statement, but she added this point

regarding the patients who receive radiation treatments, where to her, it is "depressing" to

work with cancer patients, "Um-I haven't got up there to see what its like, but I think

radiation therapy might be a little depressing…. (laughs)…a little depressing… to see the

patients getting, you know, all those therapies and knowing that they may not live. I

don't know if I can do that every day. I don't want to be dragged down."

In summary, there was, in some instances with some of the students, an absence

of empathetic language when the patients were discussed, however, this is not to say that

these students were not compassionate, caring health care workers about to enter the

profession. It is worth noting that there existed a profound difference in their discourse, during key moments during the interviews when the students were given the opportunity to discuss their reasons behind entrance into the program and the field, or how they would spend an extra hour in the day if granted the opportunity.

While these students discussed their patients through use of a language that perhaps "lacks" in "warmth," this does not indicate necessarily that these students are not empathetic towards the patients, and entered the program for reasons centered around patient care, but, rather, that they might not have the language "tools" with which to explain their experiences, and thoughts towards the patients.

Perhaps it could be stated that for some of these students who come from working class background, that their "direct" and to the point responses are based on their upbringing, where it has been noted by Delpit (1988) that the verbiage found in homes of working and middle to upper class families contrasts. According to Delpit (1988), working class parents exhibit "authoritarian behavior" towards their children, therefore, such behavior could serve as an explanation for the BCC first year students, with their absence of compassionate language replaced by to the point and direct commentary about the patients. Because the majority of the students come from working class background, it is possible that they could have been exposed to "directive" language and "authoritarian" behavior that Delpit (1988) observed.

Furthermore, some of the working class students in this cohort also might have been exposed to what Delpit (1988) describes as a difference in the expressions of authority and power displayed by teachers in secondary school, where the verbal

directives issued by African American teachers contrasted to those of the middle-class

teachers (Delpit, 1988, p. 288). Delpit describes the teaching styles of the African

American teachers to be more authoritarian and commanding, for example, "put those

scissors on the shelf," when compared to the "townspeople" teachers, "is this where the

scissors belong?" (Delpit, 1988, p. 288). While secondary schooling was not explored,

the observations by Delpit lend possible explanations towards the discourse the students

used towards their patients. For some of the BCC second and first year students, their

former educational experiences and exposure to different teachers and their behavior

patterns might have influenced their discourse used by these students. While the element

of compassion most likely exists, however, the words used do not convey compassion,

but this does not indicate that they are not compassionate individuals.

Also worth noting, is that there is a marked difference in the interview discussions

when compared to the ICC second and first year students, where laced throughout each

interview session for the majority of the ICC students, discussions focused on individual

perceptions towards patient care, and how patients are oftentimes poorly treated in the

healthcare environment. It is complex though, and it is with caution that these

observations are expressed, as it is not to imply that the ICC students cared more for their

patients or were far more patient centered, this primarily centers on their socioeconomic

backgrounds and social upbringing, two elements this study did not focus on. .

Moreover, the research questions and theory purported that the second year cohort

would have gained more perspective regarding patient care, having spent considerable

time in the clinical environment with the patients, and again this was not detected. The

BCC second year cohort discussed the patients in a manner similar and reflective of the discussions towards patients from the BCC first year students.

Of key significance, the theory suggests that based on our gender roles, the female students would be the students most likely to express the "communal" female characteristics, that of being empathic nurturing, and compassionate, all characteristics one might expect to see demonstrated through the discussions that took place during the interviews (Colley, 1998; Eagly, 1987), however, this was not detected with the BCC second year cohort females. These females were primarily concerned with their future in imaging, and economic security. Recall that these females predominantly come from working class individual and family backgrounds, where radiography was seen as a short-term mechanism for occupational mobility that did not require much education, yet could provide a decent future. Furthermore, it is possible that these students (and a few of them did admit so) could not get accepted into four-year institutions that consist of higher entrance requirements, which would be a deterrent to deflect these females towards radiography.

Interestingly, there is a connection here to the working class female students in Weis's (1990) study, where these students exhibited a "lack of primacy for a home/family identity," and were first and foremost concerned with furthering their education in order to obtain employment (Weis, 1990, p. 64). For these particular girls, they were not concerned with the "ideology of romance" found in previous studies, and their primary concerns were with going to college, and establishing a career, careers that could be obtained with two year degrees (Weis, p. 63). While the "ideology of romance" was not

part of the theory and research questions, one can still make a connection to the fact that the female students in this study, from working class backgrounds, were first and foremost concerned with their careers, as in Weis's female students, both cohorts of female students did not exhibit the "typical" or presupposed notions that females will exhibit communal characteristics or "articulate their future in terms of family responsibilities" (Weis, 1990, p. 64). Coming from working class backgrounds where everyday life can be difficult as the jobs are low paying, there is lack of opportunity and occupational growth, most likely has created for the females in this study and Weis's study the firm commitment to succeed and rise above the struggles that their working class parents experienced. Similarly this is to be expected of the male students as well.

Thus, a salient point to make is that given the connection to the students in Weis's (1990), with their working class backgrounds, there is some understanding to be gained here regarding the students and the manner in which they discussed the patients, and it relates to their comments regarding goals upon graduation. These students, much like those Weis interviewed, come from working class backgrounds and recognized the utilitarian benefits from their education, and with graduation nearly upon them, it is highly probable that perhaps their future and the extreme desire to be "better," obtain occupational and economic security, and achieve the "good things in life that money can provide" are paramount and their primary focus with graduation was nearly upon them. When the basic needs are not quite met, as in economic security, then is likely that the concentration on helping others, as in patients, is not a priority, however, this could change upon graduation, and it would be interesting to interview this cohort one year into

the work force, to determine, compare and contrast changes in their discourse towards the patients.

<div align="center">Changing Technology – The Benefits and Pitfalls</div>

A common theme emerged throughout this cohort, a theme that emerged for all the cohorts, the fascination and interest towards "imagery" and the state-of-the-art technology. Of interest also, and an emergent theme, three students in the BCC second year cohort mentioned the benefit of the burgeoning digital technology as shortening the wait time for the patients, noticed by S10:

> "Here since it's all-digital it's-um-it's a little easier. I've never really worked with them except when I had to do my week at St. Francis for the pediatrics, so it was kind of weird to see, you know, having them [technologists] go into a dark room and no film. We don't have to do that here so. Oh except there's a difference that the patients don't have to wait so long to get their uh to get their films processed just to see what it looks like."

Similar to S10, S3 had this to say about the benefit of digital for the patient: "Um-it takes-it takes a lot of steps out, as far as processing…it cuts off at least 5-10 minutes of processing time with patient turn around and stuff like that." For both S10 and S3 a benefit was the elimination of conventional film darkroom processing, as digital radiography goes directly to the computer, where the images are viewed on the monitor, and students can, for the most part, repair poor image quality through manipulation on the computer. In the past, "mistakes" had to be repaired by returning into the room to take another radiograph of the patient and repeating the processing steps all over.

S1 espoused the benefits of the new technology as being of higher quality and enabling the industry to be more productive:

"I think it great because it always evolving, like we were just discussing we have the cassettes at St. Francis and other people have the digital PACS system so as the technology progressing it's neat to be in it from where I am at, to doing the cassettes to doing the next step, is going to be these digital machines and on to the PACS, so it's nice to see that is going to be a higher quality, more productive industry as technology keeps increasing. My main fear about technological increases is that it's going to cost patients more that are already having a hard time paying for the stuff as it is."

While S1 considered the technology as a benefit ultimately could create a possible financial hardship for the patient, however, he considered the progressing technology to be a life saving mechanism for the patients, where:

"…your direct action is making this person going to feel better a lot sooner than they normally would…they feel that man, I feel 100 percent better than when I came in and that makes you feel good that you are doing good for them and the extreme of that would be, putting 'stents' in someone's cardiac artery to keep it open, it doesn't get much better than this, making someone well, that is the top you can get."

Consequently, as the technology was considered a benefit for the patient, the majority of students did, during the course of the interviews, mention the technology in some fashion, where some resounding themes emerged centered on the ability to visualize patient internal "imagery," and how "fascinating" and intriguing radiography is as a medical field because of the "x-ray" vision. From the second year students to the first year students for both BCC and ICC, the technology provided the ability to visualize internal organ functions, and the bones of every patient, a positive aspect towards training in radiography, for example, S1 commented:

"It still fascinates me, it's so interesting to take a radiograph and look at it and start naming exactly what this person did…"

The other students made similar comments -- S2 described the ability to visualize the inside of the body as "neat," and remarked, "I like the whole art of x-ray too, how

they produce, like being about to see a persons insides and all that, that's like real

interesting to me." S4 stated that she enjoys "looking at the fractures and bones and just

looking at the anatomy." During a discussion regarding the imaging modalities MRI and

CT scanning, S4 informed me that she has future plans to train and work in CT, "because

man it looks beautiful [internally], you can see more than just bones, you can see kidneys

and you can see everything."

S7 expressed interest in radiography because of the human anatomy, "I like-uh-

radiology because I mean it's a big part of knowing human anatomy, you know, and its

interesting to know the things that other people don't know about yourself." CT and MRI

imaging influenced S7 to pursue these modalities, because the ability to visualize the

body through different formats including 3D/cross sectional fascinated him:

> "Actually its uh quite amazing to me to deal with a view to every single thing in
> your anatomy. Your whole body is quite amazing, different-just by doing
> different tests. You find out what you want, I mean, um, pretty soon I'm guessing
> that we wouldn't even probably have a whole lot of demand for x-ray.
> Everything will be going out of CT and MRI most likely, I mean that's how like
> technology is. Technology is always advancing so. Its-uh-its just amazing to
> me."

Imagery and the state-of-the-art technology emerged as paramount aspects of the

field for the students, in particular the computerized/digitized technology, considered the

"wave of the future" for all medical facilities (for some the BCC students, at their

particular externship sites, the transition to CR/DR has occurred, for other facilities it has

not). However, the students had different opinions regarding the level of difficulty for

both conventional (referred to as analog) and digital radiographic methods. A number of

students referred to the digital as being "a crutch," and easy to utilize, thereby

"dummying down" the field, and where conventional was revered as the "more complex" imaging technology to grasp. The students from each cohort commented on the simplicity of computer manipulation versus the complex conventional method. For example, S2 stated: "I was at a different facility, so we did have digital, so, it's pretty good, interesting, it's fast, I like it, it's not difficult, easy to learn."

S3 remarked how digital equipment has eliminated some of the steps towards obtaining radiographic images on patients: "…it takes a lot of steps out, as far as processing, darkening, it cuts off at least five to ten minutes of processing time with patient turn around and stuff like that. You just got to do it because you're busy. You know, and Uh-I guess you do get a little more variety and range as far as-far as techniques go." With digital imaging, eliminating some of the steps involved with creating the x-ray image, a higher patient caseload has been established, with faster turn around time. Moreover, according to S3, digital allows leeway where radiographic technical errors can occur compared to conventional where repeat radiographs are commonplace.

However, as mentioned, some of the students considered digital too forgiving, thus "dummying down" the industry. For example, S4 did not describe the technology as complex, only that digital allows for "too many mistakes," and that the new technology is too forgiving of poor work. She did not think that students learn from their mistakes with digital, however, with conventional the students learn to correct their mistakes by physically repeating the radiograph on the patient, thereby not allowing for much more margin for error based on the radiation exposure factor. Unlike other students, S4 did not

state that conventional is complex, only that it commands a higher degree of precision in both the positioning aspect and techniques. To some students, the transition from digital to conventional is difficult, but not to S4. When asked if she would be able to grasp the ability to transition from digital to conventional quickly, S4 replied, "I think I will. It's going to be a little tough."

S5 considered the conventional equipment to be outdated, but easy to learn to operate. He informed me that he trained at a facility where the equipment was old and outdated. "Some of it is primitive you know…some of it's out dated. You just got to-um-I've seen –uh-you know, a lot of magazines on a new-wave technology...."

For S5 I inquired towards the aspect of learning and training on the conventional equipment when compared to the digital, and he responded: "Well-um-once I got a general range-technique range for certain-certain exams, I just sorta went from there. But a-It wasn't too long." To S5 while more complex to learn, he was able to grasp the soon to be outdated conventional method of imaging.

Similarly to S5, S6, commented on the outdated equipment and explained to me that she preferred the newer, more technologically advanced digital equipment: "Considering other-um-hospitals that I've rotated with they're kind of, you know, old equipment there. And I tried-when I was-when I was training there or when I was visiting there. I tried to, you know, tried to manipulate the images…it's just the-the digital is helpful." In essence, S6 described conventional as difficult for students, in particular when correcting radiographic mistakes, while digital is helpful to students in training. S6 reiterated that she did not care for conventional, or, as she called it, plain

film radiography: "Well, I don't like plain films. Its just, I don't know, I mean I don't

know. It's the 21ˢᵗ century I guess. Although it helps to know plain films as well…"

While S6 preferred digital, she did consider the process of learning both digital and

conventional a valuable tool that helps students gain skills and confidence. Moreover, she

explained that hospitals should be more modern in their approach to imaging and change

over to digital. However, plain film radiography did train her to position patients

accurately: "It made you-it made you learn it better….Oh yeah. Position and technique."

S8 described her interest in the technology because, "Well that it's always

advancing. Um-you know, soon to digital. I like the technology. From what I hear,

(laughs) it has come a long way from, you know, not having to hang up the films to let

them dry…Fix the-fix the chemicals…" To S8 she did not care for the old method of

processing film and dealing with the chemicals in the processor, however, she

complained that some of the students did not get a chance to rotate through different

facilities and experience training on both conventional and digital equipment, considered

to be a handicap to the learning process:

> "It is kind of a downfall because-um-in the program-if you changed it for next
> year's class they get to rotate to different facilities. To actually see how it's
> different. Whereas here we rotated for three days to other facilities but it's not
> nearly enough time to like, get the whole effect."

I then asked: "So, you didn't get enough, you feel, of the conventional film way?"

Where she responded: "It does kind of intimidate me a little bit." However, and similar

to the other students, S8 did not consider digital to be complex, and explained that the

newer imaging methods have aided in simplifying the learning process of obtaining

radiographs where mistakes are easily corrected:

"Well, I haven't had that much experience with it. So I guess cause it's not something known to me that I haven't worked with…because the digital, what is it, like burn out [of the patient anatomy] is easy and…so you can kind of repair it, manipulate it with the computer."

But S8 explained that her ability to learn conventional over digital would have progressed in a positive manner if she had learned conventional before training on the digital, and hence less complex, equipment, "…it's a lot easier to go from something complex to something easier (laughs)."

Unlike her classmate S8, S9 held a different opinion about the transition from digital to conventional and explained that she did not have difficulty and enjoyed the transition from modern digital to conventional, stating that the digital was her preference of equipment to work with:

"Oh its- um it's really good [the technology]. Here it's really good. Now that's one thing that going to other hospitals that have old equipment and stuff…and even though I can work it. You know, I, at first I thought that what they used to say was. You guys are the other digital place, its going to be so hard, but its nothing. I go straight to the other hospitals and know-um-what kind of equipment I use."

When I requested additional information towards S9's comfort level with conventional equipment, she explained that is was based on her practice with the classroom lab: "…because of our classrooms, there was certain things we had in classrooms. At a lot of the other hospitals it's the same, you know, the machines that we worked on in class so. I think I was okay to do that." To S9, the classroom lab practice was beneficial for the externship training.

S10 considered the digital equipment easier to work with when manipulating the images, commenting on how the ease of use of the equipment eliminated some of the mistakes associated with conventional:

> "Here since it's all-digital it's-um-it's a little easier. I've never really worked with it except when I had to do my week at St. Francis for the pediatrics …Um-you shoot with a little harder mAs, but if you are good at positioning you're not having to repeat so much. Versus if you were shooting film. I mean you could always change the-change the contrast and density….but having to reshoot a film."

According to S10, if students possess adequate "positioning" skills, coupled with a grasp of the technical factors associated with conventional, they would not have to repeat their radiographs as often. With digital equipment, one can manipulate the contrast and density of the resultant image on the computer console and screen. To S10, students can learn to position well, thereby reducing the "repeat rate." As noted with conventional, the only method to repair too much over or under penetration of a body part is to repeat the x-ray, thus increasing the radiation dose, making the examination longer, and inducing additional stress in the patients.

Out of curiosity, I asked S10 is she considered the equipment easy to work with, and she replied:

> "Sometimes…Sometimes the machines can be a little picky. (Laughs) Yeah. I think they're picky. We're always having a problem and they'll coming down to a do something like to adjust the collimator, align it, little things like that its regular maintenance I guess."

I then asked her if she *considered the technology to be complex, or do you think just anybody can do it?* Where she replied:

> "No. I don't think anybody can do it. A lot of-of our students too who are not digital think anybody can do it and that's not the case. They don't know that they

still have to get down that photo technique. You can't always photo time on these machines because your films will come out too gray. So um I guess most of the other hospitals are photo timed. We don't-we don't really photo time, like I said, it just comes out. Pretty bad. (Laughs) But the advantage is that if you make a mistake on your-on your image you can adjust it. Yeah. Um you have to just be with your technique within kind of a ballpark. Um if it's a little too light, you can darken it if you wanted to without having to reshoot."

To S10, manipulation of the digital equipment, does require skill, however, and similar to the comments made by her classmates, CR/DR has eliminated some of the complex steps of radiography by removing the technical mistakes that can occur and would require repeats on the patient (and higher radiation dosages). The advantage of the new technology is that the radiation dosage to the patient is lowered as images can be repaired via computer, however, for some of the students, the ability to repair cripples the ability to learn, as the mental skill and technical knowledge is no longer as paramount, mistakes can be repaired. Similarly, the students in the other cohorts commented on how CR/DR is changing the nature of the work environment and not necessarily for the betterment of the technologists.

Therefore, it is prudent to mention that the "technization" of the imaging equipment for diagnostic imaging carries with it implications that the students in this study are not necessarily aware of, yet have, unknowingly, accurately depicted a picture of how the nature of the work radiographers perform has changed dramatically with the implementation of digital/computerized equipment and PACS. With CR/DR, enter the information technology of imaging, where the "routine" and cognitive aspects of the work have been replaced by technology that can both "automate" and "informate" (Zuboff, 1988, in Barley, 1996, p. 25).

In conclusion, some of the students agreed that the computerized imaging equipment was changing the nature of the work for radiographers, "dummying down" the profession, while other students did not consider the computerized imaging equipment to be that much easier to learn, commenting on how education and training is still required in order to operate the equipment. For some of the students, they considered the older, "analog" radiography equipment to require far more mental skills than the CR/DR equipment, and how they held concerns over their own abilities to be able to transfer from working on CR/DR first and then analog, stating how the transition is far more difficult than the other way around. Ultimately, the new technology incited a combination of responses and perceptions, proving how new "intelligent technology," presents with it dichotomous thoughts and ideas, most likely based on individual level of ability and comprehension. Moreover, the students did interpret there to be changes to the nature of the work for the future, noticing how the advances to diagnostic imaging have created differences for the students in their learning abilities, and personal preferences. Furthermore, the students noticed how the CR/DR, while it might not necessarily aid them in their learning process having removed all the "mental challenges" from the daily work, comes on board as a positive aspect for the patients, removing the stress of repeat exams, and shortening the length of time required for specific diagnostic studies.

<div align="center">The Pressure to Perform</div>

Under "the pressure to perform," the differences between the male and female students emerged, and this theme was not a common one for the first year students,

perhaps because they were not far along enough in their externship rotations,

subsequently were too inexperienced, therefore they could not be utilized as soon to be

technologists. There existed a perception of "pressure" to perform the radiographic

exams, with this pressure created by the technologists, clinical instructors, radiologists,

and surgeons. In contrast, the females considered the pressure as negative, while the

male students considered this pressure as a motivating factor for the males to "prove

themselves."

The "pressure" perspective of training as a radiography student, as such, could be

tied to our gender roles and differences. For example, calling upon the work of Colley

(1998) and Eagly (1987), the gendered dimensions central to our perceptions of gender

role appropriate to our behaviors describes the masculinity attributes to include self-

reliance, and individualism, (Colley, 1998; Eagly, 1987), while femininity is composed of

attributes including affection and kindness (Colley, 1998; Eagly, 1987). The males

expressed that they felt pressured to perform the procedures quickly and accurately by the

radiologists and surgeons (all male). On the contrary the females stated that the pressure

was on them to "conduct" all the exams, where there was little to no assistance available,

thus they perceived themselves as being alone, while the "male" technologists around

them "were lazy," and unsupportive. For example, S4 had this to say:

> "Well here um students are very-um-they depend on us too much. Not as students
> but as techs. They expect a lot from us. You know…The techs depend on us to
> do- do perform-To do most of the job. Yeah."

S4 explained that there was a dependency of the other technologists on the students to

perform all the exams, with the radiology department comprised of a skeleton crew the

majority of the time, thereby rendering the students unsupervised and without assistance, a fact, at times, proved to be overwhelming to S4:

> "Sometimes it is…because not enough techs will be here. It will be all students and no techs. They'll all have the day off or something. Or they'll leave. Or I don't know. It gets overwhelming. It's been like that the whole time."

Similar to S4, S8 considered the pressure of the workload placed on students to be difficult, in particular when students are learning and not certain of their ability, she considered there to be a disadvantage placed on her when the "radiologists look to her" to conduct the exams, commenting:

> "Um-sometimes they forget you're a student…Technologists. The doctors also, sometimes when you are-um-interacting with doctors that are also doing their studies. Um-Sometimes they don't even know what they're doing and they look to you, you know, to answer, to know right off the bat and its like I'm learning too."

For the students training at this particular externship site, the radiologists are residents in training, thereby placing an additional burden on students, based on their inexperience with the equipment and procedures. Furthermore, and as mentioned, this facility was experiencing staffing shortages, leaving the students to perform exams, who complained that they often "learned as they go." As a result, and without the proper supervision, the radiographs produced by the students were not being reviewed for quality control:

> "Sometimes-um-how can you say it-uh-you shoot the x-rays that you signed off on it showing you have competency on-taking that-um-exam, but sometimes there was a shortage of staff…Mmm there was nobody to QC your-uh-films."

Without the staff to "QC" radiographs, S8 explained that she had to turn to her fellow students for advice, "so it was kind of asking you're student-your classmate-um-

how does that look to you…does that look good. That's an idea, but its just the fact that

it should be more, you're a student, you know, there has to be somebody there."

Therefore, without the proper supervision and adequate staffing, a "pressure" was placed

on the student. The lack of technologists to assist with the "difficult patients," the

"complicated radiographic exams," and the radiographs not being reviewed for quality

control, served to hinder the learning process.

 S10, similar to S4 and S8, explained that the students at her x-ray facility conduct

most of the exams, due to understaffing. She expressed her point in response to my

question about what interested her about the program, and she responded:

> "Well the class part was really good…Yes. I enjoyed it so much. I used to love
> to come to school. I was fortunate. And then the clinicals started and that all
> changed." I then asked her why she does not enjoy the clinical part of being in
> the program and she replied: "I guess I just don't like being here to begin. I've
> worked at other hospitals. I was only here a week. I guess I can't totally say that
> the little bit that I did see maybe would've been different someplace else, but here
> its just…Most of the hospitals have anywhere from ten or more tech that are
> working with the students, but here we have like four, three sometimes. I mean
> honestly there have been times that its just been students, you know, and it just all
> of us doing a regular routine."

 For S9, she also commented on how the shortage of staff can be difficult for

students in training, where the responsibility of completing the exams rested largely with

them. To S9, her facility would "be a good place" as long as the technologists on duty

conduct their "fair share of the workload," as some of the "male" technologists were on

"light duty" due to lower back strain, thereby contributing to the already inadequate

staffing issue:

> "Most of the women are okay; I guess there's a couple techs though. Okay like
> when we were in different-cause sometimes we were in routines. We were in-
> maybe we were in portables, or surgery or whatever. Here when you're in

portable you just stick in portable for the whole week. But in between time, when there is nothing to do for portable, they'll just sit around. But then they want the students and like the registry people to pick up in between, and then there are certain techs that, you know, are employed here for years and they just sit. And they will just sit for like four hours because they have no portables and then the counter is full with stuff. But they are supposed to pick up what they're supervisor has told them. When you got no portables then you can pick up like a chest, a hand, or an ankle. Something that's not too hard to do. But they won't…Probably well there are just two or three that really, really work…"

The situation at S9's training facility was expressed as a burden, and unfair situation, where the bulk of the workload was distributed to the students, registry technologists (referred to as "traveling" technologists, as they are not permanent members of the staff, and are hired through agencies to fill in when there are staffing shortages) and female staff technologists who, according to S9, would complete the exams consistently while the male technologists would not contribute to the workload.

S10 experienced short staffing at her externship facility and commented that her facility did not have enough technologists, and she, like her classmates, did not enjoy the "busy day" generated by the staffing shortage. In retrospect, while the female students perceived themselves as being on their own, this could be considered a positive in the sense that the students learn more independence, accuracy and confidence, but these particular female students did not express this in regards to their experience during training.

S3 was one student who did not consider the dependency of the doctors or surgeons on his skills as pressure, on the contrary, he discussed how surgeons "respect your opinion" when "you know what you are doing" and he informed me he "likes surgery" (a high pressure area for radiographers to work in, where there is little margin

for error and the radiographs must be obtained within a relatively short period of time).

For S3, the fact that the surgeons and the staff are counting on his ability to produce

diagnostic radiographs during high pressure surgical procedures did not deter or

discourage him, quite the contrary, he appreciated, "the fact that you have a specific

job," where everyone is "counting on you and you are the specific person for that thing

so…" Apparently for S3 this type of environment suited him, in contrast to the female

students.

Then S3 explained to me that even the "toughest" surgeons to work with

(surgeons have a reputation within the radiography department as being difficult to work

with, exhibiting "cantankerous," and, at times, "explosive" behavior) grant "leeway" to

the techs when they "see that you know what you are doing." To S3, when one is

confident and skilled the working relationship between surgeons and technologists lends

for a positive work environment:

> "Once they [surgeons] see that you know what you are doing you got leeway. You know, then they respect your opinion…they'll ask you questions and you tell them no, its not going to work, I'll say its not going to work but you might want to try it this way."

S6 had a different perception of the dynamics between surgeons and technologists

within the surgical environment, and explained that she was not scheduled in surgery

until the end of her rotation at the facility, unlike her classmates, who were scheduled

sooner:

> "Well-um-I have been. I had my experience there-um- they not as much as I wanted to or should have-um-my clinical instructor kind of like procrastinates towards the end of the second semester-I mean the mod semester, so, it would have been nice if we started like my other classmates. I would talk-I would talk to them and said yeah they started it in summer. Uhh. I was like okay um. So

> it's kind of like odd for my clinical instructor to procrastinate because surgery is really important...The x-ray techs, sometimes when they [surgeons] see it [the radiographs] and they just yell [surgeons] its like, this is not right. Its um, they just-I just think that they just blame it on x-ray techs…"

According to S6, surgery is a stressful environment with all of those working within experiencing this high level of stress, thereby creating an environment not necessarily conducive to learning or working:

> "Because they are all stressful. Uhh. Just blame it on somebody else. So they [surgeons] just blame it on us [technologists] and we just buy it or just take it, you know…it's not that-the thing blame. Its just-they just pinpoint on something that's wrong. You know. Its like. I don't know I just can't explain it. I-I think I know where you're coming from. I've been there myself. So it's okay. They don't say it, but they hold on to that, you know, vibe. They don't say it. They try to like leave as soon as possible. Just do the exam and go."

To summarize, out of this cohort, the two males, S3 and S6, regard surgery quite differently from the female students. The males considered surgery to provide an appropriate learning environment for students, however, to S3 there is a level of respect that can be earned from surgeons and surgical staff that can be granted towards the technologists, whereas S6 considered the technologists to be placed in the position of "fall guy," where the problems and issues that occur during surgical procedures are often "blamed" on the technologists. For S6, the type of pressure and stress encountered in surgery does not necessarily make for an environment conducive to learning or earning respect.

Shifting away from the surgical imaging environment, two interesting points of view emerged regarding instructors, instruction style and differences between male and female students. S3 remarked during the interview that the first clinical instructor he trained with at the facility was "a little harder on the female students," and explained "we

could…we could really we could take it as guys. He wouldn't bother us as much you

know…we take it as a different approach you know." S3 considered his male classmates

to possess the ability to handle the tough training a clinical instructor might dole out to

students, however, the female students had a difficult time with this type of instruction

style, and S3 informed: "I think he was kind of hard…you know…he could be really hard

on them." However, S3 considered this type of instruction style to be beneficial, and

stated that he "learned better" and he understood why the instructor was stringent:

> "He pushes you to do better, that's why he would make you reshoot exams until
> he knew that they [the radiographs] were okay. He wanted it to be perfect."

Contrary to the opinion expressed by S3 in regards to "tough" male instructional

methods and the effect on the male and female students, S5 (male) did not appreciate the

pressure placed on him by the technologists, clinical instructors and radiologists to

perform the exams with knowledge and skill, and stated that the radiologists at his facility

were:

> "Very demanding, being that you're a student they don't look at you as a student
> there, they don't look at you as someone that is learning they look at you as
> someone that needs to know this stuff and if you don't know it then you need to,
> you know, like they don't want to see you unless you know your stuff…they just
> put a lot of pressure on me, yeah. Not that I can I, I look up to the
> challenge…because…its not going deter me…"

The pressure S5 perceived being placed on him to perform accurately was not something

he appreciated and he did not state that he learned from this aspect. However, he

informed me that he was up to the challenge of the pressure placed on him by those he

trained among, with one specific radiologists creating "challenges":

"Yeah, they just put a lot of pressure on me, yeah. Not that I can-I look up to the challenge because I like to it's not going to detour me from speaking with him or like working with him, but it's a challenge sometimes just dealing with him."

S5 indicated that the male radiologists placed pressure on him perform to his full potential, thus, in some sense, S5 considered there to be a burden of too much work and pressure to perform, even as a student, and when asked how he would spend an extra hour, he replied, "part of me says I can go sit down somewhere and hide and try to rest…"

Interestingly, his opinion of this pressure to perform was juxtaposed between the opinions of the female students with their negative perception of the pressure placed on them to perform as if one is not a student, a fact that hinders the learning process, and S3, who considered the pressure as an opportunity to prove his worth as a student on the verge of graduating. For S5, on the one hand did not care for the burden, but stated that he would rise to occasion in order to prove himself, sharing the perspectives of both the female and male students.

I then asked S5 about surgery, and he sensed that surgery is a "dictatorship" of sorts, but everyone shares a mutual understanding of each other's professions and roles that they play. The emergency room, according to S5, is not as cooperative in exhibiting teamwork, and S5 states: " at St. Frances I don't know, but you have some nurses there that are a little temperamental. They know that there's a job to do there, but sometimes we get patients that come over and they don't even arm bands on." In other words, the nurses do not cooperate with x-ray and prepare the patient, and S5 states: "Yeah. Yeah. Exactly. Or we'll-they'll order an exam to be done and a portable chest x-ray. So then

we'll come over. You know on the requisite that it says band 13, but when you go over

it, you know, they don't even have armbands on. This patient been here for 5 hours and

he doesn't have an armband on. That's-that's the most important part." In S5's opinion,

these small and "uncooperative" acts only serve to create problems. He stated that it is "a

hassle to get some people, you know, to try and help you."

Much was revealed by the students differing opinions of the work environment,

and how pressure created by lack of staff or from other staff within the ER or OR can be

considered detrimental or beneficial to learning. From the student's individual

perspectives, I listened to the various opinions, with the female students largely focused

on how difficult the workload is on students when the facility is short-staffed. The male

students considered the lack of staffing as an opportunity to perform and become

autonomous, however, not all males did consider this beneficial, which reveals how

complex we are, and difficult to categorize.

<p align="center">The Future, Professionalism and the Hierarchical Structure Revealed</p>

Perhaps the most telling and complex responses during the interview sessions

were launched by the question *what are your plans upon graduation?* This question

inadvertently unleashed a barrage of responses and conversations regarding the other

imaging modalities, concepts of professionalism in relationship to radiography, and how

radiographers are regarded in the clinical environment when compared to the other

medical professionals as in nurses. Also revealed was how the implementation of

digital/computerized radiography slowly is changing the nature of interactions between

radiographers and radiologists, where a division in the working relationship has been

created because radiographers no longer bring the radiographs to the radiologist for review, opinion and guidance, the images are transported via the Picture Archiving Computer System, or PACS. Moreover, "telemedicine" and "teleradiology" will most likely change the nature of imaging in the future, as radiologists are increasingly obtaining the ability to read and interpret images from their homes (Harvey, 2006). Home based "teleradiologists" will no longer need to enter the hospital environment to read radiographs and computer based images, thus technology enables the radiographer/radiologist division to widen, thereby creating more distance between two vital work forces that need to establish and maintain working relationships for the benefit of the patients, and the work environment.

This cohort of students, together with the BCC first year students shared similar perspectives regarding professionalism and the depiction of radiographers as fitting under the rubric of this heading. When future plans were discussed, a number of students expressed the desire to pursue other imaging modalities in search of more pay, autonomy and to achieve a level of occupational professionalism that they did not consider the diagnostic radiographers to have.

Moreover, this was the turning point in the interviews, where the dialog captured the essence of the literature, almost as if the students themselves had read the case studies from Witz (1992) and Larkin (1983) on the history of radiography, and the changes to the field. The students expressed a desire to achieve this perceived "level of professionalism" that seemingly defined them when working in the other imaging modalities, including CT scanning, MRI scanning, nuclear medicine, ultrasound, and

radiation therapy, as opposed to diagnostic. Indeed, the majority of the students had no desire to stay working in diagnostic, instead wanting to move into the other imaging areas quickly, with some students commenting on how they had been "mentored" or encouraged to enter the other modalities, and not "stay in x-ray." For example, S3 stated that the technologists at his facility encouraged him to go into MRI: "…there's a lot of techs that I work with at the other hospitals, they say that its-its you must go on, you can't stay, you're too young to stay in x-ray forever." While S3 was encouraged to move into the other modalities, so to, was S5 who expressed that he did not want to "be doing x-ray" for "too long," where he was encouraged to pursue nuclear medicine:

> "…on weekends I play basketball and this-this guy he works in nuclear medicine and he was telling me you should get into it. So I'm, you know, little by little I'm trying to learn a little bit about it."

For S5, nuclear medicine held the opportunity to make higher pay, where the friend mentioned this to S5, "I think his main thing is money opportunities…I-I think he doesn't want me to just stay in x-ray, diagnostic x-ray, he wants me to try and make more money in nuc med."

Most telling also, were the words used by the students to discuss the other imaging modalities, where the language reflected what they considered a "professional" to be -- one who makes a high salary, works independently, is regarded by the radiologists and other medical professionals as holding a valid opinion, and wears "street clothing" not "scrub" wear. For these students, there is a level of professionalism that is achieved through advancement into the higher paying, sophisticated imaging modalities, for example S7 commented:

"…it was-um-more of a wanting to have a-um-better pay…from talking to different people and re-a little bit of research, just working here and talking to different techs."

In addition to discussions on professionalism, the interview questions evoked

lively discussions on salary, were, the students offered their perspectives on how

diagnostic radiographers are underpaid as healthcare workers who are a vital component

of the healthcare team. For example, S1 had this to say about radiographers being

underpaid:

"Well it's that radiographers historically are underpaid, for the volume of work that they do. We work every bit as hard as nurses do, I live with one so I know how their day is, they have 5,6 patients that they have to take care of on a daily basis where their working with the same person, but they are lifting and their cleaning and doing things, and when we are doing things we get dozens of different patients with different aliments and different situations that will arise all the time, so you always think that if someone comes in and you know that something is broken how are you going to move this get the film without doing anymore damage. I think that takes a lot of skill and you have to be real good with making sure you are not going hurt this patient, while you are still getting your job done. And I think that's worth something, I think the pay scale should show that."

In response to my questioning, *Why do you think radiographers have been underpaid all*

of these years, S1 replied:

"I think there has always been the feeling that they are the red headed step children of nurses and that just how it's always been I think, and talking to my two instructors and my clinical instructor and that is exactly how it's been, well we are a nurse and you are just, you just take x-rays. That's like what kind of argument is that? It's like without me you wouldn't know what was wrong with your patient. So I think that the nurse rag tag fight has been going on for years and years, years, and hopefully we'll start getting somewhere and I think we are, we are getting more recognized for the work that they do."

According to S1, radiographers have an important role to play within the hospital realm,

but the medical community has been slow to recognize the valuable contribution

radiographers add to the patient case and workload. Therefore, as "red headed

stepchildren," S1 considered radiographers to still be struggling to come out from under

the "cloak of nursing" and gain recognition, independence and autonomy. Reflecting a

similar perspective, S5 had this to say about recognition and professionalism:

> "Um, I don't think techs, I think as far as other departments, like um, sometimes, um you know, ER nurses different branches like ER department, you know, they sort of um, I-I don't want to say make fun of us, but sorta like x-rays a joke, they don't think that we do, they don't think that our work load is the same as theirs and it is, you know, we deal with patients, you know, patients that come over and we have to shoot chest x-rays on them but you know you haven't even done your part in the ER, you know, you have to disrobe them, put a gown on, you know, it's the same things we look at, you know, at the same time their looking at us like we ought to. I think we're looked at like professionals but at the same time it's like I just think that uh they don't really understand our workload. They think x-ray is just put a hand on the table and shoot it and its that simple; it's really not that simple."

For S5, the work radiographers perform is difficult and misunderstood, where this

misunderstanding serves to create a tenuous relationship between the other staff in the

different departments and radiographers:

> "once you prove that you can be a professional and you know-you know what your doing then I don't think its all that elaborate and uhhh, coming into x-ray after-after you graduate obviously they expect you to know something and if you don't, you can't prove you that you know something then it becomes it maybe causes problems in certain places. But um I haven't experienced that yet, but I've heard."

In essence, and according to these students, radiographers are not paid well and

are not highly regarded as the other medical professionals are, even though radiography

requires comprehension of a substantial knowledge base. With such comprehensive

training required coupled with the "hard" work radiographers must perform on a daily

basis, the salaries should be higher. For example, S7 commented:

"Well as far as any circle yeah. They know, you know-um-I don't know…okay I'm blank now. Um they just know-they know I mean [sic]. They don't know as much as an RN would know. But they've had their knowledge of what they need to know as a tech. And they need school for that and um know that they should get paid higher."

When I asked S7 if he knew what the salary range for entry-level radiographers is currently, he replied:

"Um-it depends on the hospital you go to and um depends on if you are working in the registry or if you're just working in a clinic or in a hospital site. Could be anywhere from, if you-if you don't-if you were just a, I guess a part-time…You're making a lower salary $16 maybe $18 whatever, but-um-somebody here had said-uh-he made $20 to $23 or something like that so."

S8 shared a more optimistic opinion regarding entry level salaries, quoting a low (when compared to her classmates) yearly average salary range of, "um-somewhere between like $30,000; $35,000…per year," and she also informed that this salary range was, "Um-that's a lot more than I make now so (laughs)…So not only now, but once again-um-it doesn't really matter personally to me."

S9 described diagnostic with a mixed opinion, stating she considered some radiographers to receive adequate pay for the work performed, however, it is contingent on how long one has worked in the field:

"it depends, okay, like some people make, they say they make like thirty dollars, thirty two dollars, I think that is pretty okay, but I think that here they are starting some of the techs make twenty-four, twenty-five, and they do a lot, especially the ones that really work hard. So no I don't think that's enough. They should be making whatever the top pay is, but they're not."

With this particular student during the interview I elected to inquire as towards the pay scale for mammographers, and if S9 knew what mammographers command for salaries as a special imaging modality. S9 responded, stating:

"Well I don't know what mammographers-what someone else in another hospital would make, but here I know the person made I guess twenty-eight dollars. But I don't know what the rate is. Yeah I've-I've been told I guess that they normally make only a dollar or two more that what you know everyone else makes."

While the other modalities were described as "money makers," mammography was not seen by this student as a lucrative area to pursue, with this imaging modality commanding only a "dollar or two more" than diagnostic. In reality, mammography is cited as the least profitable imaging modality to work within (ASRT, 2001), quite a dichotomy, as mammography requires completion (among other requirements) of up to 100 diagnostic mammograms before individuals can sit to take the 115 question examination (ARRT, 2006). Furthermore, a higher number of continuing education credits are required every two years for mammography.

Overall, throughout the interviews with the females from the BCC second year cohort, mammography was seldom mentioned, and generally the students needed slight prompting to discuss this imaging modality in regards to salary and opportunity. The responses regarding mammography varied, with the majority of the females not willing to train or work in this area, for example, S4 informed me that she was not interested in learning or training in mammography:

"Uhhh…one or two techs do mammography, but not very often. I don't like it. No, I don't like to watch it. Squeezing someone's you know. I don't. I've been in the room and they. You know. No, no not interested. I thought I would but I was like no."

Later on during the interview I asked S4 if she was aware of the pay scale for mammography and if she considered mammographers to make decent money, and she replied, "I think they do. Yeah. But I'm not going that way though (laughs). I'm not

going that way I don't…"   She had been encouraged by her classmates to enroll in the

mammography class offered through they program where S4 felt slightly pressured to

take the class:

> "One of my, some of my classmates are telling me that, to take that course
> because they need enough girls...for the class to be big enough to teach. So
> they're, they're trying to convince me…No, No No…I'm not going there. I
> probably should have different things, but I just don't…if you don't enjoy…"

She explained that one has to be "pretty close," to the patient to conduct the

exams, stating, with some amusement in her voice, that mammography was to "close" for

her personal comfort level.

For S6 she as well had been encouraged to enroll in the mammography course

with the other female students, "…my teacher has…um, unfortunately we didn't have

enough students for our semester year and so um she said she would get back to us in the

fall." S6 informed that me that there were a not enough female students to take the

course based on a lack of female students enrolled in the program:

> "Yeah. Not enough students. Well we just didn't have enough girls in our class.
> Yeah. Or they weren't as-I don't know its just weird because the teacher didn't
> really bring it up until this semester and I was really-I was just floating when. I
> guess I was just waiting for the teachers to say something. But they didn't really
> emphasize on mammography during my year-not until this semester, that
> semester. And so …Um-I may try it. Yeah. I may try it. I should try it. As a
> female. Um."

For S8, similar to her classmates, she explained that she has "seen

mammography," and does not care for it, "…well, I sat there for like two days watching.

I just can't see myself doing that."

S9 mentioned mammography, "to just do it," and explained to me that "I know

next semester they are trying to get a class started, and um-since I'll know everyone and,

the teacher, and I don't know if she is going to do it still, but someone here that's been in

CT, she taught mammo before, she is supposed to do it again, so I'm thinking about

taking it." S9 explained that she desired to have mammography "under her belt," as an

additional imaging skill, explaining to me, "I mean just you know-you know learn it. To

learn a-um-just to have it. I mean, I would-I'd do-rotate to mammo. I mean its okay. Its

something I wouldn't mind doing. But I-um-its like I'm saying I want to do it…"

According to S9, as female, she claimed that she is expected to perform

mammography, and that her future place of employment would "probably make" her

rotate through this imaging modality, regardless of her preference, where she stated that

mammography is "…just okay. I mean once I've-I'm sure once I've taken it, completed

it and if I was working here they'd probably make me do it." I inquired if any of the

technologists encouraged S9 to pursue mammography:

> "Well yeah the mammo, one of the mammo techs, she-she tells me a lot because
> she likes the way I do mammo. She could be telling a story though. She says-she
> says we're really good doing um mammos and she let me do them you know, by
> myself, well she's been there, but she said she has not done that with any of the
> other students. She says she'll help them, but not like how she has worked with
> me. She says that I would make a good mammo tech and I should really think
> about doing it, but that isn't why I decided to go on and take that class. But once
> they said they were going to have it I just said I-I might as well."

S9, along with the other female technologists, did not express an enthusiasm or

interest in pursuing mammography, only that there seemed to be this sense of obligation,

that as future female technologists, they should perform mammography, or perhaps they

will be "forced" by their employers to train and conduct mammography because of their

gender. Once again salary was not described as adequate, where S9 stated, "Um-well-

well to me I think its only two dollars more…"

The females in this cohort were encouraged to enter mammography and to take the course the program offered to the female students. There is a closure mechanism of sorts here, as males are, by virtue of societal morals (Cockburn 1985), are not encouraged work in mammography for the fact that they might not be hired on as mammographers technologists regardless of licensure (while rare, males do sit for the mammography exam). The majority of the medical facilities will not train men as it is not cost effective to "chaperone" them with the patients, a deterrent to be certain. On the other hand, women could have difficulty being hired on at medical facilities because most of the facilities request female technologists to be certified in mammography for cross-training/employment. Therefore, they must enter, train and become certified in mammography if they wish to be marketable.

As mentioned, the imaging modalities were perceived by a number of the students as consisting of demanding work, a fact that justifies the higher pay. According to these students the imaging modalities held higher patient caseloads, there was more responsibility per patient, and the caseload of patients consisted of individuals who oftentimes were difficult to move, manipulate, and image. Furthermore, higher pay should come with additional education and certification, as in the case with nuclear medicine, ultrasound, and angiography, S5 stated:

> "Um- as far as CT-um-I means yeah they are on the panel all day so, I mean, your dealing with patients also and its some places are nonstop like at St. Francis. It's like you take a patient off the table and put another one on the table. It's like right back-to-back. Back to back. Yeah. But I think as far as –um-as far as um diagnostic x-ray it's more-its more manual labor, so I believe they should get as much as CT or MR."

Interestingly, nuclear medicine, ultrasound, angiography, CT and MRI rightfully are the higher paying modalities, with the exception of mammography. As mentioned, mammography is a modality that requires additional education and certification, but was not mentioned or considered by the students as a modality that commands higher pay.

Furthermore, the imaging modalities were described as being less stressful, less strenuous and not as physical in "labor" as diagnostic, considered optimal areas for females to work in. For example, S3, commented on how the imaging modalities are optimal places for females to work, thereby attracting the female students in his class to elect CT and MRI scanning as their future modalities of choice:

> "Yes most of them [female students] seem to be interested in modalities. Um probably CT and MRI. Probably because there is less patient manipulation you know, there really is in those kinds of modalities here. You aren't pushing patients as much and lifting…it's just less work. Yeah. Less lifting, less pushing."

Just as S3 described these areas as less physical work, so to did S7, who also expressed during the interviews that a future career goal was to continue his education in radiation therapy and eventually work in this distinct modality. For S7, he described this imaging modality as an occupation that does not take a toll on the body, and requires little "manual labor:"

> "Um, yeah in a way because [there is no manual labor], um, they pretty much like stay in their department. Like with nuc med, um, cat scan, uh, every modality pretty much except for x-ray pretty much are in their department. They still have to do body mechanics and they still have to-um-you know have a labor workload, but you know x-ray you're-you're everywhere. You know whatever they need you know like surgery, you're doing a portable somewhere in ER, you gotta…"

Comparatively, S7 considered diagnostic x-ray to consist of higher manual stress on the body because of the constant "traveling" and working in other areas, whereas CT

scanning or nuclear medicine is considered stationary, with the technologists situated at a

control console and the patients are "delivered" or transported, for the exams. Where

there is occupational less stress, as in the imaging modalities, and according to S7, is

considered a "a better career move you know," and described his interests also in what

attire is worn by the technologists:

> "um, one of the most interesting things for me is-uh-I see a lot of-uh-techs here,
> they wear-they don't have scrubs. Some, you know, I like to-uh-I go to work
> sometimes I don't want to wear scrubs all day. Maybe I might want to put a suit
> on or something you know, and achieve a more professional look, it's more-it
> seems more professional."

Additionally, S7 described radiographers as the "blue collar workers" to the

"other people that are in the medical field…which is not a bad thing but…" He then

added, "The procedure doctors, you know, the doctors always want something done and

they see you, and they see you as a grunt." According to S7, diagnostic technologists are

the "grunts" in "scrubs" who receive lower pay, while those in the imaging modalities are

adorned in professional attire, command higher pay and are respected by various staff

members who work in the hospital.

Of interest, the issue of radiographers not being regarded as professionals also

emerged as a topic of discussion during the interviews with the first year students, and

similar to the second year students, the first year students garnered the impression that the

diagnostic radiographers are not well respected within the hospital, and those who work

in other areas within imaging are respected autonomous professionals who purportedly

work in tandem with other hospital staff members and the radiologists. On more than one

occasion the students remarked that the radiologists depend and rely on the "specialized"

skills of imaging modality technologists to produce adequate and diagnostic images, while simultaneously reporting to the radiologists pathological complications and findings, in essence, evaluating the scans and images, all the while operating sophisticated and highly technical machinery.

This observation calls to mind the work of Barley (1995), where he reported on the changing nature of the workforce based on the continuing advances in technology and computers. Barley mentions in this study that a horizontal division of labor has developed, where "authority and expertise are dispersed and allocated to members of distinct groups" (Barley, 1995, p. 4). An example of "dispersed" expertise is the radiographers who work in CT scanning, and angiography, and the technologists who work in ultrasound, where to work with these imaging modalities, the technologists have had to "learn to interpret pathological signs in order to operate CT scanners, ultrasound and digital subtraction angiography equipment" (Barley, p. 27). Barley asserts that the "need for these skills undermines radiology's long-standing mandate that technologists be barred from interpreting films" (Barley, p. 27). The BCC students, as well as the ICC students noticed and commented on how those in special imaging areas are "experts" and have authority. For the students, they expressed the desire to advance into the modalities and become the technologists who command authority, control their environment and interpret the images.

In addition to discussions about salary and professionalism regarding the other imaging modalities, a theme emerged out of the dialog from those students who no longer worked with the conventional methods of diagnostic imaging, but worked with the digital

computerized technology and the PACS systems. This theme once again correlates to the work of Barley (1982), where the inception of "new" technology as in the computed axial tomography scanners (CAT scanners) had been introduced at two hospitals and how this new technology occasioned change with the relationship between the radiologists and the technologist operating the equipment.

It was mentioned how there is the first correlation to Barley lies occurs with the dialog of the students, where some students, commented on how the imaging modalities are the "professional" areas. These students observed particular technologists commanding   respect, and being informed autonomous independent health care workers. These technologists worked in tandem with the radiologists based on a dependency created by the radiologists, as they need the imagery that the only the skilled "CT" technologists or nuclear medicine technologists could provide them. Additionally, and based once again on new technology occasions change. There is a second correlation to Barley (1982), that exists with the advent and implementation of digital/computerized radiography, where this technology has served to reaffirm the existing hierarchical structure by keeping radiologists in their "reading rooms" by allowing them to view the x-ray images via computer, keeping the radiologists somewhat "sheltered" away from technologists (and students) Thus, the technologists "stay out on the floor," and no longer have the opportunity to spend the one on one time with the radiologists, where in the past the technologists physically carried the completed x-ray studies into the reading rooms, conveying the information of each patient verbally, and discussing the various patient cases with each radiologist.

These individual meetings between technologists and radiologists once affirmed a working relationship, and now, without it, the technologists and radiologists are distanced from one another, a fact that impairs student education, as students formerly interacted with the radiologists, thereby learning valuable information on various pathological conditions, where medical knowledge is exchanged that serves to enhance student training in terms of strengthening visual skills for pathological conditions not normally noticed necessarily by technologists. Moreover, and a paramount point, the interaction with radiologists also serves to break down the boundaries between physicians and technologists, as conversation, discussion, brainstorming sessions, flow of ideas, and physical contact can serve to create an equivocal bond and strong working relationship. For the BCC students who trained at the digital/computerized facilities, they interacted with radiologists only when fluoroscopy exams were conducted, where the radiologists are required to be present in the room with the patient to operate and control the fluoroscopy equipment. , However, the fluoroscopy exams did not take place often, therefore interaction between students and radiologist did not occur as frequently. For example, and according to S3, he commented on how "…here there's not much interaction for some reason. Like as far as on a friendship level because over there the doctors seem much nicer. Not that they are mean here, but there is one person that actually talks." Seeking clarification, from S3, he explained how, "…because you have the PACS system, you send it [the images] to the PACS." He explained that the former conventional facility he trained at allowed for technologists to bring their radiographs to "the floor at the other hospital, you usually have to show it first [to the radiologist] to see

if it's okay," however, at his current site, he commented that, "now you just send it to the

system and you're done with it." Where now his interaction with the radiologists is

reduced to "Um maybe once or twice" during the workday, as opposed to at his former

facility where the interaction took place, according to S3, "…oh lots more. Lots more."

For S4, her comments regarding interactions because of the PACs system were

similar; "…the only time we get to see them is if we are in fluoro and we need to tell

them, oh I took a picture so I need you to look at it, that's about it." S4 did state that

during fluoroscopy exams she has had her most interaction, however, with S4, she

expressed that she "felt" she could approach the radiologists, and did not sense

necessarily any form of "division" between technologist and radiologists, unlike her

classmates, for example, S6:

> "Its-you know-I didn't even know their names [radiologists]. So I was just like
> okay x-ray reading. I'm like okay. And they, you know, they don't yell at you or
> anything like that. You know or…Not yet anyway."

For S6, in comparison to her classmates, considered herself "fortunate," as the

radiologists at her facility were not "as mean" as what the other students had

encountered:

> "Oh. The radiologists here they're pretty-uh-nice compared to um when my class-
> what my classmates' radiologists have in their hospitals. So I am kind of like
> fortunate to have radiologists who doesn't give me an attitude or bring my day
> down. So I am kind of fortunate to have that and I know there's other radiologists
> that can be a little tougher and meaner so…I'm kind of fortunate."

For S7, he commented that he has not had any problems or difficult situations

with the radiologists, but has not interacted with them as much either:

> "I have uh-I wouldn't say a lot, but I have a substantial amount of interaction with
> them, more than I ever did when I was just working here. I never really interacted

with them as, you know, as-you know just working here. But as soon as I started on my intern, you know, I said its bound to have to be-to happen."

S8 stated that her interaction with the radiologists at her digital facility has been "very rare," and occurred only during fluoroscopic procedures, including barium enemas and upper gastrointestinal exams.

S9 stated that she liked the doctors at her facility, "I think its good here and they're pretty cool." She echoed that interaction between radiologists and technologists/students was minimal, however, as infrequent as these encounters were they were positive, "…only if I'm in fluoro, but they come to visit our techs a whole lot and its like this one doctor, he's a really nice guy always talking jokes, so the doctors here are really nice. I know some hospitals are, like in class some of the other students, talk about the doctors but they are not really mean or whatever…"

I garnered from the conversation that S9 noticed a difference between the radiologists at her facility and that of her classmates. The doctors at her training site are more pleasant and congenial to work with, "…maybe because our doctors are residents. They all seem nice…"

Thus a distinction in the interaction patterns from facility to facility was noticed by S9, where she implied that the radiologists at her facility were "nice" because they "were residents." It could be highly possible that residents, being in training, have not established their place in the hierarchical structure, are juxtaposed between the technologists who are experienced and their training progress and inexperience, which places them in a similar environment that the students are in. Without the confidence and

educational know-how, they must turn to the technologists and students for assistance, which serves to create relationships.

S10, who trains with S9 also commented, "Uh we just got these first few residents, and they're still learning and they look to us sometimes to help them out. But the doctors here are, you know, are nice. Uh, second, third, fourth year students, radiology students who are nice. They help out like if I can't figure out what they're looking at or whatever, they tell you." These residents also served as educational conduits for the students, by taking the time to share information and knowledge.

Although training at a different facility, S4 noticed similar patterns of interaction between students and doctors at her facility, where the interaction between students and surgeons during the operating room procedures was less of an intimidating experience, because the doctors there were "learning themselves." She pointed out a distinction about her training facility, being assigned to a medical training facility for doctors and surgeons. S4 indicated that the interaction between technologists, students and surgeons was "different" and more "positive." The surgeons at her externship site are in training, learning the procedures just as she is learning the radiographic procedures, "…yeah, we're learning and they're learning…"

However, for S6, she indicated a surgery environment where the surgeons and technologists did not work in tandem, and the technologists were often "blamed" for the mistakes and mishaps that occurred during procedures:

> "Not beat up, but its um, they just-I just think that they just blame it on x-ray techs…because they are all stressful. Uhh. Just blame it on somebody else. So they just blame it on us and we just buy it or just take it, you know…it's not that-the thing blame. Its just-they just pinpoint on something that's wrong. You

know. Its like, I don't know, I just can't explain it. They don't say it, but they hold on to that, you know, vibe. They don't say it. They [the technologists] try to like leave as soon as possible. Just do the exam and go."

To S6, she would remove herself from the stressful environment of surgery and not allow the personalities of the surgeons to effect her, otherwise it would "ruin your day, its not worth it." Thus to S6, surgery was an area where the technologists did not enjoy the work environment, as it was shrouded in pressure, and there existed a lack of respect between surgeons and technologists, as the technologists were often the cause of any poor or problematic procedures. Furthermore, according to S6, it was difficult to train in surgery as the expectations were high, and one had to simulate experience, or be subjected to ridicule:

"Well if they put you down its like okay. Well there was this one time where you know I haven't done surgery in a long-haven't had experience much and I just you know. When you go there you pretend you know what your doing. Which is helpful. Um-so I kind of knew what I was doing and it was weird for me to do-fluoro and-and just. I forgot what exam it was. I just thought the doctor would do the fluoro in line. I was just doing two things at the same time. Which I was like okay I thought. I don't know I was just. I guess that's how it's supposed to be done. That was like hard. That's was that one time. Oh yeah. I was with another tech. And-um-I thought that I should do it on my own cause he could watch me. Um no he was-he was trying to…you know he's trying to just be jokey, but…So I just took it you know."

For these students, much emerged from the dialog regarding professionalism, salaries, and how the new technology is now serving to alter and sever the working relationships between radiologists and technologists, and thus students. Furthermore, the students commented on how diagnostic technologists are subjugated and have little control over their environment, particularly when compared to the other modalities and nursing.

Conclusion

In conclusion, dialog with the BCC second year students yielded some surprising, some not so surprising, and, undoubtedly, complex themes, where a number of these themes correlate closely to the BCC first year students. However, as the next section demonstrates, there were noticeable differences between the two cohorts, based on level of education and training, as to be expected. Additionally, the first year BCC students demonstrated how there is a strong influence of faculty and friends in regards to nature of the work and the profession, and concerning future goals.

The first year cohort proved to be somewhat malleable, garnering much (albeit negative) influence from others, while the second year students, at this time in their training, had formed strong opinions through observation, training and close contact with technologists, managers and the radiologists. At this point the second year students had, in a sense, become a significant part of the radiology workforce for each hospital, ready to be hired and looking forward to their future careers in imaging.

Findings – BCC First Year Students

Introduction

As surmised, the first year students for BCC had spent only a few months in their clinical training, and were not able to share as much information about their future plans upon graduation, or discuss salaries. The majority of the students in this cohort could only guess at this point in time what the salary levels were, and give somewhat "idealized" descriptions of imaging modalities based only on brief glimpses into these other occupational areas. They also were not under so much under pressure to perform,

as they were in an early stage of training, thereby under constant supervision. Upon advancement into the more independent stages of their training, they too would be under pressure to perform similar to the second year cohort.

Furthermore, the first year students were somewhat "malleable," easily influenced by their instructors and other staff members of the medical facilities they were training in. One school instructor in particular seemed to have influenced these students greatly, and his rather "negative" comments (shared with the students most likely during a class lecture) of radiographers and the profession created doubt for some of the students in this cohort as to whether radiographers are considered professionals. Indeed, the instructor's comments and perceptions greatly influenced the majority of these students, and this influence was most noticeable during the interviews when discussions on professionalism occurred While the instructor did influence these students, the majority of them expressed interesting opinions and perceptions on the profession, and the parameters of the occupation, perceptions garnered from the witnessing of interactions among hospital and medical imaging staff. These students had much to say, and shared valuable insight towards employment ability, patient care, nursing, technology, professionalism and their future career paths.

<u>Employment Ability and Upward Mobility</u>

Like their second year counter parts, the first year students entered radiography based on reasons of economic security, and occupational mobility. However, while the themes were similar across both cohorts, this particular group of first year students, when asked about the future and interest in other imaging modalities, all held an interest in

nuclear medicine, regardless of their awareness of the field. For these students, a

particular faculty member and outside friends promoted nuclear medicine to them as the

imaging modality to pursue. This alone emerged as an interesting contrast to the second

year students who gained their perspectives on the variety of different modalities based

on observations and discussions with other staff members of each imaging department.

The first year students had only the knowledge of books, outside research, and the faculty

to create early influence on the decisions they would make for the future.

What was paramount to the first year students, as it was with the second year

students, was to have the ability to move up the career ladder, for example, F2 informed

me of his plans and why he was interested in these other areas:

> "Um, I heard C.T. or M.R.I. is pretty good…I'm kinda lookin' towards that. I
> wanna see how x-ray goes first; see if I need more money. (He laughs.) See how
> demand it is, if I have the time….I would have to see how much money I would
> need, if I get too money hungry, how do you say that? If I wanted more money,
> I'd probably have to jump up to the next level."

For F2 he wanted to pursue other modalities, especially if he desired to make more

money. Similar to F2, F1 entered radiography for the fact that she could train and work

in other areas:

> "That there is a demand for it, you can always find a job, and I can branch out to
> something else, that the part I really like about it. And if I don't like what I am
> doing somewhere else I can always came back to it."

For some of the other classmates, they were more pronounced in their desire to achieve

monetary satisfaction, for example, F3 had this to say:

> "I was lookin' for something to do. I was going through school with, ah-- just
> taking classes, with not really knowing, having any direction. She [mother] was,
> like, "Oh, why don't you be an x-ray tech," and I looked into it, and it sounded
> good, and the pay sounded good, so I said, "All right." My mom just told me that

they get paid well for, you know, only having a two-year degree. (He pauses.) So that influenced me. I was, like, "All right. Might as well. Money makes everything go 'round."

According to F3, the idea of getting paid well for work performed influenced him to enter radiography, in addition to the lure of other imaging modalities where one can "relax" on the job and make money doing so:

"Other techs or other students saying that they haven't, what they might wanna do, in nuclear medicine, you just get to chill out and listen to music while the dye sets in for the whole time, or whatever, or.... Or you make more money doing this. No, just, we took a tour of the hospital before we entered the program, and I just heard, yeah, real high pay…"

For F5 he went into the program based on influence from his brother, who informed him how the program would not be too difficult, and the pay is good, in particular, with the imaging modality nuclear medicine:

"Oh, my brother, actually, 'cause ah, he knows, like -- His friend went to the same program, and after that he went to nuclear medicine, so he told me it would be, like, a good profession, so…Well, um, he just said the pay is, you know, it's pretty good, all right? And, ah, he said that, um, the program would be not too difficult. It wouldn't be kind of difficult, but you know it's, um.... And, you know, I just thought that it would be a pretty good profession to go into 'cause, um, I was undecided about my profession."

F7 desired more opportunity and "variety" in a job, indicating he wanted to move into other areas and "branch out," which is what radiography offers. F7 was influenced by his brother, and learned that the profession offered opportunity in other areas:

"…Yeah, he went to this. And not only that, he knew that it was like, nuclear medicine program. It was all the field, x-ray. (Seems to mean, "There were all the fields, x-ray....) He could, you know, branch out. And when I saw that, I was like, "Wow, really?" So even if I get bored with this job, I can go into, you know, nuclear, MRI, CT, everything. That's the reason why I joined. Variety…yeah, I don't wanna get, like, bored with my job. I have a lotta jobs. I been, you know, working for more than ten years, you know, so that's the reason why. I was like, "Hey, you know, even if I don't like this I can always go do something else."

F8 learned about the program from his best friend's brother, and he entered radiography to train in x-ray for his future and the opportunity, an opportunity that his past professions as an emergency medical technician did not offer:

"Well, my best friend, for thirteen years, yeah. We went through the program together. His brother does it, so, and so.... He's, like, 'Yeah, to be a millionaire....' Yeah, I wanted something, something that I could grow from, at least just-- X-ray's, like, a stepping stone....I was an EMT It doesn't really go anywhere. I mean, you couldn't-- I mean, if it's-- As far as education, I mean, you always learn, but as far as, you know, your life, I mean, everything gets more expensive but then, you know, your play time…Not about money. Don't get me wrong…"

Like her classmates, F9 entered radiography for the opportunity to train and work in other areas:

"Well, if you're going, you know, become an x-ray tech? There's, like, you know, it opens the door to many other, like, see nuke med, or CT, MRI, so you know, it happens. You have a choice there."

Interestingly, and in comparison to the second year cohort, the two paramount points for the second year students, making money and job security, were not directly mentioned by the first year students, however, to these first year students, and similar to the second year students, they did express interest in the opportunity for future training in other, higher paying imaging modalities with the ability for occupational advancement.

Out of the nine first year students, five students discussed advancing into nuclear medicine, and, described this modality as a high paying "wave of the future." The majority of the students had been influenced to enter nuclear medicine by one of the faculty members at the school, deciding upon this area based upon the "lure of more money," and an imaging modality where one can "chill out and listen to music while the dye sets in…" Another student described nuclear medicine as not being "too hard…it is

only one year of school, but the pay's real good." To the five male students in this particular cohort, making money while working in nuclear medicine without the job related stress was a common goal.

<div align="center">Patient Care Skills and Nursing</div>

Out of the nine students interviewed from the first year cohort only two (F1, F9) started out in nursing, unlike the second year students, where eight out of the ten started in nursing. Similar to the second year students who began their medical careers in the nursing program and expressed wholly inaccurate and rather "bitter" comments (the type of comments one might make when they are not accepted into, drop out, or fail out of a program) towards the work nurses perform (recall the comment from BCC S7, who stated how he "didn't want to deal with the dirty job of a nurse"). According to the BCC second year students, nurses "clean up" after patients and are the "caretakers," a perspective similarly shared by F1 and F9, to be discussed towards the end of this section.

Furthermore, and sharing a common ground with the second year students, the first year students did not mention the patient and patient care as being their primary influencing factors for entering radiography, however, with their working class family backgrounds, it is highly probable that these students were concerned with primarily entering the two year program as a means to rise above their current family economic situations. Moreover, given the age range of this cohort (the oldest student was 30, the average age range was early twenties), these students were likely to have been strongly encouraged by their family members to enter this short-term medical program. As

mentioned, the families depicted in the study by Weis (1990), attempted to persuade their children to graduate from high school, and attend college to obtain better paying occupations (Weis, 1990).

Conversely, with this group of students, again similar to the BCC second year students, there was what could be interpreted almost as an absence of warmth and compassion in the language used when discussions about patients occurred during the interviews. However, it is possible, given the working class background of these students that the discourse of these students lacks perhaps what one might consider to be compassionate statements, when compassionate statements are taken literally, word for word, and filtered through our own perceptions. Thus, an agenda can be formed when considering such statements, and care must be taken when considering their discourse, and when comparing the language and discourse used to the ICC second and first year students.

Of interest, and noticeable differences did occur, assumed to be based on level of education and training between the two cohorts. The BCC first year students discussed their patients from the perspective of how, by coping with injuries and illnesses, they learned to adjust their critical thinking skills and gain knowledge from each person imaged. The majority of these students recognized illness in their patients, and how difficult it is for patients to maneuver and follow "simple instructions" in order to complete the exam ordered. These students have begun to learn how to adjust, and work with their patients without injuring them further, in order to accomplish the exams. In a real sense, this could be considered positive, as it demonstrates how these students

recognized that they must learn from their patients and work around the difficulties each particular patient can present, personal and professional growth to be certain. While these students discussed their patients through use of a language that lacks in "warmth," this did not indicate necessarily that these students are not empathetic towards the patients, but, rather, that they might not necessarily have the "tools" with which to explain their experiences.

Recall the point directed towards the BCC second year cohort, how for some of these students, they come from working class background, and possibly have been exposed to differing forms of verbiage, that can have direct influence on their language usage. Delpit (1988) describes what is considered to be "authoritarian behavior" that working class parents use towards their children that could have effected the language used by these students, where empathetic and compassionate responses are conveyed more as directive comments, and not to say necessarily that these students do not feel compassion or empathy, to these students, they might consider their statements to be empathetic, based on what they have been exposed too, and have learned.

Furthermore, some of the working class students in this cohort could have been exposed to what Delpit (1988) describes as a difference in the expressions of authority and power displayed by teachers in secondary school. While secondary schooling was not explored, it is possible that for some of these students, their former educational experiences and exposure to the culturally different directives issued in the past influenced their present discussions about the patients.

As this section demonstrates, the students did discuss the patients throughout the interviews, where they commented on how the patients did not understand "simple" instructions, and did not "cooperate" necessarily, needing "to be moved" in order to obtain the optimal radiograph. This aspect presented as an "awakening" to the day-to-day operations and posed a challenge to learning process, for example, F2 commented:

> "I was in the hospital when I was fifteen, and they did chest x-rays all the time, and being as me, I was a fifteen-year-old, just doing chest x-rays: "Stand here and hold your breath. All right, breathe," you know, going through all the routines, and I was, like, "This is simple. You know, why not do this when I grow up." And so I was like-- I thought I was gonna deal with patients that were like me, you know, that listen to everything, that could stand on their own, that could roll over when told to roll over to, but it's different. (He laughs.) You get those patients, but you also get those patients that you have to talk to and explain everything else to."

For F2, he explained how his interest in entering radiography centered on imaging "things" and how the process of conducting aspects of radiography is not difficult to learn; yet one must gain knowledge of how to communicate and work with the patients. F2 commented on how radiography is not difficult and said, "yeah, all you gotta do is position the patient. Make sure everything is right. Make sure everything is on there...." but the job is complicated by the fact that the patients don't cooperate. However, the patients, according to F2, do add interest to the job, as one has to learn to creative in order to radiograph badly injured people who can't be moved:

> "Ah, this kinda sounds wrong, but it's something different every day. It's, I mean, you do the same positions and everything, but it's a different person. It's a different style. You encounter different styles. You might have an arm that's broken, and it's not gonna be the same broken arm the next day, so it's different. It's something new every day, and you have to use your mind, use things around you on how to do everything."

Thus according to F2, patients represent challenge, and present a mental challenge, where something different occurs every day lending an interesting environment with which to learn from.

To F3, he has begun to learn the "give and take" aspect of working with patients, where he commented on how the patients are tolerant or "patient" with him, a student in training, and in return he has learned to be "patient with people." Part of the learning process F3 has experienced has been "dealing with the patients," and his growth from this process. He explained that this is what he appreciates about the program, and it has been positive for him, learning to change in regards to patient care:

> "…being at the hospital, dealing with the patients, like, more compassionate patients, patients with patience, and....And, uh, that's not bad. Yeah....Learning, patients that have been patient, just me becoming more patient with people…"

For F3, the patients "tell him funny stories," and provide him with the ability to learn and extend his educational growth a positive experience for him while in the program. He explained that he learns "something new every day." I requested clarification on what learning "something new every day" indicates, and F3 responded:

> "…learning something new every single day. A new way to, uh..., um..., go around an obstacle, like, say with a patient, right? They can't move a certain way, you'd be able to position the film a little differently, or the tube, to compensate for, uh, for their, uh, whatever they can't do.... Or just learn a new, uh, new exam…"

Thus, the patient represents, interestingly, an opportunity for educational growth because of the challenges presented by having to work around the immobile patients, a positive point in the training process, and one that continues to provide the technical experience F3 desires to grasp and eventually master.

F4 expressed that he liked the older patients who are the "stubborn guys…" who reminded him of his grandfather. When asked what he considered to be a good day for a technologist, F4 replied: "A good day is not running into problems, but that never happens so...." When asked for clarification regarding the "problems," F4 stated, "just, in that-- something not going as planned." By "something not going as planned," F4 indicated how the patient exams do not go according to "textbook" protocol, based on "multiple reasons." According to F4, the multiple reasons are when the patient can't move a certain way, or refuses an exam:

> "A good day is....not running into problems, but that never happens so.... (He laughs slightly as he says this.) But you always run into problems....There's always gonna be problems, though. Like, um, let me see. Oh, um, sh-sh-sh.... (He makes a kind of whistling sound.) Just, in that-- something not going as planned. Um, it could be multiple reasons. It could be the patient isn't able to maneuver the way you want 'em to. It could be, ah, the patient refusing, um.... It could be an error by the tech. It could be ... a number of things. I mean, that's just a couple, um....It could be the patient isn't able to maneuver the way you want 'em to. It could be, ah, the patient refusing…"

F4, commented that there are multiple "problems" that occur daily in the working life of a technologist, based on technologist error, or based the patient. For F4, the patient creates "problems" in the everyday radiology environment, based on patient injury, illness, or inability to maneuver, or simply by refusing exams. However, while the patient "alters" the work environment, creating hardship and disrupting the "flow," F4 considered there to be a positive side to the his training, where working with the patients can be beneficial, in particular when the patients praise F4 and inform him that he "is great," which, according to F4, "in itself, is the most rewarding thing."

F5 considers radiography "a good profession to come into" because the program material is not difficult to learn, and the clinical component of the program with the hands on learning is what he enjoys. An interesting point expressed by F5, in contrast to the other students in this cohort, is he considers it "fun" to work with patients on a daily basis, among other things:

> Ahm.... I just.... It's not-- With me, it's not too hard to learn, actually, and um.... When I look at it, I see that it's, like, when you're finished with the program, I think the pay is pretty good, actually. And, um ... working with patients is-- It's pretty fun, actually…Yeah… They're ... simple-minded."

The last comment about patients being "simple-minded," was not elaborated on, however, the choice of words used to describe the patients at his facility could be attributed to temporary loss of proper word usage.   A number of the students in this cohort, as well as F5, train at one of the Veteran Administration Medical centers, where the patients are primarily older males who suffer from former combat injuries, or are struggling with some form of psychological/mental disorder based on combat, or could have poor health in general.   Some of F5's classmates described the patients at the VA hospital as being "cantankerous," "stubborn old guys," who were interesting to radiograph and perform exams on, as these patients often shared stories or jokes with the students, for example, F1 commented:

> "…the people are nice, you know, we have all the vets there, veterans of war, and the veterans are nice….nice to me. The patients, most of them have interesting stories to tell…"

Similar to his classmates, F7 commented on how he entered the program because the "money is good," and as a field not nearly as "stressful" as his former occupation of

mail clerk for the United States post office. In addition to the "good money," F7 entered

the program because he "likes helping people," and stated:

> "…plus I like helping people. That's the reason why, like, 'Hey, let me try,' you know. I get along with people real well, so I think I fit into the hospital environment, and that's the reason why, you know. I think I can-- I know for sure I can make it, you know."

Furthermore, the patients, with their diseases, pathological conditions and injuries,

represent the ability to learn from. A key point of interest for F7 is when he visualizes

broken bones or something "abnormal" in the condition of the patient on the radiograph:

> "Seeing something that's abnormal…Once it comes out on the film it doesn't even look like them [the radiograph looks different then the patient] It's like, you don't wanna [sic] see sick people, but, you know, you know, like, something not pleasant happened to people, but when you see the film come out, you're like, wow, look at your body, how it works, and look at how abnormal it is, you know. It can happen to you, like, people, what happens when you have cancer…"

F7 interjected that he does not necessarily desire to "see sick people," and how

unpleasant it is when serious pathologic conditions appear on the finished x-rays,

however, at the same time the pathological conditions are fascinating as well.

F8, who represented a challenge to comprehend as he spoke softly and often with

incomplete sentences, expressed how some negative experiences for him during his

training, were presented by the immobile patients and how it is difficult to move them for

certain radiographic examinations. Interestingly, when F8 was asked to describe any

negative experiences he had encountered thus far while training in the hospital, and he

replied: "Geez. Oh, man, I could list 'em." Seeking clarification, I then reiterated, "You

can list them?" and he responded:

> "It's – It's It's– It's, ah…. Oh, man…. (There is a long pause.) Like, someone have to do an L-spine, a series, on someone in a gurney, or in a bed, you know,

had to bring 'em to the, bring 'em here to get it done, and the process just, the patient goes through a lot and we go through a lot because they can't move as well, and the shot has to be 'cause you wanna see this spinal process, so you hafta move the patient and the patient's in pain and then the shot's not right. You've gotta go back and do it over, you know, it's like, you know, I guess it's part of it, but just, it's just-- (He grasps for words.) Maybe I, maybe I don't know. Maybe I am just starting out. Maybe as I get, you know, into it I'm, like, Okay, that's just seventy and thirty. That's done. You know, it's fine." You know, but maybe if I get, you know-- But that's just the negative part. It's just that tediu-- It's-- I don't know."

I sought clarification by asking F8 about the process of learning, and if he considered it to

be negative to the patients because the patients are in pain, the exams can be confusing,

or the radiographs don't come out correctly based on operator error, and he responded:

"It's more room for error, put it that way…Yeah, it's-- Personally, it's more that I'll get it wrong than I would right, maybe 'cause of just lack of experience but, you know, I think just in that case it's sometimes fifty-fifty 'cause sometimes the experience when..."

Seeking clarification once again, I responded by stating, "I think I understand some of

what you're telling me, I'm just going to kind of re-cap again. So it's negative because

there's more room for error indicating, because you're training, you get it wrong, the

patient has to go through it again…" F8 responded, "Uh-huh, exactly." I then added,

"And you think that's a negative then. You consider that not a very good thing?" To

which F8 replied,

"Well, as far as for the patient. For me, it's positive, 'cause I'm learning but, you know, the patient, someone has to go through that, you know, someone has to be that, ah.... It just all falls within that category as far as room for error, you know, it's just that, I mean, I'm sure there's no way around it, only experience would probably change that, you know, but...."

Ultimately, F8 considered his training experiences to be overall positive,

however, for the patients the training process that students go through can be difficult,

because when mistakes are made, the patient has to undergo through the exam process again, thereby experiencing additional   discomfort and stress. F8 did not see this changing until students fully grasp the mental, technical and physical skills needed to perform optimal radiographs, thereby bringing confidence, accuracy and eliminating the need (to a certain degree) for repeat radiographs. F8 turned the issue of the "errors" that can occur around onto himself, recognizing that as a student in training, the issues and complications are part of the learning   process, and one cannot blame the patients necessarily, and key point of recognition.

Perhaps out of all the students in this cohort, F9 was the one who stood apart from the rest, by conveying a unique point of view towards the nursing skills required of radiographers. Sharing a commonality with the eight   BCC second year students who also started their medical careers in nursing, S9 expressed comments reflective of the second year students, implying that nursing program was academically "too much" for her, thus she opted to go into radiography. Furthermore, like the second year students, S9 did not consider the radiographic nursing skills to be similar to that of types of skills nurses perform, at times implying that radiographers do not need to perform nursing skills at all. Moreover, F9 simplified radiography as a profession where one just "takes x-rays," and "pushes buttons."

This particular student had much to convey during the interview, not necessarily what I would have expected at the start of the interview, as she was not easy to ask questions of, where, from the outset she would reply with mere "yes" and "no" responses. Towards the middle of the interview she began to comment on a deeper level, once we

shared some light and humorous conversation with one another. As noted, F9 did elect

nursing as a first choice of program to enter, but decided that it wasn't a good career

move

> "Um, actually, I've always wanted to do something in the medical field, so, I started off as a CNA, going to nursing, you know, but…it wasn't for me, so…getting into nursing, and realizing it wasn't for me, so I just looked this up and-- I liked it."

Seeking clarification as to why she did not want to pursue nursing and what interests her

about radiography, F9 replied that she entered radiography because of the opportunity to

advance into other modalities:

> "Well, if you're going, you know, becomes an x-ray tech? There's, like, you know, it opens the door to many other, like, see 'nuc' med, or CT, MRI, so you know, it happens. You have a choice there."

F9 also informed me that she switched from nursing to radiography as she

considered the nursing curriculum to be, "…it's, like, it's too ... too much school," and

about giving injections, where to her, radiography did not consist of similar occupational

tasks, commenting instead on how radiography, while it is still a medical profession, does

not require "injections," "I don't know, my-- Well, it's still a medical field and, you

know, we get to work with patients, and, like, at least I don't have to, like, inject…no

injections."

According to F9, unlike nurses, radiographers do not "have to inject" patients

(this is not entirely true, as venipuncture is performed frequently by radiographers and

imaging modality technologists), a "nursing" skill that F9 expressed she did not care to

perform. Moreover, and reflective of the second year students, F9 described the job

related tasks associated with nursing as tedious, dirty work, where one must change

patients and give injections. F9's comments were reflective of those made by the BCC

second year students who, as a whole, expressed rather inaccurate statements about the

work nurses perform in the health care arena today. To reiterate, nurses do not typically

do the "dirty," tedious tasks, such tasks are performed by certified nursing assistants

(Sandelowski, p. 177), thus F9 was not wholly correct in her statements towards the type

of work nurses.

Following this statement, I then asked F9 to refer back to a former statement

where she commented on she "likes working with patients," of which I reiterated back

"you stated you like to work with patients," whereas she responded, "Mmhm, with some

patients." However, F9 did not elaborate on this statement, regardless of my inquiry, and

shifted instead to discuss what interests her about radiography:

> "What do I like about it? It's not so hard…we don't have to put up with a lot.
> Well at least I don't…. We don't have to ... say, like, nursing, we don't have to ...
> basically, like, change the patient, care after them, you know, basically, you just
> take x-rays, and that's it."

According to F9, nurses must perform injections and have to attend to the

"changing" and "caring" of patients," two patient care skills that are part of the daily

tasks radiographers perform. F9 did not consider the "changing" of soiled gowns and

linens and the "caring" of patients to be part of the radiographer's job description.

Moreover, radiographers do perform, for specific exams, injections of contrast media,

where the injection of contrast media can pose, at times, great risk to the patient because

of allergic reactions to the iodine, which makes up the solution used. F9 did not see a

connection or link together any similarities between some of the occupational tasks

performed in nursing and radiography. It would be interesting to interview F9 just prior

to graduation from the program, merely to discern if her perspective had changed and she

considered radiographers to perform similar tasks that she associated with nursing.

Perhaps F9 would eventually discover, through the course of her training, that

radiography is a profession comprised of those nursing skills mentioned.

Towards the end of the interview F9 revealed to me that the "secret" of her

"success" when working with the patients is because of her ability to be "tolerant" with

her patients, and compared herself to her classmates:

> "You know? The more-- I like this-- Well, to be honest, radiography: You have
> to have a lot of patience. Ye-ah.... And, well, I do have that, so, so I don't have a
> lot-- I don't-- I don't know. That's why I probably don't have a lot of problems.
> Others, they're probably impatient…"

According to F9 her ability to be patient with people poses fewer problems and

issues, and the majority of her patient contact experiences at this point in her education

have been positive, attributed to her attitude and demeanor when compared to her

classmates, who have had "negative" experiences with patients. F9 stated that she has

heard of a lot of negative experiences, but has not encountered any herself, and

commented,   "I heard a lot of them [negative experiences], but I haven't had any." On

the contrary, her classmates have encountered negative experiences dealing with

"immobile" patients, where she explained to me, how the negative experiences are

because, "I guess their patients are pretty immobile, so…" When I questioned F9 about

performing x-ray exams on "immobile" patients at her training site, she responded, "you

know…I haven't had one yet." But then changed her mind and added, "well, actually,

this morning I did, but…I'm patient." Thus, for F9, she considered herself a "patient" person and one who can work well with people based on a positive, tolerant attitude.

As mentioned, these students did discuss their patients from the point of view of students learning how to cope with and work with sick/injured people to accomplish obtaining diagnostic radiographs, but their language used did not necessarily utilize direct terms conveying compassion towards patients. However, one student out of this cohort, F6, commented on how one must "be compassionate" and treat people courteously. Interestingly, F6 has a sister who worked as a charge nurse for the post partum area of a maternity ward at a large, inner city hospital, where it is possible that she influenced him while training in the program. From the outset of the interview F6 informed how one has to have "good interpersonal skills with other people," and view the environment of patients undergoing x-rays from the perspective of the patients:

> "I try as much as possible to, um, try to view it from their side, and not try to always take my side always all the time. You know, you gotta be at the level playing field where you have to be neutral. You have to look at it from both sides, and you also gotta be a little bit compassionate with some people, especially in health care due to the fact that people here are sick, so they're not here because they want to. It's just because they have to. So, you really have to watch yourself. You have to be acting professional. You have to be courteous. You have to be soft with 'em. If it's an old person, you have to speak a little louder, but don't scream in their ear. Oh, yeah. Well, my father's also one of the best -- He wasn't exactly the best patient. What I mean by "the best" is he's a difficult patient to work with, so I get that experience before I got into the medical field so...."

It was then that F6 commented on how he learned his patient care skills and recognition of patient needs from a personal experience while caring for his father after undergoing a surgical procedure:

"Well, my father has Type II Diabetes. He has high blood pressure, and on top of that, ah, when he was in the Philippines, back in the day, he had an old, ah, scar that happened when he was car accident, and just recently he just went under, uh, went under surgery for removing melanoma, or cancer actually over his skin. So, basically it was from the same area, so right now it's hard for him to walk, and he's having a lot of pain, so I have to try as best I can to nurse him back to health, and drive him around, try to feed him whatever he'd like…"

This young student obtained his patient care skills from experiences and seemingly learned a compassionate, "soft side" while attending to his ill father. He was cognizant about patient needs, and how to carry himself as a health care professional. In a sense, he was more advanced than his classmates, and had wisdom about the patients almost reminiscent of textbook material. Interestingly, F6 did not start out in the medical field, and has an information technology background:

"…I have also degrees in, like, technical certificates, in different parts of computers such as networking. I have one for programming. I have one for pretty much what you can think of, and I've used some of it, but then some of it, I just put it on my wall just to make it look good…"

However, F6 gained interest in entering radiography from his sister, who gave advice by informing F6 that he was good with computers and had "good" people skills, therefore should consider radiography:

"Um, actually my sister sort of put me into that spot, because at first my degree-- my wish to be a-- I wanted to be was in regards to computer programming, computer – anything in regards to computer programming or software or hardware manufacturing. But, as time went by, I was looking how the trends went through the computer industry. It started to go downhill. So, what I ended up doing was-- Well, my sister told me, "Well, look at this field right here. You don't have to-- " 'Cause she knew that I wasn't really interested in the medical field. I mean, I had some sort of inkling towards it. I've always excelled in biology and everything in regards to that nature, but she told me, "Well, this has computers, so, and you're pretty good with that. You're pretty good with people, and so, I mean, you might as well just go with that and see what you like." And so far I've done it and, hey, I mean, it's been rewarding for me…."

According to F6, while training in the program he gained the perspective that one must learn, outside of the classroom and during externship training, a "different sense values" because patients' lives are at stake. He expressed a serious attitude towards the role radiographers must play on a daily basis:

> "The training at the classroom is totally different 'cause you're there with your peers, you know, you get to joke around, but once you're here you have a total different sense of values. I mean, so like, this is a person's life here. You don't wanna make a mistake, and you wanna be accurate, and you wanna be-- And you wanna get it correct, so there's no way here to make a-- It's not acceptable here to make a mistake. In the lab you can, but in the real, the real field, you're gonna have to make correct decisions."

F6 was cognizant of the fact that there is little margin for error in terms of the care and according to F6, there are issues of safety, making split second correct decisions, and demonstrating accuracy in obtaining the images. Ultimately, F6 was advanced in his thinking towards patient care issues, and exemplified sensitive patient care skills using language laced with a compassionate focus, relating back to his background, and strong family ties with attending to a sick parent and learning from his sister, a nursing health care professional.

In summary, the BCC first year cohort held a challenge for this researcher to interpret their comments made about the patients, and themselves. Moreover, this particular group did serve to create an awareness of differences among language usage, possibly associated with their family working class backgrounds, and how gender does not necessarily play a role in attitudes and discourse, socialization by family does seem to contain strong influencers, however. For this cohort, worth reiterating, it is not necessarily that these students do not care about people or do not contain compassionate

attitudes, for many of them, they were learning exactly the type of responsibilities associated with radiographers, the responsibilities that textbooks cannot necessarily convey, how working with human nature is complex and requires patience, tolerance, empathy and compassion. These are elements that students must learn, unless socialized from the outset.

<p align="center">Changing Technology – The Benefits and Pitfalls</p>

The first year cohort shared similar points of view with one another and the second year cohort regarding the changing technology associated with the profession. The students in the first year cohort trained at externship sites that utilized the conventional and newer computerized radiographic methods. With this particular group, in comparison to the second year cohort, and in accordance to their relatively new place within the extern training environment, they expressed commentary on how difficult learning specific aspects of the equipment was. This commentary was directed more towards learning the conventional equipment, and not the computerized radiography. The CR was considered easy and "push button machinery," for example F1 (female) told me that there was little challenge towards using CR:

> "It makes you so lazy, and it doesn't anything to do with what we learn in class, only thing we use from class is positioning and the anatomy that is demonstrated in what ever position you are getting, but I am on digital equipment, all digital, no film at all. Just digital. It just pops up on the screen…you just push a button, and there is a technique, I might adjust a little bit, little smaller or a little bigger, but yes. That's the disadvantage."

While F1 had stated earlier on in the interview that to learn radiography is a challenge, she was not referring to the new technology, but instead the conventional method where

she said the challenge was in using the dark room, and setting the "techniques" on the

control panel:

> "It's a challenge. It's a big challenge. Yes, everyone thinks it just pushing a
> button; it's a lot more to than that. I mean the physics, you have to know your
> machine, how it works, what technique for what kind of person, what kind of
> chemistry will produce this, what will mess your image up, what will make it
> better, and all that."

To F1, CR has eliminated the thought process and the steps that once accompanied

conventional, removing the challenge and creating "lazy" technologists.

F2 (male) also trained at a CR facility and considered the state of the art technology to be

easy to use in comparison to film screen conventional imaging methods:

> "Well, the technology that's in Memorial, or that big-- They have the digital stuff.
> It's really easy to use, really fun to use. I mean, from what I think, besides
> money, I don't know why everyone else doesn't use it. We have to transfer to a
> non-digital place in the fall, I think, and that's gonna be like a kinda hard thing to
> do, but it gives us a hands-on thing with both films, so if we get hired somewhere
> we're ready for either film, either techniques we have to use, but I guess it came a
> long way..."

Thus to F2 the conventional represented a challenge over digital radiography, and

could impact his training ability, however F2 had high praise for CR and stated that all

medical facilities should adopt this method of diagnostic imaging.

F3 trained at a CR facility and considered it easy to train on and learn. From his

perspective, CR has produced ease in the ability for the radiologists in how they review

patient cases on the computer monitor as opposed to radiographs. F3 remarked that the

computerized radiography has made technological positive changes for the radiologists as

they can alter the images themselves while dictating:

> "…It's all become digital, ah, but being here, being all digital, I haven't had the
> experience to use regular film, except for in the lab in class. But, here's it's all

digital, so that's-- It's pretty eas-- It's easy. I mean, like, it makes a world of difference for the radiologist to be able to change the contrast and zoom in and zoom out, rather than just looking at plain film."

I asked F3 if he considered the transition from training on CR to working with conventional to be difficult, and he responded:

"I think it is because of the sensitivity of the film, with the techniques and the things we have to use…and the radiologist can't to manipulate it to make the right..."

Thus to F3, CR represents an ease in learning and working with based on the fact that images can be manipulated, and there is more margin for error. Conventional to F3 represents a challenge because of the technical factors that need to be learned, technical factors that can cause mistakes on conventional radiographs that would need to be corrected by taking a repeat radiograph, whereas with CR when mistakes occur (too dark, too light, etc) these can be altered digitally by both radiographer and radiologist. Similar to his classmates, F4 shared the opinion that CR has brought ease to the workload; in particular as there is no more development of films in the dark room: "…I think it makes life a whole lot easier. Um, well, for one we don't have to, uh, we don't have to develop the film -- Everything's digital over here, no developing, no cleaning the rollers and everything."

F4 and his classmates learn about development of radiographs from the classroom environment, and also will rotate to a medical facility that has not made the change from conventional to CR, but to F4, CR represents ease in the ability to learn it and work with it, and stated that CR "makes life easier," and explained that he considered CR at first to

be complicated to use, in particular with learning the PAC system, but the learning curve

lasted only a month:

> "Back when I-- When I first got here it was complicated. It took me about-- I think that the "PAC" system took me, was what took me the longest to figure out, but I think it was only about a month before I was just goin' with the flow. It wasn't that bad at all."

In accordance with the commentary from his classmates, F4 shares a similar positive

point of view towards CR and how working with computers and manipulation of the

imagery is enjoyable, as opposed to developing films in a darkroom and cleaning

processor rollers, something students typically learn in the classroom, in preparation for

the clinical environment, now processors and film development is becoming a thing of

the past and will most likely be eliminated altogether as CR/DR takes over.

F5 also trained at a CR facility and compared the new technology to the equipment in the

classroom which apparently is old and outdated:

> I think it's pretty advanced, um.... I do ... 'cause, ah, the classroom, we have the stuff in there. It's just old, Yeah, old equipment."

To F5, the CR at first represented a challenge, but upon learning how to use the

equipment, considered it to be easy to work with, and stated, "well, in the beginning it

seems kinda difficult but, you know, if you set your mind to it, you can just-- I, I, I really

see that it's pretty simple now." And, like his other classmates, F8 trained at a CR

facility and informed me that the technology is advanced, and easy to work with, in

particular when compared to the old equipment in the classroom.

F6, F7, and F9 were three of the students out of the cohort who trained at

conventional facilities, and had not yet experienced CR radiography. To these three, their

perspectives regarding the process of imaging were different from the other students in the cohort, with the conversations being centered not so much on how interesting, easy and "fun" the CR was to work with, but more on the difficulties and positive aspects conventional represented to each of these particular students. As noted, similar comments regarding CR were expressed by F2, F3, F4, F5 and F8, however, F1 was the only student who considered CR to create an atmosphere of "lazy learning and working" where the technological advancements have reduced the entire imaging process, eliminating some of the mental work associated with conventional and has served to created "lazy" students and technologists, a perspective shared by some of the students in the senior cohort.

F6 considered the technology at his facility to be "low," with his expectations being higher based on his knowledge of technology through reading radiology magazines. However, to F6, his ability to be flexible with the work environment in the long run would be an asset, as he will gain a skill by working with the more difficult conventional method and from there be able to transform to CR with ease:

> "…well, with this hospital, it's a little low technology. I mean, my expectation would be a little bit more advanced, due to the fact that I read the new radiology magazines, and what I hear from other people, my other classmates who are in other advanced areas, I'd like to expect more, but I mean, due to the budget constraints of this hospital, it can only go so far, so I just gotta try to do the best I can with what I have. (He clears his throat.) The best part about it is, though, is since some hospitals are a newer technology, these older technologies will become useful to you when you move to a hospital that has both, or has one or doesn't have the other, so you become much more flexible out on the job market, so you when you go out there it's like, "Ooh. I don't know how to use this machine. I've never used it in my life." You have to at least have some sort of platform to step on. It's like, "Oh, okay. I've worked with this before. Maybe I can refresh myself and maybe I can go from there."

F6 also considered as part of the aspect of being a first year student, is the learning curve

associated with a new environment, and how training in a medical facility involves

learning to adjust not only to a unique and complex environment, but adjusting to the

people within as well:

> "Well, as when you start off, like when you're a first year student, you're here for about, maybe, let's say, nine weeks, it becomes a little complex to you due to the fact that it's a new environment. You have to adjust to it. You have to adjust to the tempo of how people want you to work. So, in the beginning, to some people it might be a little difficult to adjust, but over time it will, 'cause as time-- You have two years to do it, so as time progresses you're gonna have to adjust no matter how, if you like it or not. Some people may be slower, some people may not be. It all depends on the person."

F6 recognized that the educational growth and confidence gained from the training is

dependent on each individual. In his conversations about technology, F6 considered the

positive side of training on older conventional equipment where it brings flexibility in

training and knowledge. F6 also considered himself and his own abilities as a factor for

growth, a unique perspective.

Similar to F6, F7 considered the conventional equipment to be an asset for

learning, although he commented that the equipment at his facility is old, but it was not

difficult to learn:

> "…I didn't know--This hospital has the oldest machines. I didn't know that. Yeah, so I thought it was, all the hospitals have the oldest machines, you know. So, it's not digitalized, which to me is, like, it's okay. It's not that bad, you know. The equipment is fine, you know. It just, you know, what you need to set, you know, the technique. That's it. But otherwise, it's fine…it's easy, easy to work with."

F7 also considered doing portable radiography work to be not as complex to learn,

with the biggest issue in learning to "get it right" the first time, or needing to correct the

error by returning from the department back to the room of the patient. F7 considered

this to strengthen his ability, as the ownership to get the x-ray of the patient right the first

time is dependent on the technologist, regardless of the patient, thus students learn to

obtain this ability quickly as a matter of convenience, because correction of the error

means returning back to the patient:

> "It's …. It's not that hard. It's just that, you know, the thing is, with the portables, if you make a mistake you have to go back again. That's it, you know. You can't just-- You have to get it right. Yeah…. Yeah, so when you're goin' portable, make sure you gotta know what you're doing. Yeah, 'cause you don't wanna go back, like, up to the seventh floor, and, "Bam," here you go shooting the wrong part and, you know, come back there…It's a pain in the butt, 'cause you gotta go get the machine that we got at the different floor, right? And you gotta go up the elevator….Yeah, and bring the cassette up and down, you know…I just wanna do it once time and that's it."

F7 inadvertently has discovered that there is an advantage in learning

conventional over CR radiography, because with CR, a sense of complacency can grow

(as F1 and various second year students mentioned), and less care is exercised towards

taking radiographs as in portables, because poor images can be corrected on the

computer, and repeats don't occur as often. This can create poor quality and rushed

work, and computerized radiography cannot always produce excellent images. In the

case of F7, learning to take the portable radiographs correctly the first time is paramount,

as there is no computer to repair the image, therefore the student and technologist is left

to return back for a repeat, at times, as with F7 having to return back to the seventh floor

after tracking down the equipment prior. Both F6 and F7 recognized the value of

learning conventional prior to CR, and shared this point of view with a number of the

second year students.

Regarding level of difficulty with grasping comprehension of conventional, F9 considered the 'technique" aspect to be the most difficult to ascertain, in particular as patient body habitus varies greatly. To F9, this represented the most complex portion of learning conventional, but she did not consider conventional to be complex to learn. F9 also thought the equipment at her current externship site to be "state of the art," and "pretty simple" to learn.

Thus, the students in this cohort shared similar opinions with the second year cohort on the advanced and state of the art computerized equipment they currently train on. Moreover, a key observation expressed by F1 was made towards the fact that CR/DR has changed the nature of imaging, creating a less challenging technical environment that in term perpetuates "lazy" technologists who are not necessarily required to think about the technical aspects as much, as the technical mistakes can be corrected directly through the computer imaging system. There is an increased and perhaps "forced" reliance on the computer correcting the imaging mistakes (over exposure or under exposure) directly as opposed to the technologists needing to repeat the x-rays.

Formerly with the need to potentially repeat radiographs, excessive radiation occurs to the patient, therefore, technologists tended to be careful and apply greater mental effort towards accomplishing the task correctly in the first place, however, the computer imaging will now repair such mistakes. These students inadvertently noticed how the CR/DR serves to create a potentially negative working environment, where technologists are now "bored," having had the mental challenges removed for them, and thus become "lazy," and uninterested. While a benefit to the patients are that the

mistakes do not have to be repeated, the work is becoming more automated, controlled and computerized, and as stated by Zuboff (1988), computational technologies are capable of both automating and "informating," thinking for the technologists and enabling mistakes to be corrected easily.

<div align="center">The Pressure to Perform</div>

The theme of the "pressure to perform" and one that demonstrated differences between the male and female students in the second year cohort was not commonplace for the first year students. It could be perhaps because they were not far along enough in their externship rotations and subsequently were too inexperienced in their training for "pressure" to be placed on them by technologists, department managers, radiologists, and surgeons. At this point of time in their training, many first year cohort students cannot conduct exams with direct supervision, while the second year students advance to indirect supervision, and are more independent in their work, thus becoming more a part of the workforce.

<div align="center">The Future, Professionalism and the Hierarchical Structure Revealed</div>

For the first year students, and similar to the second years, again the most revealing and complex responses during the interview sessions were launched by the question *what are your plans upon graduation?* This question, even for the first year students just starting out in their externship rotations, inadvertently unleashed a barrage of responses and conversations regarding the other imaging modalities, concepts of professionalism as related to radiography, and how radiographers are viewed, in particular when compared to the other medical professionals as in nurses. According to

these students, nurses make decisions and "issue orders," while technologists with the "lower level degrees," are under the close jurisdiction of nurses, physicians and radiologists.

For the BCC first years they shared much dialog regarding professionalism, and I garnered from their conversations that they were influenced by a particular male faculty member who shared his own perceptions of professionalism and radiographers with these "malleable" students. Interestingly, and once again, the first year's discourse on professionalism spoke directly to the literature of Larkin (1983) and Witz (1992).

In fact, a few of the students asked me if I considered radiography to be a profession, having expressed interest in my point of view considering my occupational and educational background. For example, F3, towards the close of the interview (the tape recorder had been turned off at this time) asked me a question about my dissertation, "so this is for your paper to become a PhD," and from there launched a discussion about higher education and professionalism. To F3, he considered higher education to bring a better effort on the part of the technologist for "perfection in their field," and justified this:

> "... having somebody who wants to get higher in education probably would like to have a higher, um, profession rate or whatever, you know, you wanna be better at something else so you keep improving yourself…"

He did not consider diagnostic technologists to be respected because they do not have higher-level degrees, and those individuals with a higher-level degree, as in a medical doctor are respected:

> "Right, for if they had bachelor's-- The doctor is respected as a doctor because he's a doctor, because of the degree he has, also by what he does in his

profession, but what makes him respected in his profession is that you have to call him doctor."

He remarked how the technologists who work in other imaging modalities (as in nuclear medicine) are respected by radiologists, physicians, and hospital management because of their educational background and are paid higher wage rates:

"They're probably respected a little bit more than techs with the more education they have. I believe that they get paid a little bit better."

He considered the special imaging modality technologists to be autonomous in their work as the education provides for the independence, and he used the example of a "janitor with a master's degree":

"…because, uh.... I mean, I've yet to see a janitor with his master's that's totally-- I mean, if he has his master's and he's a janitor, he's the one running the business, telling' people what to do."

Thus, if one has accomplished a higher level of degree, the respect and responsibilities accompany the education, as well as ones "association," as in the case of nurses, where F3 expressed his opinion about how nurses receive more respect than the technologists, because nurses are closely affiliated with the doctors, while technologists are "just techs":

"…I, I don't know why, but they do [nurses] – probably 'cause they're more by the patient, more associated with the doctors…they're just affiliated with doctors, the nurses, and the -- techs are just techs. But we have the same education, we just don't get the -- I don't think we get the same respect. The nurses do. From as far as -- this is from only as far as I've been in the program, like, not.... From what I've seen. It's my opinion."

Echoing this statement regarding respect and how technologists don't command much of it, F8 expressed his point of view towards the perception of the medical staff

where radiographers are concerned, and informed me that he learned that radiographers

are not professionals:

> "And I found out recently that it's not really a profession, you know, because ah, we're not professionals, because you still take orders or something like that…is it that, we take orders, or we can't give order, or.... Like nurses -- Nurses, ah.... Yeah, nursing is a profession, while x-ray tech is not considered a profession. That's what I perceive...."

I asked F8 if someone informed him of this fact, or if he found this out on his own, and

he responded:

> "I think, Jim? [one of his instructors] I-- Don't quote me on that, but it not a profession, or, you know, something along that line, you know, yeah...."

I then asked F8 what his thoughts were towards radiographers and their definition in the

medical profession, he replied:

> "…We're just, ah, we're just, you know, we're techs. You know, kinda, you know, aiding or, you know, kinda help that, you know, someone along kinda thing, that—What is it (whispered)? What is it (whispered)? I can tell what we were called but it's something where we're not, like, uh, decision-making, or something like that. We can't -- Yeah, as far as a nurse would say, "Do this," or, "Do that," you know, we can't-- We have no power and that stuff to ask the doctor what -- You know what I mean?"

F8 expressed the point that while nurses can make decisions and issue orders,

working closely with physicians, radiographers do not have the authority to do so. I

requested clarification and more information, and asked F8 if he considered this idea

correct, that medical staff including nurses and physicians don't regard radiographers as

professionals:

> "I mean, yeah, I mean, they don't know the difference as far as, you know, the, you know, the itty, picky parts about it but, you know, I mean, I was with a nurse the other day and we were doing a portable, and ah, I go, "X-ray," and she goes, "He got the tube!" and I go, "Well, why are you running, like, across the hall?"

And she goes, "Well, this-- You guys have this to protect you," and I go, "What? This to protect?" That's how, you know...."

While his response was a bit incomplete in the sentence structure, F8 relayed a common frustration from students and technologists, that nurses don't understand the role radiographers play in the medical arena, in particular when conducting portable x-ray exams, and how their actions of performing the x-ray endangers other people, and perhaps that radiographers do not work as a team with other members of the hospital. However, as professionals, radiographers are trained to protect others including themselves, from exposure to radiation, and as members of the healthcare team, trained to work with others as well, however, the rift between nurses and technologists does exist, and many stories have been shared with me regarding how nurses are difficult to work with and don't often cooperate with technologists (Farineau, 2005).

Towards the close of the interview with F8, I asked him if technologists could become professionals, and he responded rather dubiously that technologists could become professionals, but was unable to clearly explain what it would take to be considered as such. Ultimately, it was clear that F8 had been influenced by the commentary from the faculty member, which served to displace F8's own perception on radiographers and professionalism. However, with the imaging modality nuclear medicine, F8 considered these technologists to be professionals and commented, "…You know, I mean, yeah, because they're able to carry out, you know-- That's as far as my definition of it would be, you know…" Thus, to F8, nuclear medicine technologists are able to carry out decisions and because of this, are considered health care professionals.

Regarding professionalism and radiographers, similar to her classmates, F9 revealed influence from the same faculty member, and her response to my question, "do you think radiographers are professionals" revealed a series of unique responses and how F9 was perhaps conflicted with her own interpretation and the instructors. When I asked her the question regarding professionalism, she replied, "You know, they're [radiographers] not considered professionals, from what our instructor told us. In my eyes, I think we are." Probing deeper, I asked F9 why her instructor thinks that radiographers are not professionals, and she replied:

> "It's because, um, they are told what to do... You know, actually, ye-ah.... It is a, uh.... I don't know what it's called, but, it's saying that, you know, we're probably with the housekeeping? Ye-ah.... It's like-- We're, like, on that level, you know? They say it's because our uniforms, or-- I don't even know....I'm not really sure of it, but…Um, our teacher, like, he told us, so."

When I asked F9 what her perception was regarding radiographers as being considered "housekeepers" or professionals, and whether other members of the health care team consider radiographers to be professionals, F9 responded hesitantly that she "didn't know," and she "was not sure." Ultimately, F9 perhaps will gain more of a perspective regarding the issue of radiographers considered as professionals when at a later time in her training, and most likely after observations of the other imaging modalities, which occurs when students are closer to graduation.

F6 shared his observations of how radiographers respond to the radiologists when they have to show the x-ray images in order to seek direction regarding follow-up studies, lending some credence to the comments from the other students on how radiographers don't make decisions or are granted authority to issue orders:

"We're, like, depending on the subject matter that we're doing, or the exam that we're doing, ah, there's some that we need to show the radiologist, which is considered a "wet" reading or "instant" reading, and we need to go to the radiologist. Usually a tech tells us just to go to the radiologist, 'Show him the film, and see what he says,' and that's what we get to do, show the radiologist. They let us know what needs to be done, or they're gonna be there. I mean, it's totally up to their discretion what's gonna be done."

For S6, diagnostic technologists, not those who make decisions regarding radiographs, the follow up studies or exams labeled as "wet reads." The radiologists make the decisions regarding the radiographs, as it is up to "their discretion."

As with the second year cohort, the first year cohort shared their future occupational endeavors with the majority of them interested in pursuing nuclear medicine. With these students though, most likely they will change their decisions as they have the opportunity to experience observing the different imaging modalities on a greater level. At this point, they know only the rather "cosmetic details" that they have learned in passing, as in when there is down time, these students meander into these other areas randomly, and it is difficult to ascertain the true parameters of the job from this. The first year students have also been influenced by an instructor who has promoted nuclear medicine for it's promise of a higher wage rate.

A common theme to emerge with the first year cohort, and similar to the second year cohort, is how the imaging modalities, CT and MRI in particular, demonstrate less of the "manual labor" (as in moving patients and constant physical activity) that comprises the diagnostic realm. The students, upon mentioning their future plans, showed interest in advancing into areas where the patient needed to be moved very little, there is more decision making involved, and the general work area is described as being

"more laid back." The imaging modalities were also described as being more professional arenas to work in, where technologists are considered autonomous decision makers, and where diagnosis is initiated by the technologist performing the exam, as in ultrasound and nuclear medicine.

Beginning with F2, his interest for the future is with either CT or MRI, and he described his interested to be based on the desire to achieve more money in the event that diagnostic does not meet the demand:

> "Um, I heard C.T. or M.R.I. is pretty good, so (221). I'm kinda lookin' towards that. I wanna see how x-ray goes first, see if I need more money. (He laughs.) See how demand it is, if I have the time."

F2 decided on CT or MRI not just because of the money, but also because of the ease of taking images of the patients, where the technology does all the maneuvering and he would have to conduct very little of this:

> "Well, just hear it around school, like, 'Yeah, C.T.' I guess 'cause we're new to this. We don't really know how it works, but it looks interesting, 'cause you don't really have to deal with moving the patients around. More you just slide 'em in, from what I think. (He laughs.) You just slide 'em in and take slices. You don't have to manipulate the body that much. From what I, hopefully, think, 'cause I…You take the x-ray, just hold your breath and breathe. So I don't know if that's gonna be right."

F3 also considered CT and MRI, but included nuclear medicine and radiation therapy:

> "Oh, after graduation I wanna get my bachelor's, and, uh, maybe look into a different modality of, of, like, there's C.T., M.R.I., nuclear medicine, radiation therapy, something like that. The more I go through the program, I might be able to get to see them and, um...see what I might like more."

I questioned why he held interest in these areas and he replied:

> "I just like-- M.R.I., I like the way the images come out. C.T., it's just kinda interesting with the different cuts and how they can-- I just don't-- I look at it

and I have no idea what I'm looking' at, so it's just kinda like....Yeah, that's, that's cool."

For F3, he liked the imagery aspect of the finished project of CT and MRI, but while he had mentioned radiation therapy but expressed a fear of getting attached to his patients:

"…We took a tour of the hospital before we entered the program, and I just heard, yeah, real high pay, but I heard that patient attachment gets kinda hard 'cause you see the people so often and then they finally don't make it, and it's like…So that would probably maybe deter me from being in that."

Ultimately, F3 held a greater interest in nuclear medicine, where he described this area as an environment of less stress, pressure and physical work:

"…Nuclear medicine, you just get to chill out and listen to music while the dye sets in for the whole time…the nuclear medicine tech, uh, said, 'Yeah, it's really, you know, relaxing.' He's, like, 'I just listen to music all day, and the exams take a while.' (He clears his throat.) So he's, like, "You just kinda listen to music and get your stuff done, and...."

F4 mentioned radiation therapy and nuclear medicine, and explaining his interest for radiation therapy based on personal reasons, and nuclear medicine because it "just sounds interesting":

"Um, I haven't really been thinking about it, but radiation therapy has crossed my mind, and so has, ah, nuclear medicine. Um, radiation therapy, um, because of, ah, my grandfather being a cancer patient, and, ah, nuclear medicine just sounds interesting. It sounds like it's gonna be a lot more complex."

I inquired then if F4 preferred more complex work and he responded:

"Well, not necessarily complex, it's just, once you do the same thing over and over, after it gets, I don't know, easy, it could tend to get boring, too, I think…"

To F4, diagnostic radiology could tend to get boring or "monotonous" depending on the length of time working in this particular area. A number of the second year students made similar observations and comments, explaining to me how they desired to

seek other imaging modalities to work in, deeming diagnostic to be the area most likely

to become "boring" quickly, while the other modalities did not pose the "risk of

becoming monotonous."

F5 mentioned nuclear medicine as a possible future choice of career and

explained that nuclear medicine was recommended by his brother and some of his

brothers friends, "Well-- Well, after graduating, I plan to, um.... I'm thinking of going

into nuclear medicine…I heard it's, um.... It's not too hard. Uh, it's only one year of

school right now, but the pay's real good, so...." The information F5 received from his

brother and the friends was that the program was not too difficult for nuclear medicine,

the work was not too complex and technical, the patients were "not too difficult" to

obtain exams on, and the pay was adequate:

> "…My brother's friend went to the same program, and after that he went to
> nuclear medicine, so he told me it would be, like, a good profession, so…he
> works at Kaiser, well, the one [the friend] that's working, he told me he had, like,
> about two years experience. He was getting paid, like, about thirty-eight dollars
> an hour."

F6 held high aspirations to move into becoming a radiologist, as a long-term goal,

but stated he wished to advance into MRI, or nuclear medicine directly upon graduation:

> "Upon graduation I'd wish to get into the field directly, maybe for a year or two,
> and then pursue going on to MRI. or nuke med specialist, and if time permits,
> become a radiologist, an M.D. That's about a six year program I think, because
> you have to go through the M.D. program, then specialize to radiology."

He explained that he "stumbled upon" these fields, indicating that he discovered a career

within the field of radiology that he had been looking for all his life:

> "I mean, that sort of just fell into me, I mean, uh, I just sorta just stumbled upon it,
> looked upon it, pondered upon it, and just felt that it was it. I mean, this is what I

wanted to do. I mean, this is what I probably been looking for in my life that I couldn't fulfill, and then now it's here, and I'll probably make the best of it."

To F6, MRI and nuclear medicine represented high end, technologically advanced complex imaging modalities that would challenge him more:

"Well, it's more because it goes away from conventional radiography. I wanted to go into something that's a little bit more complex, something in regards to more, like I said, complex mechanics of, ah, more high-end machines. It's more technologically advanced, so I was always interested in something that's a little bit more complex. I don't like things that are simple. My parents always tell me, "Why don't you just keep it simple?" "I don't know. I just like the complex. I mean, I think it's me."

F6 considered, when compared to MRI and nuclear medicine, diagnostic radiography to be simplified and not able to obtain the essential images of the human body as well as the other imaging modalities can, thus, to F6, diagnostic radiography is considered a less adequate diagnostic tool:

"It's more simple [diagnostic radiography]…it's more simplified. It's more like, eh, it's more like, I guess, having a person who's there just taking the pictures, more so than if you're a person here, 'Okay, so I need this part right here, but I need that little small part right there. So I need to get into it, all four sides of it,' Conventional radiography, it's more like, 'Okay, this all is the best I can do,' so that's it."

Like F6, F7 desired to pursue as a long-term goal becoming a radiologist as a long-term goal, with his short-term goal centered on nuclear medicine:

"Right now I want to go into the nuclear medicine program. Yeah, but if I have the money and the time, I'd really like to be a radiologist or a doctor, being a doctor. Yeah, or a doctor's okay, too. Yeah, I would love to, you know. I want to feel that's what I did, you know, back then."

F7 was influenced by his brother-in-law regarding nuclear medicine that informed him

that this area is "calm," with a steady pace of patients, and, of course, commanding

higher pay:

> "…The reason he [brother-in-law] went into it, 'cause he said it like, it's a steady
> pace. You know how many patients you have a day. Let's say there's a schedule
> for it, you know, and let's say you inject the contrast media, the nuclear isotope,
> you know, radiation. (He pauses.) It's just kinda calm. There's not a r-- You
> don't have to rush. You know how many patients you have, and um.... (He
> pauses again.) It's just, it's more pay, too, you know?"

F7 and his classmates have been informed about the benefits of nuclear medicine,

with it's ease of work, less stressful atmosphere and higher pay, as these factors in

themselves are the attraction behind nuclear medicine. F7 expressed interest in MRI and

CT, although his comments are conflicting, as while he is interested in the excitement of

high emergency room volume, he also would consider working in a slow, steady paced

area as in MRI, considered by the students, similar to nuclear medicine, to be an area of

less stress and ease. He had observed MRI and CT on his own briefly during the slow

times at the facility:

> "I think MRI and CT, all that stuff is good, too, but maybe nobody tell me about
> it, you know, but I see other people in CT. They're pretty easy, too. I think it's
> kinda exciting, CT, because ER, once ER come in, boom! They go to CT. It
> looks like they're always busy. Yeah, MRI's okay, too, but, they're pretty slow
> over there. (He laughs.) Yeah, that's what I think. I'm not sure…."

Ultimately, F7 commented on wanting to work in an imaging modality that is calm, with

a steady workflow:

> "…Steady, yeah, calm, you don't have to, like, rush. No, no stressful about it.
> Yeah, no stress. Less stress is better. This is not really stressing, but sometimes,
> like-- People make, like, things stressful, you know. (He pauses briefly.) to me,
> it's like, just do one patient at a time. That's it."

F8 had something different in mind, and did not see himself working as a "tech" for "very long." He commented on how he was interested in the "invasive" exams in radiology, as in the special procedures area, or specific exams that are considered invasive, as in kidney or digestive system studies. F8 also wanted to work in one particular area of the hospital, and not as in diagnostic, where technologists are assigned to different areas on a weekly (sometimes daily) basis, as in portable work, orthopedic clinic, and fluoroscopy. F8 wanted to be part of a "team," and while he did not directly mention special procedures, his comments reflect the teamwork and scheduled exams that make up this area. The technologists in "specials" work in tandem with radiologists and nurses, performing specialized, critical exams on patients daily in a sterile environment:

> "I really don't see myself being a tech very long, you know, I just wanna-- I'm more into the invasive part of it. Yeah, I mean, I think I like more just, as I said, the hands-on with the patient and just not, like, "Okay, I miss and I mess up there." It's like, you all work and it's like, and that's not just me, but four or five people, you know, whoever is in there all working, you know what I'm saying, or do whatever. We're all working for that, so, you know, I think that that part of it, I like, you know, it's just, not all over the place, but just maybe in a department, in a room, in a setting and, you know…."

To F8, he preferred an organized work environment, where the exams require "sterile" set-up, and each exam "flows," commenting how an organized work environment, "…Makes everything, like I said, it all flows better. Everything will flow and it's right there, it's done, in and out…"

F9, on more than one occasion, commented on exposure to radiation, and revealed her future career move to be an area where this is less exposure to radiation, and less involvement with "injecting" into the vascular systems of patients, as in nuclear medicine:

"Right now, I'm just focusing on, um, x-ray, then I'll probably move on to either CT or MRI? That's in more than a year, so. Mm, something-- Well, in nuke med I can't inject, like, giving injections, um.... What do you call that?"

At this point I responded that she would be injecting radioactive isotopes into patients while working in nuclear medicine, and F9 reinforced that she is not comfortable with consistently injecting patients as part of the job description:

"There you go. And I'm not-- Can't really enjoy that. I get nervous, so. I, I could inject, but I don't wanna be doing that to every patient. Exactly. CT and MRI, they seem pretty interesting. I started reading more of it and, like, learning more, um, well, when we have class, and our instructor told us. CT, I know what it's like, you know. I would like to, and it's less radiation."

To F9, nuclear medicine involved an aspect that she was not comfortable with, while CT represented to her an area where there is less radiation exposure. F9 was correct in both observations of each imaging modality, in retrospect nuclear medicine involved vascular injections and CT involves less radiation exposure than in diagnostic, where one is primarily behind the control console and not in the room performing "live action" radiography.

In conjunction with her classmate F9, F1 expressed an interest in working in the imaging modalities where exposure to radiation is less when compared to diagnostic radiology. Similar to F6, F1 also desired a challenge in learning new areas, commenting on how she would like to learn ultrasound, which while only a year of schooling, represented a "challenge" in the physics and nature of pathology that is examined:

"…not sure where, to do ultrasound or not sure if I want to do nuclear medicine or radiation therapy, think nuclear medicine is less radiation, I think, and I don't want to be exposed to much, because I want to have a lot of kids. My own lot….I think will definitely do ultrasound. Yes. It only another year. That's another challenge, more physics, acoustic physics, sound waves. yes and hopefully you know, I know sometimes you don't work with babies, you do blood vessels and

clots and stuff with legs and arms and body parts but…I think that will be another big challenge."

To F1, she did not want to be exposed to radiation based on future family plans, and diagnostic radiology represented an area where exposure is prevalent and could almost be considered harmful. Interestingly, one might question why students, from the outset, would consider entering an occupation where there is some exposure to biohazards, infectious diseases, and radiation. In healthcare, radiography in particular, there is risk, which students learn about during specific courses, however, this does not deter them from entering the field and while they maintain their progress, they place limitations on their own environment (as in not being willing to perform injections), something that could limit the ability to move ahead in the field, or make job attainment upon graduation more difficult.

When discussion regarding salary occurred during the interviews the first year cohort students answered uncertainly or not at all, demonstrating that they were not as clear on the wage rates when compared to some of the second year students, understandably so. A number of the students in the first year cohort discussed the salaries at inflated or deflated wage levels, in the end commenting that they were not sure and had heard different points of view regarding wages. A few of the students agreed that the salaries were adequate for radiographers, especially since they considered the work to be repetitive, "simple," and there is much "down time," for example, F2 stated:

> "…I think I'd be satisfied with it [wage rate] for awhile, until I get annoyed with it, or bored with it, and then ask for more, but since I don't really know how much they get paid.... It seems pretty simple to me, just to take an x-ray, but I guess it's repetitiveness and work style, workload. I think it would matter on that, 'cause I don't really know how much they get paid, it's-- I guess it's word of mouth on

where it is. I have no idea how much I'll be making. I just know it'll be a
career."

Like F2, F6 considered the salary levels for radiographers to be more than adequate and

responded:

"Yeah, I mean, more than enough. I mean, for the amount of job that they're
getting, I mean, it's not really too hard of a deal, because if you think about it,
nurses, RN's, they do more work than most of these other people do the whole
day. Nurses don't really have time to sit down, but radiographers do, depending
on the area you're working in. There's just some days where it's gonna be slow
and some days that are gonna be busy, but it's never really a steady flux."

F6 compared the workload of radiographers to nurses, commenting that nurses don't have

time to sit but radiographers do, thus justifying the differences in salary, and lower wage

rate for radiographers.

F7 considered those who work in other areas that require specialized skills as in

computer knowledge (CT scanning, MRI scanning), deserve to receive higher pay:

"Yeah, because they have to, you know, deal with computers, which I'm not…. I
know how to deal with computers, too. You know, MRI, you gotta know…. You
gotta do the physics--Yeah, computer, physics -- anything that you need
additional skills, you know."

F7 considered also that special procedures commands a higher salary and justified this:

"Oh, they gotta be paid a lot more....'cause they deal with procedures, so the
doctor be in there for a long time, and you gonna be exposed for a long time, too.
Only that you're gonna have a lotta, like, patient they might go into shock. I
guess they're doing a lot of contrast medium now, right? Okay, so I'm assuming
that it's, like, it's just like O.R., sorta like O.R., but you know, I think they should
pay more."

While for the radiographers, F7 commented that radiographers are paid adequate salaries

for the work they perform, he commented that they should received "hazard pay,"

because of exposure to radiation:

> "Um, you know what? (It sounds like he has turned his head to look away, maybe at the clock?) Um…. (He pauses.) I think so, ah, I think so (said in a softer, breathier voice). Could be a little higher, but I think so, 'cause you know why? 'Cause, ah, my thing is, if you're gonna be exposed to radiation, even though really it's not a lot, like, there should be, like, a hazard pay. Yeah…. I would consider hazard pay, but not a lot, but it should be high, too, not really high, which is outrageous, you know. I think it should be kinda fair, but should be a little higher."

To F8, the work of radiographers fluctuates on a daily basis, ranging from simple exams to difficult emergency cases, where there is a "sense of responsibility" instilled to obtain accurate radiographs quickly. Radiographers receive adequate pay when the workload is "simple" exams, but this pay is considered inadequate for the high paced trauma/emergency cases:

> "…Um. No. Yes and no, because, you know, sometimes, you know, you can get just a day where it's just, chest x-ray or, you know, a shoulder, you know, really simple, and other times you might get, you know, a broken back, or you might get a collar, you know, a trauma, and you have to get these things quick, and you have to be enough to read, you know, if they-- It can get really hard and, you know, not just everything, you know, but, you know, but I think that, you know, doctors look at what we have to determine the next step, you know what I mean? So, I-- You know, I really think it's a deep sense of responsibility, you know."

For F3, when asked him if he considers radiographers to be adequately paid for the work they perform he responded, "Yeah. They could always be paid more." However, F3 did not elaborate on this, and was uncertain about the wage rate, as was F4, who considered the salary levels for radiographers to be sufficient, "Yeah, I think, ah, it's sufficient, the amount of pay, but I'm saying that based upon just one experience, so I can't really give a complete answer on that."

F5 had little to comment about the salary, once again not certain of the wages, but he considered the salary to be adequate for the work performed, as did F9, who

considered the salary to be sufficient, "I, I know they [radiographers] make pretty good money, decent money, I know it's not that bad."

Ultimately, what became clear is that at this point in their training, the first year students were uncertain of the wage rates for radiographers and for those technologists working in other imaging modalities. With the imaging modalities, each student was clear that these areas would command higher pay, however, how much higher, remained unknown to all nine students. Moreover, at this point in time in their training, the students had formed opinions about the work radiographers perform, commenting on how radiographers are not necessarily paid well for their labor, yet some aspects of the job did not justify higher pay, similar to what the second year students stated. It was clear that those specialized skill areas should be paid higher if commanding "specialized skill sets," also in alignment with the students in the second year cohort.

Interaction between the radiologists and radiographers took place more with those students at conventional radiographic facilities when compared with those at the CR/DR facilities. One student, F3, commented on how the interaction between radiologists and students is an "alien act" for him, how the radiologists exist in their own world, with their own language, quite out of reach for students and technologists, and in response to my inquiry of how much interaction takes place between students and the (male) radiologists F3 responded:

> "A little bit, a little bit, but not as much as-- I don't feel totally comfortable goin' up and talkin' to 'em yet. They're kinda, I dunno, but my instructor makes us, or he'll make us purposefully go and try to talk to 'em to, to.... There's a different communication that you have to use to talk to 'em, like, different, and… they're in a different world most of the time, I think, because they know so much…so

when you talk to 'em, you're like, "Huh? Why don't they have to talk like a real person?"

F5, who trained at a CR facility, interacted with the radiologists only during the fluoroscopy exams, attempting to ask questions and learn from them, except for the head radiologist who F5 stated was "rude" while the others were helpful:

"You know, when we, um.... When I'm set to do, like, an exam, you know, I try to talk to them, ask them any questions that, you know....during fluoro exams. Yeah, other than that, they just-- I don't even see them…They help me. They're pretty friendly…"

F6 commented how at his facility (conventional), he would attempt to spend as much time with the radiologists as possible, considering them to be accommodating and helpful, while the other students considered them to be intimidating:

"…I mean, as much as I can. I try to see what they're doing. I mean, there are some radiologists here that are very accommodating, and they would explain to you exactly what the procedure is, what they're looking for, and things of the nature... So, it's like they sort of put you under their wing when they know you're their student, and they try to understand as much as they can, especially when there's an exam, and you don't know exactly what to do, and they tell you, 'Okay, put it this way,' or if you're a little confused, they'll come around there and assist you. Some of the students that I work with are a little bit scared of some of the radiologists 'cause.... They're a little bit apprehensive towards the radiologists, 'cause they don't know what to expect. But, to me, I like to do it hands-on, I mean, if I don't know how to do it, I mean, I'll tell you, 'I don't know how to do it.' So, it's up to the discretion of the radiologists, what they want done."

With F6, this particular student demonstrated how the bridge that exists between radiologist and student could be crossed, highly dependent on the student's attitude and perceptions. With some of the other students, their perceptions of the radiologists were different, as with F1, who interacted with the doctors on a level quite different from F5 and F6:

"…I can get the you know the B.E. [barium enema] ready for the doctor and watch everything and…Yes. I haven't had a bad one [doctor] yet, I have heard the doctors are pretty mean but…and sometime I hear them go off, but…everyone is different…"

F9 remarked how the radiologists help her and give guidance for fluoroscopy procedures, stating, "they'll talk, ye-ah, they, like, um.... They'll h-- You know ... they'll prob'ly just guide us, and they'll help us...." She considered the radiologists as those who give guidance and direction, language that conveys the division between radiologist and technologist/student, with radiologist as those who give the commands, and the technologists as those who receive the commands.

While to F9 the radiologists give guidance and are helpful, F8 was not able to cross the bride between radiologist and student/technologist during interaction with both the male and female radiologists at his facility. This interaction took place only during fluoroscopy, where F8 observed how the female radiologists (there were two of them at his facility, out of the "mostly male" radiologist group) were "tougher," distant and cold to him during the exams:

"They just, they just very, uh....Maybe because I'm a student? I don't know, but they're just very just, just ... no smile, just cut and dried--Yeah, just in and out, just maybe make eye contact some of the time, just, okay, what's wrong, okay, just leave, that's it. Almost, yeah, you know, the body-- Yeah, like I said, you know, as they go on, you know, you never know someone just has had a long day, it's been the same thing and you might look at him, 'Man, why is he being that way?' But, to that person, it's like, you don't know what I'm gonna do, so, you know, that's how I look at it, so."

Thus to F8, similar to F3, he considered the radiologists to be on a different level, difficult to communicate and work with, and both students sensed the occupational division between technologist and radiologist to be prevalent, thereby creating an air of

discomfort for them, and serving to keep the division constant. Ultimately, from the

various dialog from the students, the radiologists were viewed quite differently,

dependent on each student's level of confidence and personality. However, the students

did comment on the nature of hierarchical structure within the radiology departments, and

how radiographers seem to be at the bottom of the structure.

The issue of occupational closure came about with a discussion with the student

F7, and out of the discussion emerged a theme unique to the cohort. For F7, he was

interested in ultrasound, however, F7 sensed an obstacle to his goal, the fact that

ultrasound is primarily comprised of female sonography technologists, "Yeah, that's a

female field," and because of this, he observed and surmised how because he was male,

might not be welcome work in this area. I questioned why he considered ultrasound to be

a female dominated imaging modality, and if he had observed any males working in

ultrasound, he responded:

> "…Because you know, pregnant woman's (sic) will feel comfortable with female
> patients than guys, you know. And not only that, you know, they want a female
> in there…. Let's say you're a tech, right? They want another female there. It's
> kinda like a privacy thing, you know? Yeah, there is a comfortable level. That's
> my experience from what I see. I heard they have guys, but…. Well, recently, I
> just talked to one of the tech. They have ultrasound not just with pregnant
> woman. Ultrasound in other stuff too. Let's say, like, you know, for the liver,
> stones, stuff like that, yeah…. Which I just found out, you know. Yeah, it's not
> just a female thing…Other part of ultrasound."

I then questioned if he considered other areas of ultrasound, those with males, to contain

more males than females here, he replied:

> "You know what? (He sighs.) No. (There is a long pause.) I think mostly just
> female, because, yeah, they usually, like, expand, let's say ultrasound, I would
> think they jump into that other field."

Regardless of the pay scale, where F7 informed me that the pay is "good" because

sonographers "deal with diagnosis," F7 was convinced that males would not stay long

working in this female dominated area because of the sense of alienation males might

perceive, working around an all female staff:

> "I was, I was, like, I'd like to deal with pregnant women, too, but, now it's like, "Oh man, it's all females there." So I'm like, "Nah….Yeah, it's not that I don't wanna do it. It's kinda uncomfortable…you know, not for me. I don't mean it, like … for other people. Let's say you have nurses and all that stuff, and here I am, a male tech comin' in, you know. I make them uncomfortable. I'm not uncomfortable. They're gonna be uncomfortable. I feel like they're gonna be uncomfortable, my patient, nurses, those people who work around ultrasound all the time. You know, 'Why this guy's, you know, goin' into ultrasound?' That's what I think."

Thus, F7 expressed his discomfort (and that of the other male ultrasonographers)

regarding working around an all female staff, and how his presence will create an issue

for all those involved, including the patients, who, according to F7, are most likely

primarily female based on the nature of exams for ultrasound, that are geared closely for

observation of the female anatomy and pregnant women. Most likely F7 will not elect to

work in ultrasound based on this. F7 is correct in his statement regarding the level of

females to males in ultrasound as longitudinal data compiled between the years 1997 –

2001 demonstrates that female diagnostic medical ultrasonographers outnumber the

males (ASRT 2001, p. 80).

Conclusion

The BCC second year cohort and the first year cohort revealed themes that were

at times similar, yet differed to an extent. As expected, the discussions that ensued

between the two cohorts revealed differences in level of training, particularly when the

students discussed their perceptions and observations of the various imaging modalities. While much was revealed by the interview data, in particular five key points are worth noting, first, the BCC second year females and males were not as patient focused as originally projected, in particular where it was assumed that the females would be more so than the males, instead they concentrated primarily on their future goals, aspirations, and expectations. Second, the BCC first year student held a growing awareness of how difficult the work can be based on coping with ill and injured people, a point that no textbook can truly reveal, it must be experienced upon entering the clinical externship training arena. The third point ties into the first and second point, as an explanation, it is presumed that based on the fact that both BCC cohorts were primarily of working class background, this greatly influences education decisions, career aspirations and future goals, as well as the language utilized towards people.

The final point to reflect upon is that both cohorts are experiencing the changes in the nature of the work brought about by CR/DR, and how state of the art equipment brings with it both positive and negative aspects, and a form of "deskilling," changes that will have lasting ramifications at many different levels.

For the next two cohorts from ICC, the interview data reveals difference and similarities within the groups. Moreover, when compared to BCC, there are some surprising and key differences across the cohorts from the two institutions, with some similarities as well. Ultimately, the data from the ICC cohorts is rich with information as was the BCC interview data, with striking correlation to the literature and theories.

CHAPTER 5

FINDINGS

The ICC Second Year and First Year Students

Introduction - Demographics

The ethnic background of the students from ICC provided some surprising results,

with the radiography student population of the two different programs proving to be quite

different from each other, despite their relatively close proximity of the campuses. For

example, a sizeable population of the ICC second year students (see Table 6) were

immigrants, with six out of the 10 students coming from China, (S1/S4), Columbia (S3),

Hong Kong (S6) Taiwan (S8) and the Philippines, (S9 and S11).

TABLE 6 DEMOGRAPHIC DATA – ICC SECOND YEAR STUDENTS

ICC 2 YEAR ETHNICITY/RACE	IDCODE	AGE	IMMIGRANT	WORKING CLASS	PARENTS EDUCATED	M/F
CHINESE	S1/S4*	36	Y	Y/N+	Y	F
HISPANIC	S2	26	N	Y	Y	F
COLUMBIAN	S3	38	Y	Y	N	M
CAUCASIAN	S5	45	N	Y	N	F
HONG KONG	S6	45	Y	Y	N	M
AF. AM.	S7	24	N	Y	N	F
TAIWANESE	S8	28	Y	Y	N	F
FILIPINO	S9	23	Y	N	Y	M
FILIPINO	S10	25	N	N	Y	M
FILIPINO	S11	26	Y	Y	N	M

Y/N+ INDICATES WORKED IN A PROFESSIONAL FIELD IN COUNTRY OF ORIGIN
*STUDENT WAS INTERVIEWED TWICE (CODED TWICE), HAVING VOLUNTEERED TO BE INTERVIEWED FOR TWO SESSIONS

When compared to the second year cohort, there are similar demographics for the

first year cohort, where out of the ten first year students who were interviewed, again six

students had immigrated to the U.S. (see Table 7) with F1, F2 and F8 from the

Philippines, F6 immigrated to the U.S. from Ecuador, F9 from Vietnam (Vietnamese-

Chinese) and F10 arrived from Lebanon.

From the second and first year cohorts, a few of the students, their spouses or family members, were once working professionals in their own countries, but now are not permitted to work in the U.S. as doctors, educators or radiographers. For example, S1/S4 worked in the airline business and her husband had practiced medicine in China, S8 had been a teacher in Taiwan, and S11 completed radiography school and subsequently practiced radiography in the Philippines prior to the geographic transition.

TABLE 7 DEMOGRAPHIC DATA – ICC FIRST YEAR STUDENTS

ICC 1 YEAR ETHNICITY/RACE	IDCODE	AGE	IMMIGRANT	WORKING CLASS	PARENTS EDUCATED	M/F
FILIPINO	F1	33	Y	N	Y	M
FILIPINO	F2	38	Y	Y/N+	Y	M
CAUCASIAN	F3	52	N	Y	Y	F
HISPANIC	F4	20	N	Y/N+	N	F
HISPANIC-AMERICAN INDIAN	F5	22	N	Y	N	F
ECUADORIAN	F6	53	Y	N	Y	M
MEXICAN	F7	24	N	Y	N	F
FILIPINO	F8	28	Y	N	Y	M
CHINESE-VIETNAMESE	F9	32	Y	Y	N	M
LEBANESE	F10	28	Y	Y	N	F

Y/N+ INDICATES WORKED IN A PROFESSIONAL FIELD IN COUNTRY OF ORIGIN

The first year cohort exhibited similar characteristics, where F2 had been a computer programmer – but was unable to find work, instead working for the postal system. F6 is married to a "full-fledge doctor" from the Philippines (his second wife), who are, unfortunately, unable to practice medicine in the U.S. Thus, entrance and completion of the radiography program, for many of these foreign students, is a means to obtaining "new careers" for occupational mobility.

The students in this cohort also reflected what Grubb has described as "lost souls," or "second chance" students (Grubb, 1999), changing occupations later in life as their former occupations were phased out or they were mentally drained by their former

careers, as in the case with F3, a former wardrobe fitter for actors in Hollywood, and F1, a former journalist for television, or S3, who was the director of security for a busy/large hotel.

As with the BCC students, the ICC student ethic/racial demographics contrast the statement made by Carwile (2003) where she cited disparaging levels of ethic/racial allied health care professionals (Carwile, p. 87). As depicted in Table 6 and 7, the demographics of the ICC students proved to be unique, and somewhat different from the BCC cohorts (see Tables 4 and 5). This demonstrates how diverse particular areas of California are, given the rather close proximity of the two programs, and it would be interesting to compare these two schools with other programs across the country, those schools in suburban and urban locations.

<div align="center">Findings - ICC Second Year Students</div>

<div align="center">Employment Ability and Upward Mobility</div>

A number of students in the cohort were influenced to enter radiography based on the economic opportunity, occupational growth and the chance for flexible schedules. S2, for example, who had originally considered becoming a secondary school teacher, commented that she was influenced by a former "boss" who held a discussion with her over breakfast, commenting on how the radiography field pays well and the scheduling is flexible:

> "It was actually my old boss when I worked for a different company, and still a vendor, and he was like refocusing and he sat me down, he took me to breakfast, and…he is 'like have you thought about x-ray? My wife does x-ray and ultrasound' and he [her former boss] is an executive. He goes, 'some months she makes more money than me.' I said what. He said 'yea…she has a really good schedule.' He said 'look into it.' So I started to and then I have another friend

who is in x-ray too so she said 'come see if you like it. Come work with me.' So I went and volunteered with her. So between the two of them they guided me, my friend and my bosses wife. She helped me look into schools and I was looking basically just for ultrasound and then she is 'like you know it is important to do x-ray first.'"

The two of them, S2 commented, influenced her to enter radiography and then eventually

ultrasound, which held her interest along with the pay, flexible hours and the quick "two-

year" education:

"It was the pay, the hours. You could be flexible. You can work outpatient. You can get some weird hours at the hospital where you are not tied to a 9 to 5, it is flexible. Then I was thinking about maybe I would like to do, and the training was only two years."

As S2's original career decision was to be that of a secondary school teacher, attainment

of a "substitute career" seemed feasible. She considered radiography an occupation that

allowed her the ability to work with children in the hospital:

"So that was for me because single mom, I was not looking for a five year barely making 30,000 a year teaching job. So I was like forget it. I was very sad because I would like to teach. That is the only good thing working with the kids. I like working with the kids at the hospital."

For S2, money, flexible schedule and the opportunity for advancement into other imaging

modalities made radiography an enticing career choice, along with stability and demand:

"It is really short-term, short-term study. Good career stability. Good demand, good job…. It is not just x-ray. You get to go to the trauma center, the ER. Now especially you get to go to CT, MR and I appreciate the variety because you kind of get a taste of what you are going to do. Because they always said don't get stuck just in x-ray. You need to move on and get other modalities. I think the opportunity."

In comparison, the students in BCC cohort expressed similar motivations,

considering radiography to be a decent paying field complete with stability, and

opportunity. Like their BCC counterparts, the ICC students decided to enter the field

based on the stability, pay and opportunity. For example, in response to the question,

"why did you choose to study radiography?" S1 replied:

> "Because of my major limited me my career in this country and I got the job before in airlines. I feel this market is up and down with some reason, not stable, and it is kind of medical field, health care field, is more stable. Anybody can be sick for this reason and this is most reason to force me to find some program in this field and then I found that maybe the technologist would be better."

Like S2, S1 decided that a career in the medical field would provide more prospects and

job security, as did S9, who entered for the same reasons. He wanted a "quick" education

that would provide him with "results," decent pay, and opportunity:

> "Well, basically I just needed to do something with my life and I think that's a good start for me and I heard it's a good stepping stone to a lot of things in x-ray. It's the first stepping-stone to branch into CT, MRI, and ultrasound whatever…I really wanted results and I liked about is how they-how they pay. For a-for a two year program I think they-how they pay, for me, for what I think is I think is good pay, they pay okay."

S9 considered radiography to be a "stepping stone" into other imaging modalities,

providing, along the way, adequate pay for being a two-year program. At the close of the

interview, S9 commented:

> "I maybe um recommend it, x-ray. Like I said it's a stepping stone to everything, while you are in x-ray you could get cross trained, or you know since you already have a license you can get cross trained into anything. I really recommend it as a starting point to people who don't know what they want to do. Well for me I didn't know what I wanted to do."

To S9, radiography provides a career within a career, and a good starting point for those

who don't know what education/career path to pursue.

Similar to S9, S10 did not have a clear idea of what to career to pursue, and

admitted that he "never really paid attention to" radiography. He acquired knowledge

about radiography from his uncle (who is a doctor) and considered the field to be more

than "just pressing a button." He felt that radiography is where the money is good, and "you help people at the same time you help the doctors out." S10 considered radiographers to "be in need," and radiography is a "profession that needs people, I always worried about security. Like I don't need a business where it's hard to keep…job security."

Along with his classmates, S11 commented on how radiography offered opportunity for other imaging modalities. However, he learned this after enter the program. Being a graduate from a radiography program in the Philippines at the time of his progress through the U.S. program, S11 was not aware of ability for advancement:

> "When I was actually in the program, that's when I really started to appreciate Radiology especially when I went here and that's when I realized when I got to the radiology program. I didn't know that I thought it was just really just diagnostic, just studying the x-ray films. When I went to this program I realized you could move to other things. And that's I think it's been on my mind also that here I can do cat scans, we'll be going through these areas after school, like MRI, So, after that I really got interested."

For these ICC students, "job security," along with opportunity and "good pay" seemed paramount factors leading them to enter the program. As with the BCC second and first year cohort, they considered radiography as a field that will provide steady work, flexible hours, and, most importantly, allow for job mobility with the ability to pursue other imaging modalities, ultimately leading to higher pay.

However, out of the ten students in the ICC cohort, five expressed better pay/job security/job mobility as their primary reasons for entering radiography, in comparison to the seven BCC second year students, and the seven BCC first year students. For the ICC second year students, three students entered the profession not just for the reasons listed

above, but based on more sensitive issues relating to family members, patient care, and illness.

<div align="center">Patient Care Skills and Nursing</div>

Prior to entering radiography, the ICC students considered nursing as a career, but elected not to enter, or switched programs for various reasons. In this regard they were somewhat like the BCC students, in particular the second years, of who seven out of the ten students had started, or considered the nursing program prior to radiography. However, in comparison, the BCC students were much more expressive and seemingly negative in their statements about the nursing field, commenting how nursing is "high pressure, high commitment" occupation where nurses take care of "sick and broken people," and tend to the "dirty side" of patient care. However, and as mentioned, this is not an entirely accurate observation of the nursing profession, as nursing over the years has changed, and the "dirty side" of patient care has been delegated down to the certified nursing assistants and nurses aides. Additionally, the BCC students considered nursing to not offer upward mobility, also an observation that is not accurate, as nursing has an occupational structure where mobility and opportunity does indeed exist (Sandelowski, 2000).

Recall also that the majority of the BCC second year students commented on how the nursing prerequisites were lengthy and difficult to complete, and where they did not want to wait that long to start working on the coursework. For some of the ICC students, they too shared the same perspective, considering the length of time required to complete

all the prerequisites associated with nursing to be far too time consuming and serving to

create a delay in the progress, for example S6 commented:

> "So I um definitely do this subject and for nurse probably they have two years prerequisites and uh I'm old, I can't wait for two years prerequisites. I uh radiology is only one year prerequisite. Yeah. Yeah. Two years, two years of school. Two years."

Thus the two-year prerequisites versus one year of prerequisites for the radiography

program were the deciding factor for S6 to enter radiography as opposed to nursing. For

ICC S7, she commented how she originally was at a loss for a program to major in and

did consider nursing at first, again changing her choice of major because of the

prerequisites For S7, she did not prefer some of the prerequisites associated with nursing:

> "…I wonder did she know that my major was missing. When I first started here, I said I don't know what to do so I'll do nursing and so I took biology and speech and I didn't like biology, so I said okay well, I'm not going to do nothing…"

Thus S7 entered radiography instead, as the prerequisite courses, biology in particular,

did not hold interest for her to study, and radiography did not require completion of the

same prerequisites.

The student S8, mentioned that nursing was her first choice of educational

program, but then changed her mind, selecting radiography for the following reasons:

> "And I think if I apply here the teacher is willing to teach you without-without any payback and it's that. And-and I found out oh I could be a nurse or I could be a Rad tech. And the nursing I think is kind of hard because um they need a lot of critical thinking. And I'm-I'm not, how do you say that, I'm not as good at the critical thinker."

For F8, the academic coursework for nursing is difficult, in particular the "critical

thinking" aspect, and, also the demands of the nursing program, as in paper writing,

where she commented on how this fact deterred her from nursing, as she thought that she would not do "as well" in the nursing program:

> "… they tell me that uh once you enter the nursing program you have to write a lot of … uh uh papers. And I don't think I can do that. So but as an x-ray tech it is a more um like uh regarding positioning and I'm good-I'm good with like uh like the hands on stuff. Yeah so I know I can do better in a ray tech program."

For S8, nursing is seen as academically challenging, too academically challenging for her, and as stated, the BCC second and first year students. In comparison to radiography, which is seen as "more hands on," nursing is a program consisting of numerous prerequisites, and academically challenging.

Additionally, S8 did not want to wait, as long to enter the medical field, where the prerequisites needed for nursing would take longer to complete, also a deciding factor for selecting radiography over nursing. With fewer prerequisites required for entrance into the radiography program, completion of the program will occur at a faster rate. For S8, completion of the radiography prerequisites for her took less time, whereas for nursing she would have to engage in additional prerequisites coursework and thereby delay entrance into the nursing program:

> "…Rad Tech I think I already finished uh two classes so I only need two more and it took me like only two semesters to finish. But in the nursing program, Yeah it-it going to be uh longer and I don't want to wait that long."

Nursing represents, to these students and the BCC students, an academically challenging program that does not consist of much hands- on training, with too much academic requirements as in paper writing, and, far too many prerequisites required for entrance.

As stated previously, three out of the ten students had considered nursing prior to radiography, S7, S8 and S11. For S7 and S8, the wait time, numerous/difficult prerequisites and challenging academic coursework discouraged them from entering nursing. For S11, he had elected nursing in his home country, the Philippines, but elected not too for reasons similar to that of S7 and S8, where nursing consisted of too many prerequisites, too long of a wait time, and challenging academic work. Thus S11 elected radiography because he was informed that radiography was "in demand" in the U.S. with much opportunity waiting for him:

> "Radiography wasn't really my first choice…. so when I went to Manila. I still wanted to get into nursing program. But at that time um they didn't offer nursing. Usually the semester starts like at June and I applied…and I had to wait if I wanted to get into the nursing I'd do it for six more months. So then they told me about the radiology program. And they said it's like in demand also in the United States and I guess that is what I would do. Yes, but maybe my question before I even applied, the main question I asked, if it was also in demand in the United States."

For S11, the radiography program presented both occupational opportunity in the Philippines and the U.S. with less time to be spent waiting to enter. However, and unfortunately for S11, coming to the U.S. with a degree in the radiologic sciences from a program in the Philippines did not allow him to seek direct employment, as there is no form of reciprocity or articulation between his former foreign based radiography program and the national certifying agency, the ARRT when he arrived in the U.S.:

> "Um, actually I was already finished [radiography], I went to school in Philippines. I actually finished the four-year program for radiography technology. But when I went for this they changed the foreign policy."

For S11, his earned degree and training from the Philippines did not allow for work, an explanation for his time spent in the ICC program.

While opportunity and less wait time were the key influencers for S11 to enter radiography, he also held interest based on experiences from his childhood, where spending much time in hospitals based on having a disease from birth influenced as well:

"What interest… well Mmm I had been, I'd spent a lot of time in the hospital. When I was little I was born with a congenital heart disease. So, I guess I wanted to be, that's how I got my interest because I was exposed to these kinds of environment. I got so used to going back and you know in and out of the hospital so much…there were kids that were afraid of getting poked. I didn't I was just really used to. I wasn't even worried about the pain or anything else."

This statement brings up an interesting point regarding entrance into program, and transitions away from the common reasons for entrance, reasons of upward mobility, and nursing being unavailable and too difficult. For three of the ICC students, as in S11, and two other ICC students, S3 and S5, they revealed various underlying reasons for entering radiography that differed significantly from the BCC second year cohort. For these students, decisions to enter the radiography program were made based on mentioned influence on entering the RAD program due to reasons based on experiences of being sick as children and spending much time in hospitals, or taking care of relatives suffering from illnesses, for example, S11 was often sick as a child and spent much time in hospitals based on his congenital heart disease, and S3 had been influenced by being around an uncle sick with cancer, who eventually passed away:

"It was because I saw my uncle pass away and I saw how they were taking care of him at the hospital and that is when I became interested. I always wanted to work at a hospital but I did not want to be a doctor. I'm sorry but that is way too much schooling. I saw how they did x-rays. How he went in to get his oncology, his exams. I got exposed to some. That was about six years ago."

Additionally, and similar to S3, S5 lost quite a few family members to cancer, including her husband, and whose treatment for his cancer she witnessed first hand, a fact that

influenced her to enter healthcare. In particular, for S5, it was the "proper patient care"

actions of the health care professionals towards her husband while he was in the hospital

that was one of the major factors in her decision to enter radiography:

> "…My husband passed away, then two years later my mother passed away. And
> then two years later my stepmother passed away, all from cancer. And I saw the
> affect that the healthcare uh staffing had on their outlook on life. When my
> husband was ill and he was in the hospital, he wanted me to keep working. That
> was one of his main things. And I would go to work and it was horrible for me to
> go to work. But when I would come and visit him in the hospital and I would see
> one of the staff in there talking with him, just on a personal level and him
> laughing or, you know, just taking his mind off things. Just talking, it made me
> feel so much better that someone actually was caring for him."

To S5, she witnessed first hand her husband being taken care of by the hospital personnel

and experienced her stepmother going through cancer treatment. From this, S5 was

exposed to both husband and stepmother receiving good care, or less than adequate

patient care, experiences that seemingly shaped and molded S5 in her own career path in

terms of the patient care aspect of radiography:

> "When I would come into the hospital and see that he [husband] had been
> mistreated in any way, shape or form, I was not able to go back to work. And um
> with my stepmother, when she was ill, when she would go in for treatment, she
> had radiation, she had surgery, she had chemo, when she would go in for her
> treatment, the people there were very nice even though the procedure was very
> painful or uncomfortable, when she came home, when she had a good experience
> with people, she would try to have a very positive attitude. Regardless of how she
> felt, but when she had a bad experience, you know and I felt like I had patient
> caring and that just I wanted to help people through that. And I saw you know if
> you had a bad day, you can't take it out on the patients and I knew that I wouldn't
> do that."

Thus to S5, strong patient care skills were paramount to her in her career path as she

reflected upon the poor patient care that others can and do receive, leaving her

determined not to act this way towards her patients.

A factor to keep in perspective regarding patient care is that a number of the ICC students commented frequently on the care and treatment of their patients, reflecting on experiences of instances where patients could have been managed with compassion, or warmth. With this group of students, the patient was mentioned frequently, and through use of terms of conveying warmth, empathy, and consideration. Some of the students discussed themes distinctive to this group, describing situations and instances of how poor morale and understaffed hospitals greatly affect patient care. One student described her own personal growth, not through mastery of the technology, but through her acknowledgement of her "patient care skills" and burgeoning compassionate nature. Another student commented how conventional radiography allowed for more interaction with the patient, while digital took away much of the time spent with patients.

Nine out of the ten students were patient centered and patient focused with substantial commentary on how patients should be treated versus how they are treated by the technologists or other medical staff members. For example, S5 observed at her facility how patients could be treated inappropriately:

> "I've seen techs um be very unprofessional. Treat their patients inappropriately. And I've seen techs treat other techs, the way techs treat students, techs, treat students' um horribly. Uh that's hard to say um I don't think that it was necessarily the students themselves as it was just their attitudes towards students…"

S5 proceeded to recite an instance where a patient was disturbed by a "mix up" with and examination, one that S5 was completing, and the technologist humiliated her in front of the technologists in the department, and made the patient nervous to the point that the patient left the room before the exam was completed:

"I was doing an exam in front of the Director of the Program. Her evaluation [the director was evaluating the student] and um there was someone else who was helping me with the case and in the middle of the case she stopped helping and things got a little confused, which sometimes happens when you're a student, and the patient that I had had was having a metastatic bone survey, rarely seen exam. He wasn't too keen on having the exam, but his doctor said that you know he wanted to do it. And one of the films got double exposed, which happens, you know and the lead tech yelled in the middle of the department, probably as loud as he could probably yell, saying 'you double exposed that' you know the patient heard it. Up off the table [snaps her fingers] like that, out, he wouldn't finish the exam. And you know that is inappropriate and he [the technologist] knew that I was being evaluated. He knew the patient was in the room, he knew that the patient was a little skittish, there were people all throughout the department. He didn't do it because it was me. He did it because that's how he is. You know, but that's extremely inappropriate."

According to S5, the inappropriate actions towards students reflects upon patients, and can be a detriment to proper patient care, as in the case of the patient who needed a bone survey to rule out metastatic cancer. The result of the unprofessional actions of the technologist in essence made a nervous patient leave without a proper diagnostic study being completed.

S7 described a situation at her facility where the technologists were "not happy," and as a result, did not assist students during exams, which in turn created situations for patients where they were being attended to by unsupervised students, which can be dangerous to both patient and student (and the medical facility). It is also, according to S7, unfair to the students as they ended up the "patient advocate," a position that they are generally too inexperienced to be placed in:

"They're just not happy, you get abused there. Take advantage of you, the techs that are around, [put] all the work on the student and you are told that 'hey take that as an advantage,' but at other times you know what hey I need help, I'm starting off in this field I don't want to expose this patient twice by not getting it right the first time and I really need someone to come help me and no one will. Then you're put in that situation and hey this is not-I'm supposed to be a patient

advocate. How am I supposed to do that? This is a training facility, they know there is going to be students there and they should have to help and there's techs that help and there's techs that don't and you get stuck with the tech that doesn't and that's not fair to you or the patient."

S7 presented a valuable point. Students may be placed in positions for which they do not have the experience or the responsibility at such an early stage in their career, possibly leading to the risk of unintentional negligence towards the patients. In her discussion, S7 presented the issue of short staffing, and the "domino effect" from short staffing – poor attitude, low morale, low productivity, etc. She spoke from the patient's perspective, not from the perspective of the students treated as "slave laborers."

The final comment on poor patient care came from S11, who witnessed patients being "yelled at" by technologists, a factor that made S11 determined to learn from her experiences:

"When we watch heart attacks, sometimes when you handle patients. You see them-you see them, you see them the way they treat the patients sometimes you hear them yelling at the patients. I don't like hearing those. But you can't do anything about it especially if they have students there. But I'm just trying to learn from what I see. And I try that's everything I try to do; I try to learn from my mistakes. And I try to learn from other peoples mistakes, and think that that's going to work; I try to make myself uhm a lot better."

On more than one occasion the students in this cohort considered patient care as the essential portion of their training. Some of the students, such as S8, remarked how they had grown from their experience training to be radiographers, discovering their compassionate side:

"Before I don't understand, but I saw before I become second year and I kind of finally find my way. I really like to enjoy to helping people um even though even my husband he say I changed. If like um before I kind of have a distant with the people. But right now I kind of like um I'm trying to understand how people feel. And trying to help them and it makes me feel better. And I'm glad I found all that

because I always thought oh I'm never the kindness person before um before I entered this program. But after that after um after like helping people like ask patients what do you need and even though it's just a simple x-ray, I-I really enjoy the moment I stay with them. Especially when I finish the exam and they say thanks a lot you are so nice. Oh it would make the whole day."

I then asked S8 why there was distance between her and the patient. She responded:

"I think I didn't open my mind, I think it's because of my culture, if you-if you talk to you know like uh Chinese, I think you already uh interviewed those students, and you can-you can find out Chinese it's a little bit, its kind of you know like uh not as open as American. Yeah before I know that I didn't open my mind to people And I don't-I don't feel comfortable to-to ask people what-what do you need? And I'm not willing to help people before, and right now I feel good."

S8 attributed her recognition towards her previous lack of proper patient care skills to her culture, commenting on the differences in her background to that of an "open American." S8 added that her development in her patient care skills increased as her comfort level towards her training environment changed. In essence, S8 commented that she gained confidence in her surroundings and technical ability, bringing an "open mind:"

"In the first year because in the first year is like I never entered the medical field. I never touched patients before I never entered the hospital as a professional. And I'm so um I'm sure of a lot of stuff. Um it make-it make you feel. But after you-after you become a second year you know most of the stuff and you are getting used to the surrounding and you are-you are kind of you are kind of know what you are doing, and you will become a very good tech if you can open your mind to your patients and I learned that."

S8 stood alone in her reflections of how training and comfort level with the surroundings can bring good patient care skills in turn causing her to recognize an ability she did not know existed for her, and her patient care skills in turn allowed for the patients to be perhaps cooperative and congenial towards her. The other students in this cohort, S1, S2, S3 and S6, for example, expressed similar ideas in that they were

cognizant of the patient as a "person." For these students, proper communication and care were paramount for the successful progress of each exam, and the maintenance of each patient's well being.

Absent from their discourse were comments of how the patient could be difficult to move, or ruin their day. This type of commentary was prevalent with the BCC second and first year cohort, but not with any of the ICC students. For example, S1 informed that her ability to communicate properly with the patients brought comfort to the patient and inner satisfaction:

> "In hospital in Pasadena Chinese community most of the patients are Chinese and they expect somebody can speak Chinese and I can speak Chinese. I just saw a friend when I was an auditor, he worked with me, and he saw me. He sent his wife there to get a chest x–ray and he saw me just like a family there…made the patient more comfortable. Maybe because of my experience in the airlines as an agent just like sales and everyday I have to talk to the passenger and it is kind of, I thought I had a good communication with a lot of people. I think no matter what you are before maybe you can use your ability in another field. One day a lady just got marrowbone cancer and she needed an x-ray for the pelvis and hip and we have a good communication and she feels good. If I make the patient happy, I am happy."

She added that one must understand the "psychology" of the patients and how to communicate with them:

> "It is very important with the patient and with another tech. Especially with the people they bring to the hospital especially if they are very ill. When you are in this situation you are weak and you expect more care. At that moment you are just like a kid, expect good care from the parents. Just psychology either you know how to communicate with them."

Similar to S1, S2 discussed how the ability to reassure patients and communicate with them has created some of the positive experiences during her training:

> "The ability I think to help the patient and like really help them and to kind of reassure the parents sometimes when it is a child. It is worth it. I know it is kind

of hard study, but it is worth the exam. I think the ability to kind of calm a patient down and get them to do it even though you know they don't want to, but it has to be done for the study."

Out of this cohort, two students in particular discussed growth and the learning process, as mentioned S8, and S3. S3 remarked how he learned much from one of the female instructors in the program regarding patient care:

> "She is one fair lady…She has taught me to be fair. She has taught me to look after my patients, look after my well being and do the best I can."

S3 commented also that he liked working with patients and professed that he enjoys the fact that his work will play a big role in the "cure" of the patient, yet at the same time he will not spend enough time with patients to get attached, as with other imaging modalities, radiation oncology for example. To S3, attachment to patients would be, for him, difficult to cope with:

> "I like the people. I like the challenge. I like the fact that I am helping somebody, but yet I am not attached to that person. I just do what I have to, but I give my two cents to the cure of their illness in a way. That way if my picture comes out good the radiologist could read it and say and say you know what this person has such and such or he is fine because of your picture we are able to this surgery, or we find something that we weren't looking for but yet it is there. At the same time I don't get attached to patients. That is the hardest part is that once you get attached and something happens to the patient I think that is going to hurt me more than anything."

For S3, the patients can make a difference in his day:

> "A day that you get a smile from a patient and you get thanked by a patient when you get the film regardless if came good or bad, but yet the patient just comes in cranky and you get thanked by a cranky patient. That is a good day for me."

Thus, it was clear how patient centered these students were, with comments that were replete with compassionate statements about proper patient care concerns.   In this cohort, one student, S10 commented on some of the more negative aspects of his training

that he was not aware of, and how he has encountered some difficult moments while

attempting to negotiate with his patients in order to obtain the x-rays:

> "Um lets see, patients, lots of accidents. Yeah that I didn't know. Precaution film.
> Um. Kind of like fluor-fluoroscopy. I never knew you had to uh…I didn't know
> you had to uh work more with the patients, with the contrast media…um more
> invasive. Um another thing is like these patients, different patients sometimes
> their frustration when I can't really relate to the patient what her needs are, but at
> the same time trying to do my job. Trying to uh reason it out for her. Tell her
> why I have to do this case that's why she's not so comfortable."

For S10, prior to entering the program, and a point he mentioned during the interview,

was that he was not aware of how much patient contact existed as part of the day to day

routine of radiographers, and how many patients who suffer from "accidents" that

technologists encounter. He was not aware that technologists, as part of their daily

routine work, conduct invasive procedures, and contend with difficult patients. For S10,

his perceptions towards radiography came about based on his training, where he gained

insight that he previously was not aware of. S10 explained that he was not cognizant of

how much patient contact was needed, until he started his externship training. When

questioned, he explained that he didn't know about the profession prior to entering the

program:

> "Um you know it was something that I never really paid attention to. Like it
> really wasn't known like, like x-ray I mean. The first thing you think of is like
> taking pictures and stuff. And once I had learned more about it, there's more to it
> than just pressing a button and its just knowing how the what how the body
> works. And just the relationship like what doctors are looking for, and how-how
> in depth it is. It's-I don't know how to say it."

To S10, radiography in the beginning was about "taking pictures," but his perceptions had changed once his training began and he encountered different exams, various patients and the complications that surround the day-to-day tasks.

In conclusion, and with perhaps the exception of S10, this cohort of students exhibited patient care skills, were patient centered and patient focused, a key point, radiography is not merely about mastery of technology; it is also about the ability to learn how to communicate and work with ill, old, young or injured patients in order to obtain diagnostic images. These particular students, throughout each interview, mentioned the patients continuously in their conversations, an interesting contrast to the BCC second and first year students.

<u>Changing Technology – the Benefits and Pitfalls</u>

The aspect of learning CR first and the difficulty of adapting to conventional x-ray equipment proved a common source of discussion with this cohort, much like the second and first year cohort from BCC. This cohort commented on how CR presented almost a handicap to the technical skill that accompanies conventional, and how CR also creates a "lax" environment for the technologists, as the ease of the technique portion of the exams has been created through use of computers that can alter and "repair" the finished product on the viewing screen, something that conventional does not allow.

With CR, a number of the students commented how the mental work is no longer prevalent, as CR has by and large taken much of that away due to the visual repair ability. One student, S3, commented on the handicap of CR, and how the machines can now

"think for you," and in the event of problems, would make it difficult for technologists to

adjust to the former conventional method:

> "I was trained at, my first training session was at another hospital where the technology is all old. You have to learn from how to get the film and then going from there to a dated processor from this other hospital where things are totally changed in how it is improving, but yet they are making these machines to think for you and people are forgetting the fact that…. I work with the older people and the older people they are the ones who taught me, hey you know what the technology is there. You are always going to be there, but yet if that breaks down how are you going to be able to resolve your problem. It has happened here at this hospital where the machines are broken down and there is people there, 'Oh my God what am I going to do?' And you as a student are going, 'you know what I remember at the other hospital lets do it this way.'"

As it was at the facility for S3, when the new CR equipment malfunctioned, some

technologists did not have the ability to adapt and revert to former conventional methods

of obtaining radiographic images. S3 commented how, as a student, he learned both

methods, thus possessing the ability to adjust and keep up with the patient cases

regardless of the equipment.

To S1, not learning conventional prior to CR created a handicap for her, thus

making it more difficult to learn "manual." S1 commented that for students, learning CR

over conventional is not helpful to the students, remarking on several occasions how easy

CR is to learn and use, and it could be better for students to learn conventional first to

obtain a good grasp of the technical aspects of the equipment, something CR has

practically eliminated. S1 discussed how she had been training at a facility with CR and

then transferred to a different externship site consisting of conventional, and how she

preferred the manual methods to CR:

> "When I came-I came back over here I just like use you know old machine. Mostly I use the manual you know. Uh I like manual better. Um because I'm

second year already right, so I like to use the old machine, mostly use the, you know, the manual. Okay, we have a both kinds in both sides, but I feel more comfortable but I don't like digital. You know why? You know why? Because the change, as a tech you know the machine, make you feel more secure, but other use it just a little bit harder technique, but for train-trainee you know I don't think its good. Because its not a good idea, I'd rather you know the students to be training in a, you know…in a conventional field because it a make you to think about the body parts, thickness of the body parts and make the position."

S2 informed me that the new technology at her facility is the "cutting edge," but also noticed that learning CR first and then adapting to conventional is what she considered to be, in a sense, learning backward:

"Cedars is the best site, Cedars Sinai, everything is brand new so it is all digital, it is the cutting edge. That is what I really liked about the site I chose. Another student had told me, make sure you go to Cedars because you are going to get the most…and we are a trauma one center and it is cutting edge, even though we kind have to learn backwards, at other [conventional] hospitals for a few months. The technique really makes a difference."

Once again a student commented how the "technique" aspect of dealing with the conventional equipment adds an element of complexity that CR does not contain, thus the learning curve is greater when the students change from CR to conventional, as opposed to conventional to CR.

S9 shared the same perspective regarding the "ease" of working with CR versus the more challenging aspect of working with conventional, having trained at two separate medical facilities. He explained how, while he prefers new equipment, he would also rather have the ability to work more "hands-on" as conventional allows. He described the CR as simplistic, "push button" technology:

"I don't know if you've ever been to Venice, it's uh old equipment wise. They have old stuff and also I've been to Cedars and that's my first home hospital, they have digital and everything. So I've been involved with both of them so I think Cedars is a very good way you know to-technology wise, but then Venice I like

handling more of the film. Instead of just looking at it as a TV or something. To me, like I said, I'm a hands-on kind of guy. I like doing more of the stuff inst-instead of just pressing a button like Cedars does."

In addition to seeing the new technology as "simplistic," S9 shared a unique point not discussed before. The ease of CR for the technologist (or student) to spend less time in the room with the patient, as much of the technical aspects and manipulation of equipment formerly associated with conventional have been eliminated (as noticed by the other students in all cohorts). According to S9, this changes the nature of the relationship of technologist to patient:

"Well if you have a digital part um subject that hasn't had communication with the patient or anything like interaction with the patient while your doing well if you have old equipment or maybe your not-you have to set everything else position wise and you are interacting with the patient more….Conventional you interact more. Because I been in both I been in Cedars for a year and I been in Venice for like about eight months now. And so for like me I like-I like Venice more. I like handling more the other stuff instead of just pressing a button…"

Seeking clarification, I inquired towards the reasoning behind what makes conventional difficult over CR, and S9 explained:

"Technique wise, Of course uh handling old machines, Darkrooms, which was also good in the beginning, and mainly if you have good equipment you'll-you'll learn more or it will be easier for you since our time at Venice we have old machines that are really hard to learn and where the knobs were and you know whereas at Cedars you just press a button and it's already there. It's set for you. So you don't really have to learn more."

Upon request S9 elaborated more on why he considered there to be less interaction with the patients when using CR:

"The CR it's easy, it's very easy, I think when I was a first year there and second year I was already shooting x-ray. And it was really easy. It's the way you look at the machines, the way you look at CR, you know the PACS system...It's easy. It's like you learn it in one day, pushing buttons, but um the same time it depends on the way the patient works, if you know the patient is not mobile of course you

have to handle the patient a little more, but um machine wise you just press a button and the machine is already set for you. While in Venice you have to use manual technique which means you have to calculate the second and how much mAs you have, and-and-and then the PACS system you can change this and say it should get hot you could maybe change the-the picture. Well with just x-ray if you shoot hot, if you shoot dark you have to re-shoot it again."

In a sense, according to S9, the older equipment required more mental work, and the possibility of repeat radiographs based on human technical error, indicating time spent with the patient conducting technical "calculations" and, at times, repeat radiographs. The other students in the BCC second/first year cohort and this cohort did not express this, rather, considered CR to be better for the patient, as there is less time spent for the patient, and the chance of repeat radiographs (hence more radiation) has been practically eliminated.

In the final discussions regarding the new technology, two students, S5 and S11, commented how the new imagery is difficult to interpret. Moreover, they felt that the ability to repair the images on the computer is changing the nature of radiography. With the reduced number of repeats, there is a tendency for the exams to be performed in a hurried, "sloppy" fashion, with the knowledge that poor quality can be repaired without having to take repeat radiographs. For example, S5 stated:

"At ____ hospital I was on analog [conventional] systems, now right, old equipment, and then I'm at Cedars dealing with the PAC system and the, you know, digital, and um seeing a lot of cooler stuff on the newer equipment. I don't like the digital (laughs) I don't-I-I mean I guess it just takes you know, I think that you know in the future that lots of people will be used to it and it will be easier, but when you know when you work in the analog systems you see the film. You get used to reading the film It's very, very difficult for me personally to go to the digital and try to see the same thing, and I think that sometimes, I mean, my opinion is that a lot of times films [and computer images] are turned in that are not of good quality because you can't see what you've done, especially given the light that's available and read them. You know read images I mean the up-the up

of course the radiologist has a different reason. You know You know re-reading situation, but I think techs should have too You know I think that they should have the same quality when they look at it because they're the ones that are giving it to the radiologist to read them. They are the ones that are responsible for the images."

In essence, to S5, the images from the CR are difficult to read and interpret, and the technologist does not have so much ability to judge the quality. Oftentimes the images are sent to the radiologist without the technologists necessarily judging the images for quality assessment. Moreover, if the quality is poor, this can be corrected on the computer. To S5, the quality control aspect has been taken away from technologists, when it should be their responsibility as they are the individuals producing the finished product. However, while S5 was aware that the images should be an acceptable level otherwise the quality of the work is lost, he did consider the positive in the new technology, where the reduction in repeat radiographs is a benefit for patients:

> "…you know you can manipulate that image so you're not giving, you don't have to repeat it because your technique was not quite up to par. It has to be at a certain level, but you don't have to repeat, which I mean is more exposure to the patient. So there are definite advantages to the system. Its just a matter of training people how to read it and maybe giving them a better environment to that. You know, I think it can be as long as, you know, the techs know that they're turning in a good quality image."

S11's comments reflected similar concerns and observations regarding CR. However, he added an additional observation related to the equipment. The older, conventional equipment at the smaller hospital he transferred from caused "people to work harder," where the state of the art equipment created "techs" who no longer have to work hard:

> "I'm really impressed with the equipment they have. I went there for my rotation once. State of the art, they have everything they need. But Mmm, I, now that I've been there I've been faced with all that equipment. And coming from a small

hospital I've realized that machines don't really do much. It's a lot of getting a better relationship with the workers…I'd say by the second month I almost wanted-I almost wanted to leave, because I ended up arguing with one of the-one of the transporters…everybody, all the techs, don't really work as hard as someone at a like a small hospital. So equipment wise I don't really bother much about it. Because now that I've learned how it works it's really easy. So, I feel more challenged working at a hospital with older equipment, only because it makes you think more, makes you appreciate your work. Let's say you prep for these x-ray, let's say you're in a big hospital where they have digital image and you just look onto the monitor. You can't see much detail. I often find myself complaining you know that I can't see what I'm looking for. It's hard to tell, because you're always looking at a small monitor…"

Thus to S11, state of the art equipment can be an asset but also a detriment, and the nature of the occupation is changing as the technology changes. Similar to S11, another student in the cohort, S9, had commented how the bigger medical facilities had more staff to assist with the busy clerical work, while at a smaller hospital lack of staffing and conventional equipment create a different work ethic and subsequently, create a training environment that is perhaps richer in detail and far more beneficial for teaching students to be critical thinkers and garner proper work ethics.

In conclusion, the observations, and reflections by these students regarding the conventional versus CR state of the art technology brought forth distinctive perspectives and major implications for the changes to the profession overall. These implications included a changing workforce, benefits and negative aspects to patient care, and technology that is serving to "dummy down" the mental aspect of the work itself. Computers will now think and correct mistakes for technologists, perhaps leading to them becoming "glorified button pushers." It is of essence to reiterate how the changing nature of technology has altered the work performed by radiographers and will undoubtedly continues to alter the nature of the workforce, thus creating both a positive

(for the patients) yet negative environment (uninterested technologists). In the words of Zuboff (1988), information technology both accomplishes tasks and translates such tasks into information, becoming the "action" and "voice." These students, as the first generation to experience the transition from conventional to CR/DR, are witness to the loss of "action" to the computers and subsequent "voice," that has been created. The technologists are experiencing a loss of mental tasks and skills, having been replaced by the computerization of obtaining diagnostic images.

<div align="center">The Pressure To Perform</div>

The theme of the "pressure to perform" occurred with four of the second year students, where they encountered radiography staff not willing to train these students, as they considered them far enough along in their educational progress to have obtained a good grasp of the equipment and protocols for exams. Primarily the technologists and the radiologists placed this pressure on them. Students found themselves unable to get assistance when needed, or encountered what they considered" abuse" of their students status, indicating that all the patient exams were passed on to the students, while the technologists did little to offer any assistance, as was the case with S8:

> "I don't like some-some peoples attitudes in hospital. As a student we have to do everything they tell us, and they're trying to take advantage of this. I really don't like it. I'm thinking about we're all grown ups, and we are-we-we are in the same floor. And 'you were students before,' you know the things of students and you know how hard we work and you know how stupid we are in the beginning and they'll try to-they'll try to tell you to do anything that-that revolve like uh um how do you say that. It's like um…they, and some people I mean some people and it's like uh I think it happens in every hospital. I mean for students. Yeah they um they-they are talking over there and when they see you when the case come in they don't want to do it because they have the students. They call your name, 'hey so and so do this chest x-ray' or 'so and so shoot this.' So I don't I don't like the attitude they have, some techs they have really bad attitudes."

S8 commented that there was no difference in the attitudes among male or female techs; however, she did notice that the older technologists who had worked in the profession for twenty years were those who "worked hard." By contrast, the other, "younger" technologists relied on the students to perform the exams and did not have the patience to teach, expecting students to grasp each exam upon one demonstration:

> "It doesn't matter female or male. It's just the way they are because I found out that some techs, they-they work in the same hospital over twenty years, they still work hard. But some techs they only like work for only four or five years and they know they the hospital has students' they-they-they give every cases to the students. If you know, it's not that easy. It's very busy and everybody has to work. (laughs) But if it's a slow day we for us we don't have a slow day. Every single case we have to do it."

S8 commented how the techs do not have the patience to teach students, but expect the students to pick up on procedures and manipulation of the technology after one demonstration:

> "I understand that because when we were in the hospital, not every tech has a patient to teach you one by I mean like one times two times you know three times not forever. They-they only show it to you one time and they-the kind of they kind of you know want you to know it right away. But if you are if you're kind of hands on person from seeing one time then you can pick it up, but some students they don't."

The lack of patience from technologists, according to S8, is difficult for some students, as they are not necessarily the quick, "hands-on" types, thus needing more assistance and demonstrations. This was an issue that S2 noticed as well, with some technologists "getting irritated," thus creating an environment not conducive to learning:

> "…Because my personality is conducive to like learning in a stressful environment, I work well under pressure and for some students it is kind of hard. They are at way different levels and I know you can't make everybody comfortable on the same level, but I think certain students need certain kind of

attention…people get irritated, and I think it is just kind of personality and being able to adapt under stressful situations. It is just not fair. It is just not even across the board."

For S2, while she considered herself highly adaptable, for her classmates, the technologists who were not willing to assist students or give them attention was, what S2 considered to be an unfair situation. Similar to what S2 had encountered at his facility, S3 considered the technologists who had attitudes towards students (and radiologists as well), to have been part of the bad experiences he had encountered during his training. He commented how he had to adjust and accommodate himself to those particular technologists:

"I had bad experiences but not negative. My experiences were you have to deal with people with attitudes and I am talking about not patients but more techs. The doctors not so much because I understand. I try to understand but I think it is the fact that as a student you have to put your head down and don't make them work for you but work for them and that is the only _____ that you have to accommodate yourself to them, because you are with different techs every day and different attitudes and different views."

However, S3 did not believe these particular technologists were tired of working with him, or with student for that matter. Instead he felt that these technologists were "tired of working in the same place," and thereby were left without motivation to train students:

"I don't think they are tired of working with me I think they are tired of working in the same place and I think they get tired of not me particularly because I don't give them that, I should not be giving them that vibe which I don't because I make them laugh. I think it is the fact that they are just doing it because they have to. You see that mostly in older techs who have been in the same place more than 10 years and I think they have seen it all. I don't understand why they won't move up but that is something they have to do on their own."

S7 remarked how the radiographers at her "training" facility do not assist students, but expect the work to be performed. To S7, the fact that the technologists present an

example of unwillingness to assist, as well being what S7 considered to be "lazy," creates

an atmosphere once again not conducive to learning:

> "This is a training facility, they know there is going to be students there and they should have to help and there's techs that help and there's techs that don't and you get stuck with the tech that doesn't and that's not fair to you or the patient. Um overall yeah. I mean I'm very outspoken. Um I don't take a lot. Even when I was at Cedar's it's a larger facility and there's very-there's a lot of lady techs there. Um I don't go around those people. If I see them not doing what you know, I'm not going to jump up. I don't believe I'm not-I'm going to learn, from you not doing work. Okay. You are getting paid, don't think I am going to be here to do your job because you're lazy and I'll just-I won't go in those areas. I will go in the areas that I am going to benefit."

Thus, the students were expected to learn and perform the work without much

supervision or assistance, encountering attitudes and "burn-out," that does little for the

students who are uncertain and struggling with the concepts, equipment and the patients.

At this stage in their training, some of the students were looked upon as the workforce to

perform exams, with the justification that as students they need to hone in on their skills

in order to meet the occupational requirements. However, without assistance and

supervision, regardless of positive or negative experiences in the learning process, the

issue of lack of proper supervision could be a catalyst for trouble as the potential for

injury and excess radiation can occur, in particular when the experienced technologists

are not available to assist and correct excess mistakes.

To recap, there were similarities between this cohort and the BCC second years

students, who also commented at length about how they were expected to perform and

complete the work as if they were fully licensed/experienced technologists. While some

of the students attempted to step up to the challenge and considered this part of the

learning process, others considered the technologists to be "lazy," placing an unnecessary workload on the students, and therefore not conducive to the learning process.

<u>The Future, Professionalism and the Hierarchical Structure Revealed</u>

The question, *what are your plans upon graduation*, yet again struck a cord of interest the students, where the ICC second year cohort expressed a myriad of conversation and opinions. These students expressed similar points of view to the BCC second and first year cohorts, on the imaging modalities, professionalism and the field of diagnostic radiography, and how radiographers are considered and treated by other medical staff. Their future goals were centered on advancement into the other imaging areas, in particular mammography, CT scanning, MRI, special procedures, and radiation therapy.

A difference in future goals emerged, though, where the BCC second year cohort did not mention radiation therapy as a future imaging modality to pursue based on the rationale that spending time and possibly getting close with the same patients each day, only to have them pass away regardless of their efforts would be difficult to face. In contrast, while a number of the BCC first year cohort where a number of these students set their sights on nuclear medicine as a future goal, the ICC students did not mention nuclear medicine for the future. Furthermore, three ICC female students, S5, S7, and S8, expressed interest towards eventually working in mammography, where their rationale for doing so contrasted with the BCC second year females who primarily commented on how they "should do" mammography because they were "female" and "probably would be "forced" to work in mammography regardless of personal choice. For the ICC second

year females, some reasons for working in mammography were based on personal and

"negative" experiences, for example, S5 commented:

> "I thought I wouldn't like mammography, and I ended up liking it. I didn't think
> that I would, but probably, plus I think that it's very helpful to women too. I think
> that it's important for them. To come in and have an exam and have a pleasant
> experience, So that they will keep coming back. I mean I had a bad, really bad
> experience one time she really bruised my clavicle. I did not want to go back
> ever."

S7 offered similar comments regarding her future imaging modality options and how she

would like to work in mammography. However, she had been "discouraged" by others

(it is not known who) to avoid this particular area:

> "Um I was just always taught you don't want to touch boobies all day. Its so
> boring, da-da-da people just go on and on about how boring it is. You don't want
> to do that all day long. So half the time I worked at Cedars I tended to
> mammography and I was observing and I said hey, you know, I could do this.
> There's no pushing patients, no strenuous work, you are on your feet all day long.
> But, you can make a difference, you know, if you have the patience and the
> personality. To deal with woman who have to come in and get a mammogram.
> Some people should not be doing it. And there are others who can."

Recognizing that mammography is a high touch, sensitive, high patient care imaging

modality that requires "patient" technologists with "personality," did not deter S7 from

expressing her desire to work in mammography as a future imaging modality. Both

students recognized the importance behind excellent patient care skills that are required

for this imaging modality, and how some female technologists, particularly those without

the proper "sensitive touch" or patience, should not work in this area.

S8 was the third female student to mention an interest in mammography, again

emphasizing the importance of being a "good" mammo technologist who can make the

patients feel comfortable with an uncomfortable x-ray exam:

"Even though um I don't go CT I would choose mammo. Yeah I love mammo. Yeah I love mammo. As a female I think um for me its like its not hard doing mammo. And as a female tech mammo is like the think we should do (laughs), I don't know I just feel like uh mammo is very intimate with the patient. It's-it's like if you are a good mammo tech your patients is going to feel like very comfortable with uh you doing the procedure. And I think it helps a lot as a I mean as a good mammo tech, you can-you can because most of your patients they are-they are kind of afraid of the mammo screening. Because breast is-breast is you know very important to female…I mean most of the females, so yeah I would like to be a mammo tech."

S8, who had elected CT as her first imaging modality to pursue, commented on how she would chose mammography if she didn't go into CT, explaining how mammo is an intimate exam that women can be "afraid" of, and the importance behind proper patient care. Interestingly, these three students held an interest in mammography because of the nature of the exam, and the importance behind mammography examinations for women. They did not express interest in mammography based on some of the other reasons mentioned by the students in all cohorts, reasons including ease of work, less stress, and of course, higher pay. As mentioned, mammography does not command a high salary, and according to survey data on salaries, is the least lucrative imaging modality within the imaging arena (ASRT, 2001; ASRT, 2004).

However, while not commanding a higher salary as with the other imaging modalities, S1 commented that her training in mammography would make her more marketable. There is less competition (as she is competing only with women for mammography positions) and her skills will be in high demand. She commented also on the workload for mammography consisting of less physical work:

"It's kind of for, you know, for all female. You know we are not strong as uh male. Do you agree with me? So its kind of mammography is a kind of more

opportunity job opportunity and uh you know because diagnostic is kind of sometimes needs a more physical its kind of physical work."

The mammography class was promoted to the female students in this cohort based on the current high demand and job security, should the market in diagnostic radiography not be lucrative:

"Actually I take this class mostly because of the demand. But not just for men. But not just for men because its mammography. Yes right and for the protection right in case. That you know the market in diagnostics portion is not very good and its good protection right"

She was also encouraged to enter mammography by a technologist at her hospital, one who reinforced the notion of marketability in relation to the occupational arena where mammography is not in direct competition with the other mixed gender modalities:

"You know in the other hospital. Um-there is a mammo-mammography tech, she highly recommend me to take you know mammography. Because she also said if it make you more competitive in the job market. Um CT you know, MRI because um they said that CT, either female or male. Both of them, they can take a CT. Right. And mammography only female. Only. And they say that you know in the job market of CT it seems more competitive."

S2 interested in mammography because it made her "marketable," commenting that mammography is a "guaranteed job," because "only girls can do it." Regarding men and mammography, she explained that, "I don't think they [men] can do it [perform mammography]. When I asked her why she thought this to be true, she replied, "I think it is the law." S2 considered mammography to be a "challenge," but it was an attractive opportunity for her because of the flexible schedule mammography might allow. Oftentimes mammography is housed in medical outpatient facilities operating primarily from 9 to 5, thus providing her more time with her family.

In addition to mammography, a number of the students expressed interest in CT scanning and MRI as future pursuits, (S3, S6, S8, S9, S10, and S11). The reasons were varied regarding why these modalities were optimal. However, CT was described as an "easy" area to work in, where the technology is not difficult to comprehend. For example S9 stated:

"I like CT and MRI, but to me I think it's boring. It's very boring. You sit there. You press buttons, you read something. Well it's easy. I think it's easy to learn. I've been rotating I-I was rotating before Cedars. Like I said I was there for-maybe I was there for three hours. And I was scanning on my own."

CT was also described in terms of less physical work, where the labor intensive aspects of moving patients and being on the feet for hours was non-existent, a perfect imaging modality for those technologists who were older, as described by S11:

"I still have in the back of my mind that I know that I don't want to stay in diagnostic. Forever, so, I'm still looking forward to maybe, I really like doing CAT scan. Actually one of the reasons why I choose CT is sometimes you think ahead like ten years from now. Ten years from now I'm not going to be that young anymore, and see people in CAT scan there about forty-fifty years old. So I see myself as like being there. At this age I'm still able to work because I'm like been there already. If I'm going to stay in diagnostic I can't see myself being at this age and really working hard. As opposed to being so young and you know just compare the type of work that you're going to be doing. Because at that age sometimes I-I kind of see like umm other techs already in the clinical side like one of the female techs now I see how, sometimes I you hear her tell you that she limps already and she tells me she gets tired really easy…hard on your body."

To S11, diagnostic imaging eventually will take a toll on t on the body, thus the less physical work, the better it will be on the body in the long run. Student S10 agreed. However, his language described CT as "not as dangerous as x-ray," indicating that in CT

the equipment works around the patient, will less movement of the patients by the

technologists:

> "CT and MRI. Um it's not as hectic. Not as dangerous as-as x-ray sometimes. Um its more I guess the patients are not as hurt in CT than x-ray. Not much in pain, you don't have to look around it to get the job done, but CT I like how it's more-it's more in depth in trying to study the images."

To S10, CT was not as "hectic," and the patients are not as "critical" as they can be in

diagnostic (not necessarily true), with CT allowing for in-depth studies that x-ray can't

account for. Thus for S10, CT is considered to be an imaging modality consisting of ease

in the workload, where one does not have to "look around" to perform the studies, CT

can perform the imaging at a higher, more in-depth level.

Referencing the less dangerous aspects of CT scanning, S8 commented on how

diagnostic gives more exposure to radiation, with the technologists receiving less

exposure in CT. This is seemingly a concern for some of the students, as with S8, who

stated. "So I think that CT is uh it's a less radiation to a tech…. because techs stay

outside of the room.

While the students commented on how there is less exposure and less physical

activity, CT was considered to be the "wave of the future," with numerous exams from

diagnostic being replaced by CT scanning, for example S8 held interest in CT as a goal

towards learning Positive Emission Tomography (PET):

> "I want to learn CT and MRI. Yes definitely. Yeah because um-um I know CT is like uh they are going to-they are going to introduce uh PET. So I think it's a good opportunity to learn CT if they are going to introduce uh you know PET Scan into CT film."

Some future technological advances are indeed CT scanning being merged with PET scanning as well as many diagnostic exams from diagnostic being replaced by CT. It is apparent that CT scanning holds interest for many students because of the imaging advancements, high demand for radiographers who are skilled in more than one imaging modality, less exposure to radiation, and being the wave of the future, as S6 informed me:

> "Uuhhhh okay for me right now probably I go to-I go to CT. Or-or-or yeah exposed myself to the to-to-to the other field….Because uh because they uh always take…they need the tech to do whatever they want to do after three or four years I want to train you for the CT. Imaging um as I-I-I-I-I told before in the future that's really when they we can see through the body, see what has happened right there. I-I-I believe medical imaging…should be really, really powerful in the future in medical field."

Thus to S6, the technologists will be required to train in other areas in accordance with what might be the demands of the job, and as imaging becomes "really powerful in the future."

S8 expressed interest in CT and MRI, but ultimately wanted to train and work in radiation therapy. When questioned as to why this particular modality over all others (recall that the other students did not express interest in radiation therapy, specifically because of the "nature" of this modality) she replied that this field to contain a "flexible" schedule suitable for her and her family:

> "Yes after I worked-after I entered into this program I know I have so many opportunities to get into as CT tech, MRI tech, even as Radiation therapy, and um I-I already volunteering in City of Hope... and I want to apply there after I finish this program. Um I think the most of the reason I choose the radiation therapy because I have a family, and I couldn't do swing shift. And I as a x-ray tech working in the hospital you have to you have to uh you know like uh like uh signifies your family times in the beginning. And I want to take control for my daughter. So I want to choose a field you know that has stable hours, and I can control my schedule. I-I think it's very important to me. That's why I'm thinking

about like if I go into radiation therapy they have a good hours, and it's going to be good to my family in the future."

Although it was not mentioned by most of the students, a number of the modalities, including CT, MRI, Interventional/Angiography and Ultrasound require technologists to be "on call" for evenings or weekends. This brings more money but also impacts weekends and nights as technologists lose their time off, so to speak. Being paged to come in at any time in order to perform emergency exams controls them. To S8, radiation therapy has the type of hours conducive for the family, where she can take charge of her schedule and still have time with her daughter.

Two students S3, and S9 mentioned training and working in the cardiac/interventional area, with S3 commenting on how the "cath lab" is an area where technologists work closely with doctors:

> "I like cath lab and angio because you work closely with the doctors. You work closely with a group of a people, with a team and basically if somebody is down you are up there to rectify the problem. If you are down somebody is helping you out. I like the part where you work as a team. In x-ray you work by yourself, in a room with the patient and the pictures are there for you, but in these places we are working with other people and everybody has different ways of doing stuff and you are constantly learning. There is always a new way or new method to learn. You could have done this and somebody can make it easier, somebody can make it harder, you could teach somebody else to do something easier. CT is the same thing. The only thing in CT that I would get tired of is the fact that it is just sort of like a routine. But I like the fact where it is challenging where everything is the same. The procedures are the same but the people are different. Our body structures, our habitus, is different and it is to the point where you are doing a head CT and you are like he looks just like this person, you do it like this, but yet it is not. It is different. I like the challenging stuff."

To S3, the cath lab consists of a teamwork environment where technologists work in tandem with the radiologists as opposed to the solitude of diagnostic. S3 likes "challenging stuff," as in the cath lab and CT scanning, where there are new methods to

learn, and different "body styles" to image. Although CT scanning is viewed by S3 as an

area prone to routine, he still considers this area as challenging based on the patients and

pathology. The idea of working closely with the radiologists as opposed to experiencing

the ever increasing division between technologists and radiologists within the diagnostic

realm, calls attention to the fact that some special imaging areas still allow for the one on

one and/or constant interaction between technologists and radiologists.

This point calls attention to the issue of professionalism and the perspectives of

the ICC second year cohort, where discussions on professionalism were not as common

as they were with the BCC second and first year cohorts. When discussions occurred, the

main points regarding professionalism centered on how radiologists have "attitudes" and

are difficult to work with:

> "My experiences were you have to deal with people with attitudes and I am
> talking about not patients but more techs, the doctors not so much because I
> understand. I try to understand but I think it is the fact that as a student you have
> to put your head down and don't make them work for you but work for them and
> that is the only way, that you have to accommodate yourself to them…"

According to S3, students must learn to work around the "attitudes" and it is seemingly

acceptable for the doctors to possess "attitudes," while as students they must put their

"heads down," and not make more work for others, being accommodating to the attitudes

surrounding.   S8 remarked how the radiologists don't share information with the students

and are not very helpful in some respects when it comes to seeking clarification on

radiographs or digital images:

> "She no I mean not she he, he is seventy seven years old and he's very, very good
> in his field. And when you ask him he tells you. While some radiologists
> they…they don't. When you ask them they are like mmm its nothing. They don't
> even bother to tell you."

For S2, the radiologists at her facility were difficult to work with, because of their

temperamental actions and expressed anger towards the students and technologists over

equipment malfunctions. S2 explained that at her facility the equipment is old, prone to

malfunctions, and the images during fluoroscopy exams are hard to visualize on the

television monitor. S2 explained, the students and technologists bear the brunt of the

frustrations:

> "It is different for different hospitals because over here at Memorial everything is
> old and so like in our fluoro when were having fluoro stuff, you can't even see. It
> so grainy you can't even see the machine, doctors are mad at you. The
> radiologists get frustrated and take it out on you…"

S2 complained that the doctors at her facility were difficult to recruit to perform exams

on patients. She claimed they are not willing to help because this involved working with

poor quality, outdated equipment, which in turn affected the technologists' attitudes as

well, in a chain reaction:

> "They don't want to do the case, you have to beg them to do the case. That is
> when I get mad. When the speech therapist is supposed to be the one doing the
> video swallow and we have to do and they are mad because the patient's head is
> not straight. Well you are not in here helping me either. I am not wearing a lead
> glove. I have to give them the food and have them hold it in their mouth and they
> are like 90. So stuff that is not fair, which would be radiologists. Your
> equipment sucks. It is not your fault and you are not getting the right help you
> need. It is just the radiologist's attitude. They are lazy and they don't care and so
> it affects the way the techs don't care…"

To S2, those in command can have a profound affect on those who work under them, as

in the relationship between radiologists and technologists, where the physical

surrounding as in outdated and broken equipment can inadvertently create an atmosphere

of poor patient care and low morale from all of those around, and where, in particular,

this can influence all involved, from the technologists, to other staff members, to the students and, ultimately, the patients, who might not necessarily get the best care.

The students did notice and comment on how working within the other imaging modalities creates a different working atmosphere from that of the diagnostic technologists and radiologists. Some of the students (similar to the BCC second and first year cohorts) commented on how the particular technologists in sonography, or cardiac cath lab have a closer working relationship with the radiologists. For example S5 commented on how sonography and mammography technologists must be able to "read their own films and help the radiologists more," by giving information:

> "Ultrasound and mammography in particular, they are expected to be able to read their film and help the radiologists more, by giving them the information…Um and being able to make decisions on their own, you know its you don't always have the radiologists saying you know what you need to go back and x-ray this again. You know, you're just expected to know how to do that."

S8 shared similar comments regarding mammographers and why she considers them as professionals, and as at a higher occupational level than that of the diagnostic technologists.

> "I think because as a mammo tech you have to talk to the radiologist who read the mammo films. And you have to decide what x-ray views you have to take. Because radiologists they don't tell you. You have to see you have to check…you have to look up the previous films. You have to look up what doctor sign off, what do you need and decide what x-ray films you need."

To S5 and S8, the technologists who consult with the radiologists and make the decisions regarding what images (or even additional images) to obtain thereby grants the imaging modality technologists, as in mammographers and ultrasonographers the ability to make independent decisions. This fact in turn also has created a different working

environment with the radiologists, where their knowledge is respected and the

relationship with radiologists are based on confidence, respect and common ground, not

so much the "master to servant," as the students had commented on regarding the

interactions between diagnostic technologists and radiologists. What makes up

professionalism for some of these students is the ability for radiographers to make

decisions independent from radiologists. Also important is the action of working closely

with doctors, where the technologists are consulted and relied upon, as opposed to

diagnostic radiographers who cannot make decisions:

> "CT for most of the CT, they-they are kind of more professional but from outside like you close the door and * and from outside you see its a little more conventional because doctor can talk to them and ask them about their opinion. Like a new…doctors they even can…yeah they kind of ask the more experienced techs what do you find in the film?"

To some of the students, salary also had much to do with the issue of professionalism,

where a few students believed that the harder the work and more invasive the

procedures, the higher the salaries should be. For instance, S9 commented on the salaries

for CT and the cardiac cath lab:

> "I think CT should be paid less, they do have-they do CT is very good at the anatomy, but to me I just don't like it that much, um the procedures [cath lab] are harder. They are very hard to do and it's very hard to learn. It's very invasive you know your patients are lying on the table. I think being in that situation you should be paid more. I think it would make you work more, Maybe handle it more professionally. Uh not-not-not like people don't handle it well. You'll care more about the patient."

> According to S9, CT scanning technicians (where the procedures are less

invasive) should not be paid as well as cath lab technologists are, because the nature of

the work among the modalities differs. Additionally, and according to S9, higher pay

would be reflected in adequate patient care, and in the case of invasive procedures, the

remuneration should reflect the danger (high radiation exposure, invasive procedures)

and the degree of difficulty in such work, as in the cardiac cath lab. However, while S11

did think that radiographers should make higher pay, he did not think that higher pay

would bring adequate patient care. If the work demands consistent patient interaction

then it should command higher pay, and radiographers, who are in constant contact with

patients, should receive not only adequate pay but also good benefits:

> "Mmm, just by right now that I'm getting close to graduation I try to listen to
> what other techs have to say. I've heard a couple of techs say that their not
> satisfied with the, with the kind of benefits that they're getting. Also, this is not
> just from one tech. But even if you work at other departments you hear from
> nurses. So, sometimes you think about you know if I want to work at some place
> do I really, what should I consider? Also the benefits? Will I work at a place
> where I can really put my time into it, it is really influencing. But I just think that
> like diagnostic should be paid also like even higher, because they're more, they're
> more they interact more with the patients, more interaction with the patients.
> Basically let's say by the end of the day and almost like patient wise you get
> almost the same volume of patients."

Out of curiosity, I asked S11 if he thought there was a correlation between higher salaries

and better patient care. He responded, "no, because it should be like that, it should be

like that anyways, if you choose to work in a field, you should do your best, because

that's why your there."

Regarding professionalism and radiography, S7 commented that radiographers are

not considered professionals, and that it takes a bill to be signed in Congress for them to

be recognized as such:

> "I'm not sure that radiographers are considered professionals legally yet. I know
> there was a bill; they were trying to get papers signed for that, in order to
> recognize us as professionals, but naturally there is just so many of the
> nurses….just a lot of resources and they're just more respected. They think if

there's some nurses maybe like in ER they see you working maybe those people respect you, but as far as just nurses taking care of inpatients, they just like to see how are things done and you-they don't really care to help you or they just-they just see you coming in the door and press the button, but they are not in there watching what you do."

To S7, nurses are considered professionals and are the dominant medical profession. Unfortunately, according to S7, nurses and other medical professionals do not consider radiographers to be professionals, and it will take an act of signing a "legal" document to enable radiographers to become a recognized medical field, worthy of being described as a professional occupation.

The student S6 made similar comments about nurses being considered as professionals, and highly respected in the medical field, in particular when compared to radiographers. S6 commented that nurses are "high ranking," above radiographers, where he informed that nurses are, "much higher ranking. Yeah we get yell by nurse…" To S6, the act of nurses being able to "yell" or reprimand radiographers places them in a higher position in the medical spectrum. When I requested clarification towards this perspective, S6 informed me why he considers nurses to be higher ranking than radiographers:

"…because they have more authority. They um, they not only take care of patients, transport the patient you know and places like that, but right here they are more um, um how do you say um they are more in um…Po-potential in the treatment in the treatment planning, not the uh treatment itself. So um they-they-they use the-the according to the-the-the experience they can use the medication. And they can also doctors can use the medication and the doctors sometimes are rely on them to use the medication and so on and also they have uh uh they more at once is the diagnostic of uh um portion, because they ask a lot of questions. And uh they-they ask the questions that needs the history they have more understanding uh more understanding for the for the dis-the disease. Or they have the one according to the experience there the ones that look at the films we are not the ones that tell what's happening. And uh but they but we know but the nurse

it's the same thing they look at the general picture they know to arrange for the- for the um-um like the external fixation I guess...and they arrange that and the doctor do the same thing."

While at times complex in his explanations, the commentary S6 shared regarding nurses depicted nurses as those who are in the "front line" of patient care, and who ask the questions of patients to aid in determining the diagnosis, as they are more experienced in disease and pathology. According to S6, nurses do more than just the patient care, they aid in the next steps towards working with the patients to assist with their care and potential cure. The interesting point is that S6 considers nurses to be skilled in looking at radiographic films, and being vital players in the decision making process of "curing" or "fixing" patients, which is not in their scope of practice necessarily. However, to S6, nurses carry much responsibility, working closely with the doctors and the patients, vital aspects that put them in high-ranking positions over radiographers.

Interestingly, S6, in his observation of nurses and the higher ranking status, when compared to the role radiographers play in the medical arena, was not far from painting an accurate portrait of how closely nurses are accorded a higher status than radiographers. In truth, nurses, from their inception in the field, did become the "physician's eyes" (Sandelowski, 2000, p. 69), where this position established nurses as the "extra eye" of the physician, a critical position that elevated the status of nurses and placed them in a higher ranking position in accordance with physicians. The "close observation" of the patients afforded nurses "knowledge only nurses could possess by virtue of their constant presence at the bedside, and it was this privileged knowledge that physicians needed for accurate assessment and management of patient conditions" (Sandelowski, 2000, p. 69).

In respect, nurses, by virtue of their close positioning and alignment with patients, and the close observation, and continuous close care of the ill and injured afforded them a place in the medical hierarchical structure not so granted to radiographers, who, while they play a critical role in the diagnosis of patients, spend less time with the patients and did not establish their place alongside physicians as nurses did.

The subject of professionalism evoked thought provoking statements from the students, including the observations made towards the hierarchical structure where the nurses are above the radiographers. As professionalism brought forth much commentary, so to did salary, where the final interesting comments regarding salary were made by S10, who considered radiographers to be inadequately paid. According to S10, the work performed by radiographers is difficult, and highly physical labor that needs to and should bring higher wages. However, when S10 compared the physical diagnostic work to that of less physical, more mental, sit down type work associated with CT scanning, S10 remarked that these technologists should make higher salaries than those in diagnostic, and justified why:

> "Um I would say its ok-its okay. It could be better. I mean-I-I deserve it for training for the past two years. Its good pay, but you really have to work hard. I think in x-ray you do more-it more physically. And CT is more-it's more laid back. You don't do much physical work, but you have to know more, like terminology. Because you have to have more skills over in CT, just knowing, knowing your-the human body, more pathology, anatomy."

While radiography is the more physical work, such physical work should not command as much money as CT scanning. However, along with similar comments made by the BCC students regarding CT scanning, this "laid back" area requires technologist to

possess mental skills, thus justifying higher pay, with mental skills commanding higher salaries over the physical aspects of diagnostic radiography.

A common theme that emerged with all groups, from the BCC second and first year students to the ICC second and first year students was how interaction between the radiologists and radiographers occurred on a limited basis for those students training at the CR/DR radiography departments versus the conventional radiography departments. Out of the 10 students in the second year cohort, seven students mentioned either the differences between each group of radiologists who dictated radiographs/computerized images of the PACS, the nature of the interactions that did take place, and how there was a marked difference between the two types of departments. In essence, the students spent less time with the radiologists, a noticeable difference in their ability to learn from interacting with the radiologists. For example, S7 trained at a CR/DR department and then transferred to a conventional facility, where establishment of a working relationship with the doctors occurred as they interacted on a more frequent basis:

> "I get along with the doctors great. Um if its not there, I'm trying to compare procedures with where I am. You don't see the doctor's that often, you send everything through the computer. You don't know many of the doctors by name because they have so many doctors. Versus where now, even though they are going to get PACS in the next year, it's like you already have the relationship with the doctors and our doctors are very friendly here. They're very, very friendly."

S9 trained also at two different imaging type hospitals, and discussed the differences, explaining how the procedures for sharing the radiographs or images with the radiologists took place at each facility, with "Cedars" being the digital department:

> "I get to talk to them more, got to work with them more. Not at Cedars. At-at Venice they show you what, they will talk to you whenever you need to talk to

them or…I don't think I got along more than with the radiologists at Venice than at Cedars, because um in digi-its part of the digital or something, because in digital you could just send you can send it to where they [radiologists/images] are at, while in x-ray you have to take them the x-ray to communicate what you did or what you're going to do not-not in Cedars, not like that. I'm not trying to put down Cedars, I like Cedars a lot. Its just, it doesn't work for me."

For the remaining five students in the second year cohort who had commented on the infrequent interactions among doctors with technologists/students, they each stated similar points. They had recognized noticeable differences in the relationship between radiologists and technologists/students, and how this relationship has been altered by the technology. With the changed technology, the ability to learn about valuable pathology on radiographs from the radiologists, an ability that aided in helping students to develop skills in discovering pathological issues on radiographs has faded away.

Worth noting again, clearly this new technology is altering the interactions between radiographers and radiologists, correlating largely to what Barley (1986) proposed, that technology "might occasion different organizational structures" by altering roles and interactions between radiographers and radiologists (Barley, 1982). The implementation of CR/DR has begun to challenge traditional role relations among radiologists and radiographers by altering the nature of interactions between radiographers and radiologists. A deeper division has been created within the working relationship among radiographers and radiologists, as with PACS, it is no longer necessary to hand deliver radiographs to the radiologist for review and guidance. Mentioned previously, "teleradiology" is changing the nature of imaging, where radiologists now have the ability interpret radiographic images from their homes (Harvey, 2006). Unfortunately for the radiographers and students, radiologists will most likely

become scare within imaging departments, and the labor divisions within diagnostic

imaging will become more pronounced then the existing structure.

Moving away from technology creating change, there were four distinct themes

discussed by S6, S5, S1 and S8. The first theme was of closure encountered by S6 based

on what he considered a language barrier that would not allow him to train in special

procedures/cardiac catheterization:

> "…Difficulty for me is you know the language. Yeah because I-I-I'm not that
> good enough to-to react when the doctor tell me quick that-I-I need more training
> if I-I-I-I doing very good like them. I think I-I need more training. Not just the
> thing the American not that bad want to give they-they want they quick. Yeah.
> Yeah. So I think there-there-there's is some kind of restriction for me, but-but I
> don't know-I don't know. Maybe I go for it, but I compare if the doctor say
> something to me not that clear or a little bit quicker maybe I can-I can figure it
> out, and this is what they need because they need to be quick and…they need to
> be quick yeah and they need to be quick because there is a um very dangerous
> procedures. Sometimes the patients need that, that is the thing that uh I cannot
> get."

To S6 a closure mechanism is in place unless his language skills strengthen, as with the

cardiac catheterization imaging modality. Such work demands quick responses based on

the level of risk and danger to the patients. S6 sensed a restriction to entering this

modality based on language.

In addition to this form of closure, a second closure mechanism was noticed,

regarding gender and women in leadership positions. S5 commented on how not many

women work in lead technologists positions, based on what she has witnessed during her

training:

> "It would be nice to see more women in lead positions. See more women in lead
> positions. Because um men are typically stronger. They get more experience in
> more areas. And they're capable of manipulating patients more. Typically they're
> not as uh, I don't believe this, but people believe that they're not as emotional.

> Women are more emotional. Women have, you know, children to contend with and they're typically the ones that take off to go take care of those children and uh, yeah it makes it sound stereotypical, but it's still the same unfortunately, and the extra reliability. I don't think that's always the case."

S5 then shared her observations of the ratio of male to female technologists throughout the imaging department at her facility:

> "Well I mean there's females [mammography] over there, but the males dominant angio, they dominate surgery, well I see some females in MRI, in CT and x-ray, but I see males dominating ER. And I actually had someone tell me that they would not, they do not want to hire another woman in their department because they hired a woman and they had a bad experience with her. She did not-she didn't want to come in on her time off like come in early or stay late because…It was I'm trying to think, this was in the ER."

While this field is feminized, the point is where are the females concentrated in comparison to the male technologists, As S5 observed, a higher concentration of males are in lead role positions and women are in diagnostic and mammography. This pattern is consistent with the ASRT survey data where statistics reveal more males working in the highly technical/higher paying imaging areas versus more women working in mammography or diagnostic radiography, two "high touch" imaging areas (ASRT 2001; ASRT 2004).

Interestingly, a striking view emerged about the nature of the work in diagnostic and how this work is not being considered by two students to be the "proper work environment" for women. This view was because the work is difficult and extremely physical labor where "women are not as strong as males." Thus women should not work in diagnostic. The students S1 and S8 commented on the difficult nature of diagnostic, and did not consider this a proper environment for women. That is one of the reasons (among others) that S1 elected to train and work in mammography:

"If I'm trying to find a job with mammography, you know, I have a spend my time to search around. Okay. Um did you-did you choose mammography because, the pay. I was told there's a four-around a four-dollar difference, and its kind of for you know for all female. You know we are not strong as uh male. Do you agree with me? Yeah so its kind of mammography is a kind of more opportunity job opportunity and uh you know because diagnostic is kind of sometimes needs a more physical its kind of physical work. Its more physical right."

S8 considered diagnostic radiography not to be a proper place for women to work. She indicated how the nature of the work is certain to be difficult for her, with heavy equipment, and heavy patients, justifying why many technologists are male:

"…now I understand why techs the lots of techs here are male. I think um honestly as a x-ray tech it's not a good profession for the female. Um I don't know I just feel that um how okay machine is heavy. Tube is heavy, even though patient is heavy, and like me I'm petite. For me it's hard to move the patient. Tube is okay you know. And they sometimes part of the machine like I'll stop if part of the machine is heavy. Yes. (laughs) Part of it is heavy and especially when you are doing in like uh ER or like ICU, CCU patient. You have to lift up the patient by yourself and one hand on the patient and one hand on the cassette. If like patient I mean if like tech like me it's hard to do all by yourself."

To S8, the majority of the male techs she has witnessed working in diagnostic are male. However, this does not fit with the national pattern. The profession is made up of 77 percent females (ASRT, 2004). Working in diagnostic, 51 percent of them are women (ASRT, 2004).

<p style="text-align:center">Conclusion</p>

The findings from the ICC second year cohort revealed some unique points, in particular when the female students discussed mammography. For S1, S7, and S8, they commented during the interviews how they wanted to advance into mammography, not necessarily based on the preconceived notion that they would be "forced" to do mammography because they are "as females," or that they should enroll in the

mammography class because the student numbers were needed in order to justify starting

a mammography class. These females expressed their interest in mammography to be

based on the "special" patient care/needs and type of work associated with this imaging

modality. This is a key, as mammography is a profession that is primarily short staffed,

yet carries high patient volume, and there is always work. However, with short staffing,

new graduates do not often flock to mammography because of the rigorous requirements

to be met to become certified, this is often a discouraging factor. Additionally, the nature

of the work ("close" and "redundant" imaging of female anatomy) seems to make women

shy away from this modality, as evidenced by the commentary the BCC female students

shared.

From the dialog with the ICC students, there were some discernable similarities

between the cohorts, where occupational mobility was important to these students, as

well as the flexible schedules, in particular imaging specialty areas that allow for time to

be spent with their families. However, these students revealed a seemingly different

sense of family and patient care values from the BCC second and first year cohort, or

were, perhaps, more vocal about such values. It is not to say necessarily that the other

students do not hold similar values; they just did not reveal them.

What was also revealed in this cohort was the effect of faculty influence, in terms

of teaching these students patient care skills and work ethics. S3, for example,

commented on the positive influence from the program director. By contrast, the BCC

first year students had been influenced and confused by the negative perspectives of a

faculty member regarding the professional nature of the field they were going to soon enter.

Findings – ICC First Year Students

Introduction

The ICC first year cohort demonstrated some surprising themes, and represented a distinctive group of people, with two of the students, (F3 and F6), being in their early fifties. Out of this group, five students expressed interest in radiation therapy; regardless of the often-negative depiction of this imaging profession all students in the group had positive and respectful comments towards the faculty and the program for ICC. These students shared similarities with the other students in the BCC and ICC second year cohorts. In particular, they shared common themes with the BCC first year students in terms of lack of knowledge about other imaging modalities. However, a distinct difference did emerge. These students were not impacted by any particular faculty member who issued negative comments regarding radiographers as professionals. These students did, on their own reconnaissance and at this early stage in their training, comment on the treatment of radiographers from the radiologists and nurses. They noticed how there was an uneven balance, with radiographers seemingly on the bottom rung of the ladder. In their words, these medical staff members were always "getting yelled at."

Employment Ability and Upward Mobility

Upward and occupational mobility emerged as a theme for the ICC first year cohort, with a number of the students commenting on how they desired to earn good

money and have the ability to move into different imaging modalities. For example, F1

entered radiography with the goal of moving into radiation therapy, and stated that he

entered radiography, as a degree in radiography was needed in order to enter the radiation

therapy program:

> "…I have a bachelors degree in journalism actually and I was so drained with that field. I was in TV actually. So we started talking and he said why don't you become a radiation therapist. And I did not know what that was actually to tell you the truth and he told me what they did and I will admit that the pay sounded really good. Apparently there is a big shortage of them and that is why the pay is high. So that is what I wanted to do….but I did not have the money to move up there so I decided to see what my options were down here in Southern California and I found out that City of Hope has a one year program, but in order to be in their program you have to be a rad tech first."

For F1, radiography is the "stepping stone" to radiation therapy and he confessed that he

did not plan on staying in radiography for long, "To be honest with you I have no plans

of doing x-rays for more than probably two years, two to three years." Similar to F1, F6,

considered radiography a "stepping stone," and commented:

> "…It's a stepping stone. If I want to go, as I said I do want to go beyond, as time goes by and depending on how my skills develop, so this would be a good foundation too, to go beyond into something."

Both F1 and F6, commented that radiography presents the opportunity to advance in to

other imaging modalities. Two other students, F4 and F7, considered radiography as the

foundation or stepping-stone to the imaging modalities, offering occupational mobility

and the geographic flexibility. For example, F4 commented:

> "I like how I can basically go anywhere and some people say I don't do this and if you have the right attitude and you have the right degrees then its probably good and it makes you confident and, and that's about it."

To F4, the more imaging skills and "degrees" one acquires will bring opportunity and freedom of occupational movement. For F4, radiography provides her with the ability to "go basically anywhere," given the skills, and right attitude, and for F7, she remarked on how radiography consists of "so many different modalities" thus providing her with the opportunity to "move up." And similar to F1, F7 planned to work within diagnostic for up to a year, before entering school for radiation therapy:

> "And also I kind of-I really liked about this career is that there are many opportunities to move up. There is so many different modalities like MRI and ultrasound and radiation therapy, which is what I really want to do, so I plan to do radiography for about a year and then go back to school and try radiation therapy. I like the idea of working with cancer patients."

> F9 considered radiography as a "career" where he will be able to secure

employment "forever." He remarked how radiography provides a stable and available "career path." Where radiographers are marketable and in constant demand:

> "You know, the career is always going to be there. There-there is no such thing as 'we don't need you anymore.' So it's more like a like a career path whereas it can go on forever."

In addition to occupational and geographic mobility, with the ability to consistently secure work, radiography was considered by F3 to provide a "comfortable" living with "reasonable hours." This was in contrast to nursing, where the hours are "way too long," or to being a doctor, which required too much time and money to invest in one's career:

> "I did not want to be a doctor. I certainly can't be a doctor. I don't have the time or the financial means to do that. I wanted a career where I thought I could at least earn as much money as I was earning before, or enough money to be comfortable and work reasonable hours. I did not want to do nursing because the hours are way too long, doing 12 hours shifts as a nurse."

However, for this cohort, the lure of money or occupational flexibility/mobility was not necessarily the deciding factor in entering radiography. Indeed it was mentioned only briefly if at all. When asked why they entered this field, the majority of them were influenced by family members and friends to enter radiography. The family members and friends were employed in the medical field or in radiography, and advised these students to pursue radiography. For example, F9 decided to enter radiography based on the advice from friend who works as a radiographer, who gave him "…a little advice. Here, try this field to see how you like it." Family members who are nurses, as in F8, or a spouse who trained as a physician in a foreign country, as with F6, influenced other students:

> "My second wife is a doctor, as a matter of fact she's a full fledged doctor. She can't practice here because of the language. So she needs to go get her apprentice, we're going through the process…Hopefully that will work out. Well even a PA, I mean something she can use for her. In that her being in the medical field has helped me complete this program."

For this first year cohort, while monetary gain, stability and occupation growth were mentioned as influencing factors for entrance into the program, the students were influenced by others already employed within the medical field. Additionally, three students (F5, F6, F7) commented on the patients throughout the interviews, expressing points about patient treatment, working closely with patients, and coping with illness, disease and injured children. For this first year cohort seven students out of the ten expressed strong patient care values, and a pattern emerged reminiscent of   the ICC second year cohort, who commented on their patients frequently throughout the

interviews, demonstrating strong patient care values not entirely matched by the BCC

second and first year cohorts.

<div align="center">Patient Care Skills and Nursing</div>

As mentioned, seven out of the ten students expressed strong patient care values

throughout the interviews, demonstrating their care and concern for, and their empathy

and sensitivity towards, the patients. In particular, three students F5, F6 and F7,

mentioned patients frequently, regardless of the topic. For example, at the start of the

interview with F5, a discussion about patient care ensued from our conversation about her

life and outside interests, where she worked as a medical receptionist at small clinic. She

discussed handling the patients and how rewarding it can be when the patients respond

positively when they have been assisted. F5 expressed frustration when the patients will

request results that she is not authorized to give and they have difficulty obtaining:

> "…It gets difficult, you know, when their grumpy it's like they don't want to be
> there, they're sick, they're tired, you know, they just want to be anywhere else but
> the hospital, so it's…the anxiety of like getting your results and stuff, all that. I
> do work in the radiology department, so, um, there…you know, patients, as soon
> as their exam is done they're like 'when can I can I get my result and will the
> doctor call me' and…can I call you for my results and it's like, you have to say
> 'no because your not authorized you have to call your doctor' and some times
> they get such a hard time trying to get a hold of their you know, physician to get
> the results…and you do your best to try to help them out and um I guess because
> I've been there and I've seen them sick. I-I already know how that can help and
> how I can help them. Like, even though I can't give them verbally the results,
> who the person is that they need to speak to- to get it and it's better than most who
> push them away."

F5 attempted to describe the process for patients undergoing exams from their

perspective, and explained how it is rewarding to her when she can help the patients

obtain their results from radiographic exams through her assistance in contacting the

physicians for the patients. She also commented on how when the patients are not

assisted or responded to by the physicians, this is a source of frustration for her and the

staff:

> "…you know it does affect us as well, you know, it frustrates us to-to know that a
> patients going through that. But you know you don't want to give that department
> or your-your company a bad rap, you know it's like you wanna um, make sure
> that every time they come to you or your department that your able to help them,
> you know."

From F5 and this group of students, there emerged sensitivity towards the patients and

sensitivity towards the pain and discomfort the patient's experience. Some students

spoke of how they placed themselves in the shoes of their patients and would "try to

empathize with them," as with F3:

> "…Even though I am student you still are in the same level as women and
> parents. I have a lot of compassion for these people who come in, I mean getting
> old is a bitch…"

F6 expressed similar comments about being empathetic towards his patients:

> "At least I'm treating them right. Um, I try to empathize with them, like I said I
> try to, I come in and they're in pain, and so rather than just saying you know 'this
> is so and so I need' and I try to explain to them what I'm going to do. Um…the
> request is for shoulder and what did you do to your shoulder? 'Oh I fell and
> landed on it.' 'Okay which side hurts more? The backside or the front side' and so
> and while I'm preparing I listen to them, I try to listen to them. And then I say
> 'okay well I'm going to move it so but if you feel, I don't want to hurt you, so if
> you feel you could move it in just the position I want'."

F6 recreated his interaction with a patient, to demonstrate how he attempted to work with

them without inducing further injury. His sensitivity towards the needs of his patients

was genuine and not commonplace when compared to the BCC second and first year

cohort. In addition to revealing his empathetic nature towards the patients, F6 expressed

concern towards radiating his patients, as opposed to commenting on concern with the

radiation towards himself. To F6, radiating his patients presented a negative and a

positive. On the one hand radiation is harmful. However, on the other hand it is essential

to achieve a diagnosis of the injury.

> "Um, the fact for one thing, the benefits that you-that you give to people by taking radiography. Because when you think of radiograph, okay you've got a broken hand. But there's more to it then that. You-you have a broken hand, you're looking for a fracture of the-of the third uh, finger. And then you find that there's another fracture in the fourth meta-carpal on the medial side. Well, if I had not taken that radiograph this person may have grabbed something and made this worse. So yeah I'm radiating a person. But who knows, you know it may be beneficial down the line."

For F6, concern about the well being of his patients was presented as paramount in his

training progress, to the point where he commented on keeping in check his emotions and

sensitivity towards injured patients, children in particular:

> "…I saw two children in the hospital. The hardest thing for me was. I mean I'm like I think maybe I'll get calloused as time goes by but it's difficult…Inside I was like uh, I-I went ahead and did the procedure. But inside I was just like ahh…I think it's just that I-I what I need to do is I need to maybe be a, get a little insensitive, not to much because you don't want to lose sight. But-but not be so-so consumed within me and I-I try not to show it. But inside it's like, I want to somehow make it right. You know, and obviously that always isn't impossible. But you know I have to watch that I don't go overboard on that. I have to say okay you know, I can only do so much. So I'm doing the best the best I can to help this person and then somebody else can take over and do the rest."

With F6, his concern and sensitivity is reminiscent of the female second year ICC

students in their discussion of mammography and how such exams should evoke

sensitivity, empathy, care and concern toward the patients. F6 explained how seeing

injured children stirred his emotions, yet he needed to maintain his composure in order to

obtain the images, creating a dichotomy of sorts. He had to harden his emotions in order

to get the job done, contrary to his sensitivity and concern, which could hinder his ability

to achieve the images needed. In relaying his radiography "stories," F6 demonstrated a

personal side that many of the other students did not reveal during the interviews.

While F6 discussed how injury could stir up emotions, one student, F1, whose

future goal lies in the pursuit of radiation therapy discussed how injured and very sick

geriatric patients depressed him, and he considered dropping the program:

> "I actually considered quitting the program. Again, I did not know what the job
> involved. I did not know how physically demanding it was. I was actually a little
> depressed dealing with the patients. It was like, oh no I want to be a therapist this
> can't happen. If I can't handle the hard situations then what about a person dying
> of cancer or whatever…just seeing them in pain and I guess maybe I saw a lot of
> old people that reminded me of my grandparents or something and that really
> affected me. I guess dealing with middle aged people because my parents are
> now in their 60s and some of them even reminded me of my parents."

However, for F1, there emerged an awareness of what comprised the bulk of the job,

dealing with sick individuals who reminded him of his middle-aged parents. This

awareness called his attention to the fact that if his goal is to work in radiation therapy, he

would have to be able to handle seeing patients in pain if he desired to achieve his goals.

He expressed how he would have to learn to handle difficult and hard situations where

people will "die from cancer."

This level of sensitivity was not evident in all of the students. However, to some

degree, each student conveyed some aspect of patient care values and empathetic actions

or behavior towards their patients. Throughout the interviews with this cohort, the

students mentioned how they treat their patients or how patients should be treated, as

with F9, who had received advice from his friend, a former student from the ICC

program now working in diagnostic:

> "…He said that you know you had to be good with patients and that you have to have good patient rapport. A lot of good understanding of how they feel. You just can't go in and not-not-you can't just deal with the patient than you can't do this field, and the rest is just you know, you just have to learn hands on."

F9 was informed how the field consists of understanding and comprehension of the patients, where establishing a rapport with the patients is paramount. One cannot just enter the program/profession without some common knowledge towards what the occupation is comprised of. Similar to F9, F10 received some lessons regarding how radiography is about patient care. She commented on how she learned this information from the Program Director of the ICC program:

> "Um I like everything about it. Every case is different, every patient is different. You can talk them into doing it, doing the positions on them and its rough then you have to do it another way…you don't want-you know we don't just care about taking the x-ray and moving on to the next patient it's also patient care. It's like with Ms _____, is, the first thing is when you come into her class is patient care."

In addition to the Program Director, F10, acquired some of her patient care values from the new graduates of the program, during the times that she would work alongside them:

> "Um we have a recent graduate, she works hand in hand with us. And when I'm in the ER and the ER manager is also there to guide us and I-I'd say that yeah as far as that. I mean the new graduates are the most helpful."

Three students in the program (F2, F4 and F7) shared how they like "working with people" and conveyed a common attitude that patients must be cared for, and the patient care aspect of the program/profession exists. F2 stated that he has learned from the patients about illness, and this in turn has helped him to understand his own family members undergoing physical changes associated with age:

> "I like to work with people. My mother is sick also. So it helps me to understand more. It is not really sick but I think it is the age factor. She thinks that she is

sick and she is not really sick. I notice that, I take her to so many doctors, back in the Philippines and over here and there is no such thing. I try to find out and figure out how to see more of the patient out there because they see a lot of experience out there to keep learning and adapt and try to help."

F7 expressed how working with the patients and how treating patients on a "specialized" and "individual" basis brings memorable rewards:

"…I like working with people. I love patient care. I like because everybody has been in the hospital and they don't like to be treated like your just another case or another patient and it's so nice when its more than what you have, especially older ladies and men. They like give you big hugs because they are thanking you so much for making it so much easier for me. I just-I like to remember that."

F4 expressed how she will complete the patient "cases," where others, including the staff technologists, will take breaks or not attempt to complete the exams. Although she does not care for the other technologists "putting their jobs" on her, inadvertently she does not have issues with being the student there to complete the work and attend to patients:

"I like caring for people….Um people not putting their jobs on me while they go have a cigarette and how they or go talk to their friends or going to lunch or something like that and….I don't mind working, but if I see you know a patient up front and nobody wants it, I don't mind getting it…"

The issue of students completing imaging exams has been mentioned throughout the cohorts. Of interest is the fact that this particular student did not seem to have issues with completing the exams while others took breaks. By contrast, the BCC second year and ICC second year students did resent this, complaining that the burden of the cases was placed on them, a burden they were not willing to shoulder.

In conclusion, the students in this cohort trained at medical facilities where patients were ill, needed to be moved, and the like. In essence, the ICC first year cohort expressed an advanced awareness toward nature of radiography, where it is not merely

about technology, imaging, occupational stability and mobility, but, rather, that the profession is a high touch, patient centered/patient focused field. Moreover, and in some respects, these students entered into the program with pre-conceived notions about the profession learned from other family members and friends, and they were also heavily influenced on patient care principles from their instructors.

<div align="center">Changing Technology – The Benefits and Pitfalls</div>

The ICC first year cohort were in awe of the burgeoning technology. Not all students believed that CR/DR was a "handicap" in the learning process, in contrast to the ICC second year cohort and BCC. Two students (F4 and F8) remarked that the transition from CR/DR to learning conventional would be difficult. A third student commented on how learning conventional is a benefit because digital is "very easy to learn." For example, F7 stated that digital was "so easy it's just push a button and it's done," while conventional will "benefit" her more based on being more complex, in particular where "techniques" are concerned. F4 said that her fellow students are "terrified to not go to digital," as they did not "know conventional," and had, at this point in their educational progress, trained only on digital. For F8, the facility he trained at is well known for its modernized technology, with the digital imaging:

> "…it's really advanced and I'm very glad to be there, you know, working in a place that is really state of the art. I think it's very nice. I think that people would love to have, if money wasn't an issue, I think that people would just love to jump into digital. For me personally it's easier to learn, I will be able to do both right…I mean there is still some questions in my mind. My next semester I'm going to rotate and I know that I am going to rotate to a place where they have both conventional and uh technology. And I still have questions about that, but I know that um developing my skills is that they're protocol I guess is what I'm worried about, not digital."

For F8, it was not the transition from digital to conventional that concerned him regarding the learning process. Rather it was the comprehension of the hospital protocols for the imaging exams that he was worried about. Echoing F8, the other students in the cohort commented on how the technology is state of the art and "incredible." For example, F6 commented on viewing a mobile fluoroscopy surgical procedure (C-arm):

> "I'm amazed, some of the new equipment they use, it's just uh, and I had a chance to see a C-arm yesterday, for the first time in actual surgery, and I think they did twenty-six seconds in all, total, over a period of over an hour and a half, but it was just; you know you read about it in books, and it's nice but when you actually see it…and then I had another opportunity to see a catho [cardiac catheterization], where they were inserting contrast medium into the coronary artery, I could see the heart moving and pumping, as the contrast medium is going through the coronary artery. I was like a little kid going, 'wow' it's incredible and the things that you can see. And you can record it and bring it and send it across the country to Dr. Jones over there who wants to see it."

The technology held a fascination for F6, as it did for the other students, F2, F3, F9, F10 who shared in the opinion that the technology was state-of-the-art, "great," and not difficult to learn. F9 felt that the digital equipment reduced the wait time for the patients and was a benefit for both patients and technologists:

> "The technology is great, I mean. I wish-I wish, yeah, I wish every facility has digital. I mean it makes it more easier. It cuts off the time to do each patient, Oh yeah time to do patient or you don't have to ask patient. Just give me a few minutes and I'll check all your films while on digital. It just scans by itself and as you do the patient it comes up and you know if you did it right or not…it benefits the tech also."

F2 believe that the CR aided her learning process by allowing for the immediate visualization of the radiographic images and related the classroom material to the x-ray "camera." Again, like the other students, F2 did not comment that the CR was complicated to grasp:

"…right now at Cedar we are digital and filmless. I like it very much because I can work and relate everything that I have before and put it to help me and helps my knowledge about how to take a picture. I see it like a camera before but it is more like it goes through to it. So you see a better picture, either way you have to angle your camera better."

F3 considered radiography as an art form, where imaging the body is comparable to "understanding a good painting," the achievement of a good radiograph is the goal, and the process of achieving this goal is, to her, an art:

"The whole imaging thing appealed to me. Maybe it is art side of it. There is a lot of art involved in radiology and understanding how to achieve a good radiograph is like understanding a good painting. There are those layers of things that you have to pull apart and look at and there is a whole process involved in it. So I like process."

Overall, the majority of students in the BCC and ICC cohorts did not consider the latest digital technology to be complicated to understand. However, two students, F6, and F3, did state that the technology was difficult to grasp at first and presented with a learning curve early on in their progress based on how much there really is to comprehend in the beginning for new students with no medical experience. In a sense, it was not so much that the technology was difficult to comprehend, but, rather, that there was so much to focus on during the entire process, as in patients, protocols, working with different technologists, learning the systems of the hospitals, and so forth. F6 indicated that learning the technology had been made more complicated in the sense of grasping all that there is to know in the beginning, and exactly what to focus on in during the learning process:

"Some of it, not, yeah some of it has been [complicated] only because I-I regret not having done, um volunteer work prior to stepping into this. I mean for me it was difficult at first, I mean here I am, and why are you doing that for? I mean literally…and what else do I write down? The room is pink and then I go home

and I figure out which makes sense and which doesn't make sense? Which do I
need? So for me that was difficult. Had I had some prior tech experience…but
um, live and learn."

To F6, the learning curve would have been reduced had he completed some volunteer

work in a radiography department prior to the whole process of learning the nuances and

components of the profession. In accordance with her classmate, F3 shared a similar

perspective regarding the technology and the learning curve created by training in an

alien environment:

"I am still confused by it. It has not clicked in my mind, but the approach towards
the whole process and that is the point that I am at right now as a student, as a first
year student. I am not that knowledgeable yet. I just think it is very challenging
and you have to really focus on that is where all the education comes in, the first
semester we don't really spend much time on that."

Thus, what can be learned from the ICC first year cohort is that whether the

technology is conventional or the easier, state of the art CR/DR, learning the technology

is still difficult, in particular when students do not have any former medical background

or conducted volunteer work in radiography. For these students, they did not raise some

of the issues that emerged for the BCC second and first year students, who indicated how

the learning curve from digital to conventional exists. The ICC first year students

encountered learning curves within the hospital environment itself, coupled with that of

learning the technological concepts

Additionally, the ICC first year cohort did not have much negativity to share

regarding the "dummying-down" of the profession, and how CR/DR is "push-button"

technology. The students were much more optimistic as to how the technology is

changing the face of imaging, and from their perspective, changing the nature of the industry for the better.

<div align="center">The Pressure To Perform</div>

The ICC first year cohort, as this early stage in their training, sensed pressure to complete the exams because they were the students and were expected to learn. In addition to the pressure to conduct the work while the technologists would "smoke cigarettes" or "take breaks," an older student, F3, sensed, as she described it a pressure placed on her to "know information" because of her age. In other words, F3 remarked how the patients look to her for knowledge, skills and information because she is older and therefore inadvertently placed in an advanced position:

> "…I can identify with so many people. Of course it has its advantages and disadvantages. Patients look to me when I don't know what is going on because they assume that I am older and I know what it is…the expectations that the clinical instructors have is much higher of me than they are of the other students."

With F3, because there is the age difference, the clinical instructors in the externship site have higher expectations of her then the other students, creating an added pressure as she is at the same level as the other students.

The fact that students are utilized to their fullest potential has been commented on by the BCC and ICC second year cohort, as well as four students in this cohort. However, these four students consider the fact that they are expected to complete "all of the exams" as a method for the hospital management to utilize them as "cheap" or "free" labor. It creates stress for these students as they are in the early stages of training. In truth, these students should not complete exams unsupervised, as this can be dangerous to both student and patient because of repeat rates and accidents. Furthermore, in

accordance with the Joint Review Committee on Education in Radiologic Technology

(JRCERT) standards, students who have not completed "competency examinations"

cannot conduct such exams without being directly supervised (JRCERT, 2002). Once the

competency has been achieved, then students advance toward indirect supervision

(JRCERT, 2002). California state radiography mandates also state that students may not

conduct repeat exams without proper supervision, and cannot train without there being

adequate staff on duty to supervise any amount of students during clinical training hours

(Radiologic Health Branch, 1983).

The students confessed that they did not appreciate this aspect of their training,

and considered this as a negative. For example, F5 was reluctant to comment that she is

"cheap labor" out of fear of retribution:

> "…I don't know I don't what to tell you! Don't want to get into trouble, because
> it has been negative in clinical and here at school. You know, it's like it's been in
> both areas. I guess in clinical it is more like I don't know if it was a
> misunderstanding but I felt like cheap labor. I really did. I really was, I was like it
> wasn't like I was there and someone was teaching me it was like, I was thrown in
> to the-to the mix of like being an employee. You know and the type of person
> that I am it's like, I don't like beg for people to help me it's like if you want to
> help me out of the goodness of your heart than I will completely appreciate it.
> And if I notice that you're the type of person that just doesn't want me in your
> way. You know I will stay out of your hair."

For F5, it was difficult to find assistance when needed. In fact the assistance was not

readily available coupled with the fact that she was "thrown" into the employee mix. She

felt this was a negative component of her training. She remarked how the majority of the

technologists, regardless of the patient caseload, were not willing to help out, with the

exception of those technologists at the in-patient side of the facility versus the outpatient

side:

"…The thing was is that where I was is pretty much everybody was like that. Yeah, you had your good people but where I was-was kind of split so you like one side where it's outpatient-inpatient hospital. But inpatient wasn't that busy. Yet, you had the people there that wanted to help you. So you didn't have the volume but you had the help. At the outpatient you had people that kind of just wanted you to do all the work while they sat down, had their cup of coffee, and read the newspaper. You had the volume and you had the cases that you really wanted to learn and in some aspects it was good because it like forced you to learn and forced you to do things."

Ultimately, F5 was "forced" to complete the exams and thus learned from the experience.

This did in fact, according to her, assist her in the training aspect, as it did for F10, who

experienced something similar:

"…Just the fact that, just because I'm a student I think sometimes they love, techs like to take advantage of it. Oh well they give it to the students. They're lazy. I can't say that to all because some-I have been in a new environment where everything was teamwork, but I don't think its teamwork there, and I would say more male than females, but it all depends on the time. I don't know what it's like on…the second or the third shift. I don't know what it's like, because they know they can get away with it, so they know that they can trust us."

I then inquired as to whether F10 appreciated the fact that the technologists trust the

students to complete the exams and F10 responded:

"Uh well yeah that I do, but sometimes I just want to go to um like a water break or something, I want to just * just give me one minute you know or let me sit for one minute you know. You've been sitting there all day. I mean it does help me, the more work I do the more experience I get, but, some of the techs, they, the positive part of it they actually they sit, like our clinical instructor they actually explain things. I wish he was part of the-I wish he was a tech there all of the time than you know he would explain things little by little if you can do it this way, do it this way and if it's not possible try another way or he would show it to us and then tell us why you would use this versus this. I mean he just great."

While it was a positive for her learning process, there was still the negative aspect of the

fact that when explanation and assistance was needed, F10 could not find that, except

with the clinical instructor, who was willing to assist, explain and give information all to

aid in the learning process. However, according to F10, the clinical instructor was not

available at all times, creating an environment of self learning, where this is not always

helpful for students in training, in particular for those students who need more guidance.

The last two students, F4 and F8, commented on how the technologists will put

the work on the students and "take breaks," or simply assume the students will do the

exams:

> "I guess it just applies to every work situation where some people are taking
> advantage of us students (laughs) for working. But I don't know, that's the only
> thing that I can find that is you know…Uh I am actually at a big hospital actually,
> I guess-I guess they can besides from them saying-it's just the fact that they're
> teaching us that they thought-they think that maybe they can let us work and also
> the fact that we can actually do as much work as the techs are doing. Um when
> they see a case coming, they assume right away that you'll do it."

 For F8, he also mentioned how students experience "forced learning," where they are

taken of advantage by the technologists, to complete the patient caseload. There is a

general assumption among the technologists that students will complete the work

because they are students and only "learn by doing," however, this is not true. . Yet, for

F8 he looked upon his own ability to be worthy of and at the level of the technologists.

As a student in an early stage of training, F8 commented on how he can perform as much

work as the technologists do ,   Yet, this can be a negative for other students who are not

as independent and confident at this stage in their educational training.

In conclusion, what is lacking from the dialog is the sense of teamwork. While

the student might learn from the "forced learning" method, being "thrown into the fray"

is not conducive to training, necessarily.   The important point to stress is that students

are training on injured and ill patients, while simultaneously learning how to

administering ionizing radiation. The pressure to complete the exams coupled with the administration of radiation to injured/ill patients creates a learning curve that comes with pressure to acquire the radiographs correctly from the outset in order to not have repeat radiographs (and higher radiation dosages), accompanied by the stress of not re-injuring the patients, and also the hardship to get the exams accomplished as quickly as possible. Students need guidance, mentoring, instruction and supervision in their early stages of t not to be utilized as "cheap labor."

<u>The Future, Professionalism and the Hierarchical Structure Revealed</u>

Once again, and specifically with this group of students, the turning point in the interviews occurred during discussions regarding professionalism, students and technologists working with radiologists, and the work performed in the imaging modalities. In particular, the of the ICC first year students captured the essence of the literature, as if these students had read the case studies from Larkin (1983) on the history of radiography, and the changes to nature of the field based on physician control of the occupational parameters.

Such discussions on the relationship between radiographers and radiologists occurred when questions regarding perceptions on what the salary ranges for radiographers were asked, where such discussions of salaries more often than not led to talks of ill-tempered radiologists who "yell,"   treat the radiographers poorly, and address them unprofessionally A number of the students noticed and remarked on how the radiographers were often mistreated when the radiologists would address the staff technologists in a derogatory manner throughout. Furthermore, the students commented

on how the nature of the work is difficult and how the salary should compensate for this.

As first year students, a number of them sensed a definite hierarchical structure where

those technologists working within the diagnostic realm were placed at the "bottom rung"

of the organizational ladder. For example, in response to the interview questions "what

would you consider to be a good day as a technologist," the resulting commentary from

F1 spurred a discussion about the poor and disrespectful treatment of radiographers:

> "A good day would be getting along with your coworkers. I noticed that there are
> some, but then again I guess it is true about every job. Another thing that I find
> interesting about the hospital. I noticed it…and it has been my observation
> anyway that radiation technologists are kind of low on the ladder. A lot of yelling
> involved, which I never experienced before."

I then inquired, "a lot of yelling between who?"

> "There is one difficult tech who is just an [slang] and then radiologists. It seems
> they are allowed to yell. If this were any other company I would be reporting to
> HR. I look at the way the techs interact with radiologists and seems they just take
> it. Is that right or should you not be going to HR? Again, it seems they just have
> to take what the radiologists say. Like if they are yelling, it is like why won't say
> something. You are not supposed to just stand there. Just interaction with other
> hospital staff, they do not seem as respected as like even RNs. At least that is my
> observation, at least at this hospital."

I requested some specific examples of the "yelling" scenes, but F1 could not recall any

specific scenes and instead responded:

> "I cannot think of specific examples right now, but just the interaction again.
> Interaction and it seems a lot of them do not get a thank you when they should.
> Again, just the way the radiologists behave with the techs."

Four students, F9, F7, F4 and F5 mentioned how the doctors can be intimidating and

difficult to work with, as the working environment is one where the technologists are

intimidated or "terrified" to work with the mostly male radiologists. The students

commented on the level of respect and interaction between the radiologists is lacking in

professionalism and the arena of mutual agreement. Instead, what they relayed is an

environment of technologists "serving" radiologists, and having to "tiptoe" around those

doctors who are having a bad day. For F9, working at a CR/DR facility, his interaction

was seldom with the radiologists because of the PAC system, and he did not mention

interaction (F8 mentioned no interaction with radiologists at his CR/DR facility),

commenting on how the doctors are difficult to interact with:

> "Where I work we don't hardly see any radiologists because everything is on
> PAC system where you just send it to a doctor on a different floor and we don't
> see them at all. I've done fluoro patients with doctors and sometimes some
> doctors can be intimidating if they have a bad day."

The student F7 went a step further, commenting on how while the technologists from her

perspective are respected, the doctors are placed on a "God-like" pedestal. The division

is apparent, and the technologists are "yelled" at by the doctors.

> "…I think they [technologists] are respected but um I mean it's the whole um I
> guess it's the whole God issue. Where like doctors are you know they are kind of
> like Gods you know (laughs). We're like because you know we get that a lot and
> that the doctors are like God. You know *** and they do that. We have doctors
> that are like you know you have to…so they get you know they get yelled at a lot
> by doctors and you have to do this and that and I think that well because
> everywhere you know when you think of medicine you think doctors and nurses,
> because it's more of a recognized thing and you know nurses I think like I said
> they deal with so much. I mean they're pretty much the-their pretty much
> advocates of the patients as well you know. So I think that's why they are a little
> more appreciated…"

F7's commentary towards nurses being the patient advocates, and sharing in a

natural age old close interaction with the doctors is reminiscent of the ICC student S6.

Both students shared similar discussions on how nurses and doctors are what "we think of

when we think of medicine," while technologist don't share the same type of

communication and teamwork with the radiologists. As mentioned, nurses and

physicians, from the outset, have shared in a close, although unequivocal relationship

(Sandelowski, 2000), where nurses were patient advocates, and the "eyes of the

physicians" (Sandelowski, 2000, p. 67). Physicians relied upon nurses, with their

"trained senses" and ability to "know the patients," to detect and act on problems with

patients early on in the treatment, although it was made quite clear that nurses "have

nothing to do with diagnosis," prognosis, or treatment, they serve to execute orders and

record patient status (Sandelowski, p. 87). For S6 and F7, this nursing/physician

recognized binary relationship, is in truth accurate, and however, this relationship has not

been established between technologist and radiologist. Radiographers provide images,

yet to do not share in a binary relationship.

Although F7 thought technologists were appreciated, she also added that this

appreciation and recognition must be "won over" by the radiologists, in order for the

technologists to not be considered as a "tool" to take the radiographs. Therefore,

according to F7, the technologists must prove themselves in order to bridge the gap. It is

not a natural crossing, but can be crossed as long as the technologists are willing to work

hard, and such actions can level the playing field:

> "…I think that techs-techs can-techs are appreciated also probably not as much just because you know you are working for the unless you make yourself an asset you know unless you make yourself a really good asset, there is more of a respect for you. They don't see you just as a tool. You know you position the patient you take this, you know you make yourself more of an asset…you know you make yourself more of a person to them, and then they kind of take the time to remember your name afterwards. More of a person, more of an asset and um and um because you do see a lot of techs out there that are kind of lazy…"

F5 shared similar remarks about the temperament and difficult working environment that

is created by the radiologists, and where she had experienced some "run-ins" with them:

> "I mean just coming from radiologist down I really just didn't have a good experience there at this particular spot, I mean I try to make the best of it, but I did have some run ins with the radiologist and just negatively to just the way they would talk to you…"

F5 added in how the female radiologist is easier to work with in comparison to the male

radiologist and where such an environment can make it difficult to learn in:

> "The female radiologist there she was like really nice she was sweet. It was it was the doctor the male doctor. That was…Yeah, and people would always say 'oh that's just how he is and um so deal with it' you know and it's like no sorry. Like you know he's like that in the beginning and he comes around its okay. You know, it's like but my thing is it's like you know, I'm there to learn and for you to-to educate me about the things you already know…I mean the radiologists they are just I think sometimes they are just a bit snobbish."

F5 mentioned the difficulty some technologists and radiologists, where the radiologists

would discuss preference for other technologists openly:

> "…Where I was there was certain radiologist that didn't want to work with certain tech. They would be like 'well who's doing floor?' And if they told them a certain person then they would be like 'can't you get someone else to do it?' They really do not because they-they have their way, their certain ways, they're creatures of habit and they want this-this and this, and if they know there's a tech that can't do that or that veers from it they want somebody they know that likes their ways."

The perspective F5 painted was one of radiologists commanding the exams and the

department according to their specifications, where the mostly female technologists had

to conduct themselves around such behavior and commentary that could be construed as

negative or demeaning. To F4, she also worked at a facility where on radiologist in

particular was difficult to communicate and work with. F4 explained that it was a matter

of standing ground with him in order to change the negative or derogatory commentary:

> "…The doctor um that I work with is very, very, very temperamental. And he so far he…he prefers me in there by myself and some of the other techs…especially ones he just basically doesn't like working with them. Sometimes he'll ask me when I show him a film, 'are you going to be in there?' and I say yes and he's like

(takes a breath) 'good.' He's older, he's English. A lot of them are terrified of him."

I asked F4 about the interactions between male and female technologists with the radiologist and if she noticed a distinct difference in behavior, and she responded:

> "Um he's okay with them, he's just overall-you have to I guess-I don't see a difference you just have to understand his humor. If he says something to you-I found out its not really offensive that's just how he is. These ladies [female technologists] let him walk all over them sometimes. And I have been told never let anyone walk all over you. So I don't mind telling him stuff back and I guess that's what he likes about me is that I don't let people walk all over me."

F4 commented on the fact that if a stance is taken, then technologists (and students) are apt to have a more successful working relationship with the radiologists if the technologists exhibit confidence, and strength in character. To these students, their observations and comments reveal that the nature of the profession does indicate a subservient position to the radiologists, a position that can be altered possibly, if the technologists themselves work to change that relationship.

The current radiologist/technologist relationships commented on by these four students is reminiscent of Larkin (1983), where male radiologists looked up to the radiologists in "rapt admiration" (Larkin, 1983, p. 90) and the females were required to ensure that the radiologists were presentable (Larkin, p. 90). The comments also call to mind Barley's (1982) study of changing technology, where those technologists who were confident and sure of themselves on the new equipment altered their working relationship with the radiologists, where the teamwork aspect became more apparent as the radiologists were not as confident and relied on the technologists for assistance, information and competence with the imaging modalities.

During discussions regarding salaries, the majority of the students were uncertain about the wage ranges for diagnostic imaging as well as the imaging modalities. However, the common knowledge shared was that technologists should be paid higher wages and the imaging modalities should command higher wages as the nature of the work is difficult, patient caseload is high, and there are less technologists working in these areas. For example, F7 stated that he considered the salary adequate for radiographers, but those in other imaging modalities should make more:

> "I think that if you have more of a modality that you can do you know rad tech, you can do mammo you can do CT you should get paid more because you are you can do different things and um I don't know much about how much mammos about how much they make, but I do think that they should get paid higher if you have if you're more of a because you can do different things, because you are doing the job of four people.   I mean you're more of an asset."

F9 held a different opinion about radiographers and did not consider the wage rate adequate as the work is physically demanding and should pay higher:

> "Because there is a lot of physical work in radiography that we do. They should get paid more. They do a lot of physical stuff and a lot of-a lot of radiographers by the six years I know they do have tend to have back problems…you pull a patient here and there, it takes its toll. (laughs) I see a few techs in my work that have um back problems too."

Similarly to F9, F5 commented on how radiographers should be paid higher, and that the nature of the job is "misunderstood." From her perspective, radiographers are paid low wages because they are "button pushers" and spend less time with the patients than nurses do:

> "I think…medicine is just an underpaid field all together.   To be honest I mean techs work really hard, to know that they're in the process or you know they help out the doctor. You know the doctors make a hundred to two hundred dollars an hour, you know. It's like I mean…we're the people that are helping him do that, I don't see why we couldn't get paid a little bit better. I think people just really

think that we are just a push button job. I just don't think people think highly of radiographers, I think nursing people think they're more prestigious than you know radiology…because…they're more with the patient. You send the patient down to x-ray for 10-15 minutes and then they're gone, then you have no other contact with that patient other then that…but if they were to see how important that image you just took of that patient how important to their care it is, then maybe people would think a little differently. But because nurses are you know attentive, they have to check on the patient every half hour, five minutes, ten minutes, you know what ever the timing may be I think you know their looked at like…more the helper."

F5 considered the work that radiographers perform to be an important part of the healthcare environment. However, the wage rate fails to recognize that. Radiographers work hard but are not rewarded, in particular when compared to the field of nursing. F6 considered radiography to be a low wage area, but based his commentary on the nature of the economy, or "supply and demand."

Discussions regarding imaging modalities were varied with this group. What did not emerge, as it did with the BCC first year group, were conversations about the professional nature and ease of the work associated with nuclear medicine. The following students, F1, F2, F9, and F10, mentioned working in radiography for a year (or two) and then entering radiation therapy school. When asked if they had been mentored or influenced by anyone regarding such a decision, they had not. However, three of the students, F1, F9 and F10, responded that they wanted to work with cancer patients. Comments about monetary gain were secondary to the nature of the work itself. F2 did not have a true idea if this was a future goal, based on lack of education at this stage in her training. A fifth student, F7 stated that she is considering radiation therapy but discussed mammography as an option or radiation therapy as the educational aspect of

radiation therapy is known to be difficult and takes an additional year of schooling,

versus mammography, that is generally on-the-job training:

> "I was thinking about um mammography because it's something that's very open to women and it would be good to have it. I'm not sure I have enough time [to pursue radiation therapy]. I-I heard it's very hard and that there are a lot of things involved in that. Mammo um I like working with-with um women who you know their because we get patients that-that do have cancer so I mean it's good to detect that before anything happens because how many women have died from cancer…"

F4 expressed interest in mammography for similar reasons, commenting on how

mammography is much more "intimate" with the patient, and because "a lot of people

have breast cancer and don't know it." For F4, she wanted her work to assist in the

diagnosis process.

Two students, F3 and F6, were considering MRI imaging as their future goals.

When questioned, F3 and F6 commented on how the imagery and the technology intrigue

them as well as the upcoming technology for MRI scanning and other modalities

including CT. The student F5 mentioned nuclear medicine, with her reasoning focusing

on the invasive and important nature of nuclear medicine, and the "challenge" of learning

this modality.

The students did not share as much information about the imaging modalities.

Throughout each conversation they confessed that they were uncertain about the nature of

each modality, merely basing opinions on conversations heard or brief visualization while

in the training environment. The students were enthusiastic about their future in imaging

and the ever-changing technology and what it will offer for patients and technologists.

Discussion about "easy" work environments or making "lots of money" did not come about. These students were, overall, patient care focused.

Conclusion

The ICC students from both cohorts were an ethically diverse group of students, who overall were positive about their training, the education received thus far, and their future. Throughout the interviews, the second year and first year cohorts presented themselves as students who are concerned about their patients, and empathetic towards those they must care for in the imaging environment. In retrospect, there are some vast differences among the cohorts from each program. Although these programs and institutions were not geographically located at a great distance, the student body of each was quite different in their national origin and ethnicity. Furthermore, there was a marked difference in discussions and comments about working with the patients, the nursing profession, the imaging modalities, and professionalism.

The BCC and ICC cohorts did demonstrate similarities too, and proved how faculty can indeed make a lasting impression on the students, in particular when comments were made regarding radiographers considered as professionals, and aspects of how patients should be treated. The first year students from both cohorts had little knowledge about the imaging modalities and the salary ranges, while the second year cohorts were confident and certain about their future occupational plans. All students mentioned how the nature of CR/DR and PACS has reduced the student/technologists – radiologist interaction, and how the new and fascinating technology has reduced the challenges that conventional radiography presents. The students' responses have

important implications for professional practice and for future research as technology is

changing the face of imaging, the patient/technologist interaction and

student/technologist/radiologist interaction.

CHAPTER 6

CONCLUSION

Introduction

Through the in-depth study of students from two radiography programs I have explored their perceptions and experiences of training in the medical world of imaging. In analyzing their responses to various questions, I focused on the potentially gendered nature of their approach to, and experiences of, their radiography education. What emerged from my analysis was that although some gendered patterns did emerge, there were also overriding commonalities that emerged as well, with such commonalities based on class and socioeconomic status. Furthermore, a number of minor themes related to ethnicity and national origin surfaced, therefore, in opening this chapter, I explore the complexity of the students' responses, by returning to the research questions that guided this study.

Research Questions

To recap briefly, the central research questions for this study were designed to explore three issues, (1) gender and social role in relation to the radiography profession (2) the male and female perspective regarding the technology in the profession, and (3) students' sense of a structured hierarchy within the field, with there being higher paying and thus, prestigious areas of radiography. Furthermore, research question three sought to determine if the students, or significantly the female students, detected any closure mechanisms in place within the higher paying modalities.

With regard to the first set of research questions, the responses to all of the questions from the students did not fall into gendered patterns, revealing instead the greater significance of social class in shaping students' perspectives. From the outset, I entered this study with expectations, derived from the academic literature, of gendered responses. However, the findings in regard to the first set of questions revealed that to use only gender role theory is inadequate, and that the responses from the students demonstrated a multifaceted interplay of gender, race, ethnicity, national origin and social class affecting the students' lives and perspectives.

Recall that research question one was designed to interpret how men and women explain their interests behind entering a program that teaches and promotes patient care principles. I looked within the students' comments and responses for reasons as to why they elected to enter radiography. Most often, and in particular with the BCC cohorts, the students explained that they entered into the program to achieve economic and occupational mobility. What emerged from their dialogue was the interest in making money, advancing into the imaging modalities, and working with technology. Interestingly, a number of the students revealed choice of career that was based on factors for students seeking a "second chance" at education. In other words, their choice and attendance characteristics are those so described by Grubb (1999) where students who attend community colleges have been given a "second chance" to attend higher education based on lack of motivation to attend four year institutions, had been "bounced out of promising careers through no fault of their own," were displaced workers (or professionals) affected by geographic relocation or economic dislocation, or were

emerging from the aftermath of divorce (Grubb, 1999, p. 3). The students in this study proved to be no different, revealing similar reasoning and issues as motivators for entering into radiography.

Furthermore, and as mentioned in Chapter 4, there is a correlation of the BCC second and first year cohorts to the working class high school students ("Freeway") in Weis's (1990) study. Recall that the students in this school had experienced a steel mill closure, causing high unemployment and de-industrialization. The working class students in Weis's (1990) study expressed the desire to graduate from high school, go on to college, and upon graduation, obtain high paying employment leading to social mobility, with social and occupation mobility being paramount to these students. Moreover, these students were influenced by their unemployed working class parents to leave the area, and go to college in order to eventually advance into higher paying careers and employment (Weis, 1990, p. 151 – 152).

Recall that the BCC second year and first year students were primarily (with a few exceptions) from working class backgrounds, and listed as the primary motivators for entrance into radiography to be based on accomplishing job security. It is reasonable to state that as working class students from working class families, reasons for entering radiography were centered on getting ahead in life through achieving monetary gain that diagnostic imaging and the imaging modalities, will provide. This is not say that they did not care about the patients or did not prefer to work with people, these working class students were focused on their future and the desire to achieve higher paying, secure employment, much like the students from Weis's study.

Additionally, given the age range of both the BCC second and first year cohort, where the average age ranges were from the early twenties to early thirties, these students were likely to have been strongly encouraged by their family members to enter this short-term medical program that leads to immediate, stable, and decent paying employment, much like the "Freeway" parents, who attempted to persuade their children to graduate from high school, and attend college to obtain better paying occupations (Weis, 1990).

Moreover, students who come from working class backgrounds typically enter two-year institutions in order to achieve a short-term education that leads directly to employment (Shavit and Blossfield, 1993, in Winslow, 1995). Studies on the two-year and vocational sectors have demonstrated that working class students use short-term educational and vocational programs as a means to open up the employment opportunity in a wide range of occupation. Postsecondary technical education does lead to considerably higher wage earnings for those graduates who have earned a credential or degree, when compared to those with no education beyond high school (Hollenbeck, 1993, in Winslow, 1995). For the BCC second year and first year students, and also the ICC second and first year students, radiography was considered to be an attainable program to enter and succeed in, and a program that will provide stable, well paying employment upon graduation.

While career interests and the desire to achieve economic means can reign as the primary points for entrance into any occupation, no matter the type of work involved, during the course of the interviews the students did discuss their interactions with the patients in a fashion that might make us interpret these students to be people who are

uncaring individuals, incapable of expressing compassion or empathy towards the injured and ill patients they spend their eight hour days with. In particular, the BCC students do come across in such a manner, when compared to the ICC students who shared personal storied about sick family members or spouses, and also, about the patients, where they frequently utilized language made up of words that exhibited their level of care, concern and compassion.

Recall that the point has been made that it is difficult to state that the BCC students did not care about their patients, or were not compassionate individuals training in healthcare, they just did not express these points using the same language the ICC second and first year students used. Perhaps it could be stated that for some of the students who come from working class background, that their "direct" to the point, and seemingly "cold" responses are based on their presumed working class social upbringing. It is prudent to connect to points made by Delpit (1988) about how the "verbiage" used in homes of working and middle to upper class families contrasts. Delpit explains that where middle/upper class parents ask questions of their children in the form of tacit directives, that contrast to how working class parents issue directives, and tell their children to "take a bath," or, "Boy, get your rusty behind in that bathtub" (Delpit, 1988, p. 289). Now, as Delpit states, such language does not indicate that these parents do not love or care for their children, they talk to their children differently than middle to upper class parents might. Therefore, it is possible that the authoritarian behavior exhibited by working class parents towards their children serves to remove warm and compassionate

responses that these students convey later in their life, as they were not exposed to such language.

Furthermore, and as mentioned, some of the working class students in this cohort might have been exposed to what Delpit (1988) describes as a difference in the expressions of authority and power displayed by teachers during secondary school. According to Delpit (1988) verbal directives issued by African American teachers contrast to those of the middle-class teachers and where the teaching styles of the African American teachers are more authoritarian and commanding, when compared to the middle-class teachers, who are less authoritarian and are more likely to issue directives in the form of questions (Delpit, 1988, p. 288). While each student's former educational paths were not explored in this study, it is possible that for some of these students, their educational experiences and exposure to working class teachers could have served to influence the discourse used by these students in their discussions about the patients, however, this is an assumption, and therefore this point remains inconclusive.

It is important to stress the point that there are no indications, outside of the student conversations with me during the interview questions, to certify that the BCC male and female students were not compassion, empathetic and patient focused students training in a high touch health care profession, it is, instead a function of the differences found within the language used by students that is based on the multifaceted interplay of gender, race, ethnicity, national origin and social class. However, as gender was the focus for this study, and the key points of ethnicity, race, national origin and social class

where not included to define the research questions, or provide in-depth analysis for the findings.

What also emerged, and as mentioned in Chapters 4 and 5, were signs of institutional effects on the students, through the faculty, who shared comments and opinions during class times with the students that proved highly influential. The majority of the students from both cohorts indicated that they were indeed influenced by discussions and points emphasized by the faculty, and specifically recalled the negative commentary and the positive points. Recall from Chapter 4 how the BCC first year students were influenced by a faculty member who informed them that radiographers were not professionals based on the fact that that diagnostic radiographers cannot "give orders, only take them." Such reflections by that particular faculty member influenced the majority of the BCC first year students, rendering them uncertain about the level of professionalism associated with their chosen profession. Recall also, from Chapter 5, how the ICC second and first year students reflected on the strong patient care values that had been being instilled upon them by the faculty associated with their program. Such differences are paramount, as opinions and perspectives have either a negative or positive effect, and clearly influence students in their opinions, perspectives, and actions while training.

For research question one, gender was the primary and pivotal point with which responses from the students revolved around, and it was anticipated that the findings would reveal more females than males mentioning that their interest in the program is based on the desire to help patients and work with people, however, this proved to not be

the case, particularly for the BCC second and first year cohorts. The basis for this assumption was formulated not only by theoretical influences of Colley (1998), and Eagly's (1987), but also by Seymour and Hewitt (1997), who discovered in their longitudinal study on why students leave the science majors, that male and female student quoted largely different influencing decisions to leave the sciences. Seymour and Hewitt found that women were twice as likely to switch out of the sciences and pursue educational programs where the careers offered a "greater prospect of more humanitarian or more personally satisfying work" (Seymour and Hewitt, p. 237). It was anticipated that the female students entered the field of radiography based on decisions to seek more "humanitarian" work, and that our so stated "gendered dimensions" would have greatly influenced the females to enter radiography.

Stated previously, gender role theory describes the organization of masculine and feminine characteristics and behaviors within the individual (Spence and Sawin, 1985), and there are gendered dimensions central to our perceptions of gender role appropriate behavior, with these dimensions comprised of masculine and feminine characteristics (Colley, 1998; Eagly, 1987). Furthermore, the theory implies that perceptions of male and female characteristics and adult sex differences are attributed to our social roles, and our social roles are in turn influenced by biological predispositions and socialization by parents and peers (Colley, 1998; Eagly, 1987; Spence and Sawin, 1985) For the BCC second and first year female students, the gendered dimensions did not emerge during their discussions about choice of career, working in the profession, and future plans. Similarly, the female students did not mention that they aspired to enter a field that

provided humanitarian work. For the BCC females, they did not utilize language where our masculine and feminine attributes emerged, or that were linked to our gender differences, sex-roles, or social roles. The language used by both males and females overlapped, and students did not employ terms that can be associated with our male or female attributes or pre-defined/assigned social roles.

The male ICC students also did not align with the gendered dimensions, and a number of them were patient centered, patient focused individuals who spoke of their patients warmly and expressed how they wanted to give the best care that they could. The males at ICC used terms indicative of nurturing and strong patient care values, much like the ICC female students did.

The final point to make towards gender role is that the ICC female students did exhibit the "gendered characteristics" by discussing, at length how they wanted to work with patients. Furthermore, the ICC females mentioned their future plans to include working in mammography, an imaging modality that is high touch and expressly commands good patient care skills, compassionate and empathic attitudes from technologists.

One major difference among the male and female students did emerge, the comments expressed by some of the BCC male students to work independently and away from other technologists, and staff members. These comments contrasted the second year BCC female students, who considered the lack of teamwork and staff member participation to place   extra pressure on them. . Thus, it is appropriate to state that as studies of male and female differences are highly complex and escape simple definitions

and clarifications, so too are the findings for this study, where the findings did not reveal the male and female gendered dimensions. Furthermore, cross over into the male and female dimensions was present, where males exhibited female characteristics, as in the ICC males, and females exhibited male characteristics as in the BCC females. For all of the cohorts, gender role theory did not suffice, and gender differences were not so apparent.

Interestingly, a pattern did emerge from some of the ICC males in the group, which speaks to a study conducted by Lemkau (1984), where she discovered that males working within female dominated professions (or atypical professions) hailed from differing backgrounds and held dissimilar personality traits then other males working within the sex-typical field. The atypical males in her study experienced the death of a family member, a parental divorce, or other stresses that "sensitized" them to "their nurturing and emotional capabilities" (Lemkau, 1984, p. 111, p. 120 - 121). The atypical males, Lemkau discovered, were "more frequently cultural minorities" (Lemkau, p. 121).

With this study, correlation with the research conducted by Lemkau (1984) can be implied where a slight connection can be made to those males who discussed the patients most often, or expressed sensitivity towards their patients, including statements where there is recognition of exercising proper patient care techniques, being "soft" and careful with people, or making attempts to understand the patients (for example, BCC F6). These male students, who expressed the sensitivity points, had come from backgrounds where they reported attending to ill family members (BCC F6), or had experienced other stresses (ICC F6). Interestingly, BCC F6 parents had come from the Philippines, and

ICC F6 emigrated to the U.S. from Ecuador.   Similarly, a comparison can be made to

those statements where patients were considered difficult to maneuver, or could make a

working day complicated (for example, BCC F2, F3 and F8). These male students did

not mention similar backgrounds, however, closer examination of these students former

occupations could lend validity and connection to the "typical" males in Jome and

Tokar's (1998) study, where men who pursue traditional careers endorse to a greater

extent, success/power/competition, and restrictive emotionality, however, this cannot be

stated with certainty and again, remains inconclusive at this point. .

Regarding the second set of research questions, radiography and the imaging

modalities are technologically based, and the equipment is transforming into digital,

computerized, state-of-the-art technology. Thus, it was essential to obtain the perceptions

on the part of the students regarding technology. What emerged out of the students'

discourse was a correlation with technology being considered as a "masculine medium of

power" (Cockburn, 1985) where technology embodies various perspectives, and is

"shaped by specific concepts of interests" (Wajcman, 1995). The ability of the imaging

modalities, as in CT scanning, MRI scanning, and special procedures, were described by

the students as powerful tools capable of providing imagery that enables doctors to

diagnose illnesses, thereby assisting in curing patients and saving lives. For example, S1

commented on special procedures, "…so when I got into the specials, it was that close to

surgery, basically surgery, what you are doing and that is really impacting someone's

betterment of their daily life."

Interestingly, the female students in each cohort described the imaging technology as the males did, rendering portraits of powerful technology capable of providing precise images of the internal workings of human anatomy and physiology. The one exception to this pattern is a very important and gendered one, the imaging modality of mammography. The female students did not discuss mammography as a powerful method of providing "incredible" images using state of the art technology. For example, BCC S2 remarked how mammography "is not as cutting edge as MRI." The modality of mammography was described more in relation to how the patients should be treated during the procedures. For example, ICC S8 commented how female patients should be treated with care and compassion as they are "afraid of mammograms, however, this imaging is of importance to females, "…because most of your patients they are-they are kind of afraid of the mammo screening…breast is-breast is you know very important to female."

Moreover, the female students in the ICC second year cohort mentioned mammography as a choice of imaging modality based on the need for female technologists, and the lack of direct competition with males for occupational opportunities. However, mammography was not "the cutting edge technology" as so described by the BCC second year students and the majority of the females in that cohort did not hold interest in pursuing mammography as an imaging modality. This finding, then, does speak to the literature and theory, as technology is "sex-typed," with high technical skills being "central to male dominance," (Cockburn, 1985), and those skills linked to primarily female occupations seen as requiring less skills and thus reduced to

"women's work" (Cockburn, p. 140 – 141). Of interest, and in comparison to the physical nature of the work in mammography, scanning, as in MRI and CT, require less skill, as the patient is positioned on a table, placed in the gantry, and the computer/equipment takes over upon the manipulation by the technologists. Cockburn describes CT scanning as "more of a push-button job" (Cockburn, p. 121) than other methods of diagnostic radiography. Although Cockburn does not specifically address mammography, this imaging modality can be included, as consequently, both diagnostic and mammography require more physical, mental, and communicative skills to position specific body parts, as in breast imaging.

Wajcman (1995) posits that there is "remarkable persistence of the gender stereotyping of jobs, even when the nature of the work and the skills required to perform it have been radically transformed by technological change" (Wajcman, p. 191), with "high-technology activities," being the "key to power within the profession," where the technological sophistication of the specialty provide the means and mechanisms for professional expertise. MRI and CT scanning are technologically sophisticated as both can provide in-depth cross sectional imagery and now, with the latest in CT scanning, 3-dimensional reconstruction as well (Ballinger and Frank, 2003), and those who operate such equipment are paid higher wages than those technologists who work in mammography (ASRT, 2001; ASRT. 2004). Interestingly, breast imaging, over time, has also advanced into sophisticated and technically advanced equipment, and requires additional licensure to perform. Yet, the students did not reference to mammography as "neat," or "fascinating," or even "state-of-the-art."

A critical and relevant point to make here is that women "must" advance into the training aspect and then become certified in mammography in order to meet, for some of the hospitals located in California, requirements that expressly state that females are to be trained/certified in mammography. For example, I visited a large medical facility where require their new female technologist hires to sign an "agreement" that they will be trained and certified in mammography within six months of employment or consequently be terminated (Kaiser, 2006). As mentioned, mammography is an imaging modality mandated by strict state and national standards, as in documented 100 hours of supervised and approved mammography examinations, additional licensure through accomplishment of a 115 question difficult national certifying examination, and continuing education credits every two years (ARRT, 2002). However, and unfortunately, this particular imaging modality, when compared to diagnostic, CT scanning and MRI scanning does not command the high salaries that should accompany a "semi-profession" that is controlled by strict state and national standards, requires additional certification and stringent continuing education credits.

The issue of mammography as a low wage, "high touch," "feminine caring" imaging modality can be compared to Sandelowski (2000) historical study of nursing and technology. Within this historical accounting of the growth, professionalization and changes to the nursing profession, Sandelowski (2000) describes how the advent of technology (as in radiographic imaging and laboratory studies) created new opportunities and expanded nursing into "specialization areas," yet failed to offer higher pay and "was simply added to the nurse's ward work without additional pay" (Sandelowski, p. 85-86).

With mammography, this imaging modality represents how those fields and professions, as in nursing, are very much still undervalued. Fields and professions that are considered "high touch" or associated with feminine caring have and still are traditionally denigrated in Western culture (Sandelowski, 2000). In essence, mammography is about breast imaging performed on women to detect breast cancer (only one percent of the male population is afflicted with breast cancer (Ballinger, 2003), thus very few males need mammograms). Therefore, mammography exists for women and is performed by women technologists, and as evident by the given salaries (ASRT, 2001; ASRT 2004) is cited as the least lucrative imaging modality to work in, this speaks directly to the literature, where the correlation between touch and caring is related to feminine and undervalued. It is crucial to comment that mammography is gendered female, where being gendered female overrides any significance it has towards being highly technical. Judging by the lack of commentary towards mammography being considered a highly technical and powerful imaging entity, coupled with the consistent low salaries associated with this essential imaging modality, the females students themselves and the medical imaging community denigrate this modality thereby reducing the significance and powerful ability mammography does contain.

The fact that the females in this study seemingly dismissed the importance and power behind mammography calls into mind Sandelowski (2000) historical account of the nursing profession and technology, where nurses identified themselves with the advancing technology in order to "align themselves with an entity associated with science and progress and thus highly valued in Western culture" (Sandelowski, p. 178), while at

the same time disassociating themselves from technology as it became increasingly

associated with dehumanizing patient care. This disassociation and "irony" has served to

keep the work that nurses perform as "invisible," where Sandelowski comments how

nurses have been and remain a key component of the infrastructure of medical

technology, yet are "invisible," as all infrastructures, interfaces and connecting links are

generally rendered. Nurses are described as the "glue or cement" that holds the

healthcare system together, but, similar to glue and cement, are not noticed in the overall

structure, presenting to us how the "dramatic presence of devices," even those

"spectacular" technologies that allow those in the medical profession new methods and

new ways to visualize, diagnose, treat and possibly cure "has not remedied the traditional

cultural invisibility of nursing" based on the inherent and consistent tendency of Western

culture to devalue those fields and professions associated with "touch" and "caring"

(Sandelowski, p. 180). The same could be said for mammography imaging, a highly

critical imaging modality crucial in the detection of breast cancer, yet rendered almost

invisible by those who work in the medical community, and as evidenced by the pay

scale, certainly undervalued.

    Moving away from mammography, the technology associated with the profession

spawned conversations about the newest advances with CR/DR, where a myriad of

responses were shared. The research questions that sought to ascertain student

perceptions of the technology demonstrated a changing environment, with the students

juxtaposed between the old technology and the newest, state of the art CR/DR. The

CR/DR technology by far elicited the most commentary, where this technology was

described by the students as simplistic, "push-button" technology that is capable of "thinking" for the technologists. Furthermore, the students considered the newest advances in diagnostic imaging, digital/computerized radiography, to be far more simplified that conventional radiography. They commented on how the conventional technology required the constant knowledge and application of kilovoltage (kVp), millamperage and time setting (mAs). If the selection of the techniques are not conducted correctly (in addition to mistakes made while positioning patients), the radiographs will either manifest as being under-exposed or over-exposed, much the photographs taken with a camera, where repeat radiographs are taken to correct the errors, resulting in, consequently, more radiation exposure to the patients. With CR/DR, the "mistakes" once made by under exposure or over exposure, can be corrected on the computer, similar to that of digital cameras, unless, of course, the mistakes are beyond repair and therefore must be repeated on the patients, however the technical nature of the work is changing to a "push-button" reality.

It is important to restate how the majority of the students from both cohorts inadvertently commented on how CR/DR has created a working environment where the mental challenges have been removed, thereby creating a "lazy," atmosphere. Presumably so, the changes in technology are deskilling an occupation, where computers conduct the cognitive aspects that had formerly been part of the day-to-day operations for technologists. Thus, and according to Zuboff (1988), the reality here is that radiography is undergoing a shift from more manual/mental skills, to the more automated, informated type of technology that only imposes information in the form of programmed instruction,

but serves to produce the information (Zuboff, 1988). With the merging of information

technology with imaging capabilities has produced the type of technology that is highly

capable of accomplishing tasks and translating such tasks into information, generating

"both action and voice" (Zuboff, 1988, p. 9). The action performed by technologists is

now the computerized programming of technical aspects; the voice is the computer

repairing the overexposed or underexposed images.

Stated previously, the "technization" of the imaging equipment for diagnostic

imaging carries with it implications that the students are aware of, yet have painted a

picture of how the nature of the work radiographers perform has changed dramatically

with the implementation of digital/computerized equipment and PACS. It is reasonable

to state that the introduction of new computerized equipment "inevitably has its human

side, including the cognitive, emotional and expressive reactions of men and women"

where their lives are radically changed by advancements in technology (Bernard and

Pelto, 1987, p. 301).   There are cognitive shifts that occur that can describe the future, as

computer based technologies are not, as Zuboff (1988) states, "neutral," rather, "they

embody essential characteristics that are bound to alter the nature of work within offices,

factories, and medical imaging facilities. Furthermore, computer based technology alters

the nature of work for the workers, imaging professionals, and managers, where "new

choices are laid open by these technologies" and must be confronted in the daily working

lives of men and women across the landscape of the new frontier created by the increased

sophistication of "intelligent technology" (Zuboff, 1996).

The advances in technology carry with them ramifications that could be costly and perhaps alter the already precarious position that diagnostic radiographers occupy on the medical professional ladder. Radiographers have had to justify their position as professionals in the medical hierarchy of occupations, where they have been juxtaposed between the patient care aspects and misunderstood technology, thereby lending confusion to the nature of work radiographers perform (Cockburn, 1985). Those who "command over them," as in the radiologists, it seems, have considered radiographers, "button-pushers," in particular. For example, Cockburn discovered that the radiologists in her study considered radiographers as those "who twiddle knobs," and could be adequately trained in "six weeks" (Cockburn, p. 125). For with technological change comes the opportunity to "re-gender work, to change the demographics and labor costs" of occupations, where de-skilling brought about by advanced and "simplified" technology will drive the salaries down, and, subsequently, the gender make up of the field (Simonton, 1998, in Croissant, 2000). Therefore, new computerized technology carries implications, and is not neutral, where those who control the make up and use of the technology, can also alter the nature of the work through deregulation, based on the new interpretations of how to operate the technology, particularly when the technology is associated with a feminized field (Cockburn, 1985).

In addressing the third set of research questions, the students perceived a hierarchical structure in place within radiology. It was evident to them that radiographers were not only in a subservient position to their superiors, the radiologists, but to other medical professional as well, in particular, nurses. The students' perceptions of how

radiologists (or other doctors and surgeons) relate to both the male and female radiographers (those working in diagnostic) mirrored and reinforced the age old relationship described by Larkin (1983), where the male and female radiographers assumed a role of subservience, and were under the direct purview and control of those in higher paying more powerful medical positions. The students related witnessing technologists coping with poor temperament on the part of the radiologists, or experiencing and being subject to unprofessional actions including "yelling" and verbal abuse. In essence, the students' relayed statements of interactions that were reflections of what Larkin (1983) described as the "connotations of docility" associated with the radiography profession (Larkin, p. 87).

Moreover, with the existing hierarchical structure, and as mentioned in Chapters 4 and 5, the implementation of the digital/computerized radiographic technology has served to broaden the already existing gap between technologists and radiologists as the nature of computerized imaging in diagnostic is changing the relationship between radiographers and radiologist. In retrospect, the radiographers play the subordinate role as they bring the completed radiographs for the radiologists to review for quality and additional views, giving out the protocol to the waiting radiographers. Now, with computerized radiography, the radiologist can summon up the completed study that has been reviewed on the computer system and perfected by the staff PACS specialist, and the radiographers no longer need to contact the radiologists. The interaction between radiographer and radiologist is less frequent, as noted by the students in all cohorts. This finding addresses the third research questions, and presents a similarity to the

technologists in Barley's study (1982), where the implementation of new technology changed the nature of interaction, serving to reinforce at one facility, the subordinate role between radiographers and radiologists.

While diagnostic radiography as a medical field fits under the definition of a professional contemporary medical occupation, the students from both cohorts did not describe the diagnostic realm necessarily as such. Oftentimes, they were dubious or uncertain in their responses regarding how radiographers are defined as professionals, commenting on how those who work in diagnostic are at the bottom of the medical structure, as BCC F9 stated, "You know, they're [radiographers] not considered professionals, from what our instructor told us. In my eyes, I think we are…. It's like saying that…we're probably with the housekeeping…"

When one draws upon the parameters that define the professions, where professionals are considered as the agents of formal knowledge and are those "groups who seek autonomous control of various conditions, and domains of work" (Burris, 1993, p. 114), diagnostic radiography fits within those parameters. However, under close analysis of the descriptions of radiographers issued by the students in each cohort, diagnostic technologists are not described as professionals. moreover, radiographers do fall under the rubric of professionalism because there is present within the educational and clinical environment the acquisition of formal knowledge that leads to national/state certification, and application of professional knowledge. Therefore, radiographers are professionals, but are not independent, rather, they are "managed professionals," and are much like university faculty, who do not manage university budgets, set salaries, and or

participate approving or eliminating academic programs (Rhoades, 1995). For diagnostic radiographers, they are not in control as they cannot diagnose, or take additional radiographs if the need exists, they interact with other departments where they are under constant supervision and control, they do not set salaries, do not participate in creating radiographic/imaging protocols, and do not participate in policy making, yet, they are professionals, but managed professionals.

During the discussions regarding salary for the diagnostic level, comments from the students ensued regarding how the nature of the work for radiography is difficult, highly physical and "back-breaking," yet commands a lower salary, in particular when compared to the imaging modalities, as in CT or MRI. This calls into question the nature of the occupation, and how those professions considered to "score high on such feminine values as nurturance are not accorded additional compensation, but, instead, are devalued and are accorded low wages" (England, et al, 1994, in Jacobs, 1999, p. 135). Such low wages can, according to Jacobs (1999) "persist after educational investments." Female dominated professions, as in radiography, or nursing, do not necessarily receive significant monetary bonus due to unfavorable working conditions, and the work involved in radiography invokes emotional stress, cleaning up after patients, and involve "risk due to lifting heavy patients," and exposure to illness and infections through needle sticks (Jacobs, p. 136). A number of the students commented on how diagnostic wages can be higher and should be, as the day-to-day occupational characteristics involve exposure to radiation, and constant heavy lifting of patients.

However, when discussion of the imaging modalities took place, the students had much to say regarding the nature and job characteristics of the specific imaging modalities, commenting on how the salaries are higher in these areas, because the work is more involved. Through their language, and thus their descriptions of the imaging modalities, in particular when compared with diagnostic radiography, what emerged were definitions of the other modalities that fit within the parameters of professionalism. Their constructs of CT scanning, MRI scanning, nuclear medicine, special procedures, and ultrasound demonstrated how such areas justifiably command higher salaries. The students referenced how the imaging technologists work independently, free from the close control that the x-ray "grunts," (in the words of BCC S6) must experience on daily basis. For those who work within the imaging modalities, autonomy comes from the direct actions that imaging provides them with the ability to also diagnose. Their precise and careful work will provide the radiologists with what they need, and the radiologists depend on the imaging technologists to "discover" pathology and report this back. By contrast, the radiographers are not necessarily relied upon for their "expert knowledge."

This "redefinition of the field primarily exists within the imaging modalities, and was noticed by the students from both programs, calling to mind the work of Barley (1996). As imaging (formerly known as radiology) over time has "branched" out into the various imaging modalities, and the technology has advanced into sophisticated, state of the art equipment, so has the division of labor changed. Professional bureaucracies have "spawned employment opportunities," where, for example, hospitals developed the ability to acquire medical resources and offer various services, as in the various imaging

modalities (Barley, 1996, p. 18). Years ago, radiology was once organized according to a vertical structure (authority and expertise were arranged hierarchically and those further "up" have power over those below), however, the advances in technology brought about the imaging modalities, leading to "separate" imaging areas, and the creation of "semi-professions" with certified professionals to operate the equipment (Barley, 1996, p. 34). However, and stated by Barley (1982), technology occasions change and it is clear that the advent and implementation of the various imaging modalities has served to change the once vertical organizational structure of radiography to a horizontal structure, where individuals rather than positions become the "vessels of expertise," and the "members of the different groups retain authority over their own work" (Barley, 1996, p. 4). In the case of CT and the other modalities, the radiologists rely on the expertise of the technologists, and where the need for these skills ultimately "undermines radiology's long standing mandate that technologists be barred from interpreting films" (Barley, p. 27).

Thus, the students did notice and commented on the various differences between the profession of diagnostic radiography and the professions made up of the imaging modalities. The students did reveal how the imaging modalities are viewed as ;professions within a profession, complete with their own defining job descriptions, as in, (1) autonomous nature of the work, (2) the required ability to determine pathological conditions and act upon it, (3) a noticeable level of expertise instilled in the technologists who operate the equipment, (4) additional education and certification, , (5) higher

salaries, (6) a working relationship with the of the radiologists not laced with subjugation, and (7) overall, there are "white collar" aspects to the profession.

The last point correlates to Barley (1996) who states that "technical work punctures the cultural bulwark, by melding opposites, it is at once mental and manual, clean and dirty, white collar and blue collar" (Barley, 1996, p. 37). Interpreting the comments from the students regarding the imaging modalities, on more than one occasion these modalities were defined as white collar work, where, according to the students, it is about control of technical equipment, a "horizontal" division of labor (Barley, 1996, p. 4), no physical/manual labor, and the ability to wear "suits" or dress clothing.

Thus, we find that the professions and semi-professions, as in diagnostic radiography, CT, MRI, and nuclear medicine have developed, over time, internal differences to one another that have "served to shape and bind them directly to the development of the individual definitions of professionalism" (Abbott, 1988). Moreover, each individual imaging modality is shaped by state, national and, at times, federal involvement. Clearly, each modality consists of noticeable differences among each other, with most of them placed, according to the students, at a higher level than diagnostic radiography.

Furthermore, these findings correlate to the more contemporary definitions of the professions by Brint (1994), and Rhoades (1998), it is reasonable to state that these professions are internally stratified and placed in a hierarchy according to location and alignment with market demands (the cost of an exam in MRI of the lumbar spine, for

example, is close to $1600.00 for example, versus diagnostic films, costing about

$250.00. The radiologists are paid for their reading/diagnosis/dictation time for these

exams, with an MRI, with its multiple "slices" of that particular anatomy commanding

more reading/diagnosis time than diagnostic films would).   Consequently, and with the

advanced technology, the patient caseload for CT scans, from the time of Cockburn's

1985 study, where the caseload could average a patient an hour (Cockburn, p. 120), has,

21 years later, doubled, perhaps tripled, with the ability to scan patients (without

increasing staff) in less than 30 minutes. For radiologists, more cases dictated can bring

more monetary gain as well. Thus, for those who are "expert professionals," as could be

the case with the imaging modality technologists, the emphasis is on "technical

dimensions of work and casts professionals as applying formal, technical knowledge,"

(Rhoades, 1998, p. 23).   The CT technologists have the ability to operate "sophisticated"

equipment, and handle a high number of patients per day, increasing revenue to both the

hospitals and radiologists.

Recall that a number of the students, for example, ICC S8, described the

technologists in the imaging modalities as working closely with the radiologists and

doctors, who depend on these technologists to apply their knowledge, skills, and

expertise towards the exams and ultimately produce a highly diagnostic and complete

study. These technologists primarily work on their own or with another technologist, and

carry many more job responsibilities then diagnostic technologists do. The students from

all cohorts shared similar commentary regarding the imaging modalities, and these areas

were described as high tech, offering in-depth visualization of the body, where the work

was seen as complex, requiring additional training and certification and, according to the students, justifiably higher salaries. Moreover, the majority of the students did not want to stay working in diagnostic, but desired to move into these higher paying, higher tech areas.

In addition to the findings regarding the nature of radiography, and the apparent lack of professionalism, the field of nursing was described quite differently, and a dichotomy emerged where student perceptions of nursing were discussed.   To recap, a majority of the students, especially the BCC students mentioned nursing as an educational and career choice prior to entering radiography. When questioned why they opted out of nursing and into radiography, the BCC students described nursing as "dirty," "difficult" and "thankless work." As an example, S1 described nursing as hard work, "oh yeah, their job is no picnic, it's not easy...they have 5-6 patients they have to take care of on a daily basis where they're working with the same people, but they are lifting, and they're cleaning and doing things…" The student S7 commented on the "dirty side" of nursing, and stated, "I didn't want to deal with the-um-the, how should I say the-um-the-uh-all the dirty jobs of a nurse. Um-just like the-uh-taking care of-you know-um-of the feces…" Similar to S1 and S7, S10 commented on how nursing "was a lot of work, and I think it can wear you down after awhile," and to S10, she did not consider nursing as an optimal occupation, because of all the patient care required, and stated, "…it felt kind of uh-I guess a little out of place I guess, um-I just like, you know, helping out the patients, you know, its not that-I don't know, it was kind of uncomfortable." To these students, nursing consisted of undesirable, difficult and dirty work, "too much" patient contact,

and, ultimately was not considered as a career option for the students. In essence, both

male and female students perceived and considered nursing as containing the elements

linked with "women's work," where such elements that make up "gendered work," are

those that do not necessarily define career choices for males (England, 1992; Cockburn,

1985). England (1992) defines these elements as "adverse working conditions typical in

some women's jobs," including exposure to interpersonal stress, blood, urine, death and

suffering (England, p. 40). The second year BCC and first BCC students described

nursing in such terms, thereby associating this profession with "women's work."

However, while radiography does consist of high stress levels, exposure to blood, urine,

bodily substances, and infectious diseases, the students in all of the cohorts did not

describe radiography as such, where to these students, radiography is not associated with

that of being women's work, indeed, some of the students expressed how they were not

aware that radiography was and still is a feminized field, as national demographics

demonstrate (ASRT 2001; ASRT 2004).

With the students perceptions of nursing and radiography, a dichotomy exists,

where, on the one hand, the students, in particular BCC students, described nursing as

difficult, undesirable work, and yet on the other hand, they considered nursing to be

recognized as a profession and is considered by others in the medical field as a higher-

ranking medical profession than radiography. Subsequently, a few students described

radiographers interacting with nurses as to "working" under them and not alongside

them, thus being treated as minions or subordinates. Both the BCC and ICC second and

first year students mentioned this uneven distribution of power and control, and as an

example, BCC S1 commented that radiographers are the "red-head step children of nursing," BCC F5 mentioned how "nursing people think they're more prestigious than, you know, radiology," where the nurses and the doctors "look down" upon the radiographers. Similarly BCC S5 considered nurses uncooperative with radiographers, where he explained how the nurses at his facility are " …a little temperamental. They know there's a job to do there, but sometimes we get patients that come over and they don't even have arm bands on…" BCC S5 and other students commented how the nurses fail to understand the occupational parameters of radiography, and more often than not, such work is considered the "push-button" simplicity.

A few different definitions emerged when the students offered explanations as to why they considered nurses to be professionals, and thus placed at a higher level on the organization chain than the radiographers. From the outset, the students did not regard the work of nurses very highly, however, when compared to their own profession, the students regarded nurses to be the recognized professionals over the radiographers. They justified their observations and perceptions by stating that nurses are closely aligned with physicians, where they are required to consult with the doctors about the patients, an action considered by the students to define the parameters that make nursing a profession. Nurses also spend more time with the patients, with good patient rapport a defining factor behind the professionalism of nursing. Moreover, some of the students commented on how, when compared to radiographers, nurses can make decisions (as BCC F8 stated) and are involved directly in the patient "treatment planning." As ICC S6 explained, "…they [nurses] have more authority. They um, they not only take care of patients,

transport the patient you know and places like that, but right here they have more po-

potential…in the treatment planning." To ICC S6, nurses are experienced with

medication and can consult with physicians, as they are directly involved with the

patients and obtain the appropriate patient history, thus are considered to have "more

authority, rather than just patient care…"

However, the students, in their perceptions of nursing, were not entirely accurate

in their definitions of the professionalism parameters that make up the nursing field.

While it is true that nursing education and practice is one of the oldest professions

consisting of strict entrance, education and training requirements, nurses do not carry

such professional autonomy and direction as described, quite the contrary, they are still

under the direct purview and control of the physicians. Furthermore, while nurses might

perform medical functions, they do not, in a sense, "practice medicine," when medicine is

so defined with the central core consisting of diagnosis, prescriptions, and treatment, all

core areas that are not the domain of nurses (Sandelowski, 2000, p. 107).

While the students considered nurses to be of higher ranking status, particularly

when compared to the role radiographers play in the medical arena, it is of essence to call

on Sandelowski (2000) in-depth historical study of the inception, growth, and

professionalization of the field of nursing. Nurses, from their inception in the field, did

become the what Sandelowski (2000) termed the "physician's eyes," where this position

established nurses as the "extra eye" of the physician, a critical place that elevated the

status of nurses and placed them in a higher ranking position in accordance with

physicians. The "close observation" of the patients afforded nurses "knowledge only

nurses could possess, having acquired this knowledge by their constant presence at the patients bedside, and it was this "privileged knowledge that physicians needed for accurate assessment and management of patient conditions" (Sandelowski, 2000, p. 69). Conversely, nurses, as the "eyes" of the "physicians," were placed "theoretically" in a higher position within the medical hierarchical structure, but are not recognized as such because of the field is feminized, with occupational characteristics associated with feminized fields, a "high touch" "nurturing" profession, and thus, undervalued.

Additionally, the work of Croissant (2000) and Witz (1992) lends an explanation towards the defining occupational parameters and patterns consistent with those professions that are feminized, as in nursing. Croissant (2000) explored the gendered occupations and profession, in particular reviewing case materials as in the work of Witz (1992), who explored the "historic" professionalism of nursing, where those within the nursing field sought to "improve the quality of the entrants to the field, centralize the authority over nursing care, and give it the social and legal status of the male health professions" (Croissant, 2000, p. 178-179). According to Croissant (2000), nurses, despite the major changes to the field and their successful actions to create a licensed profession, are still, "enjoined from diagnosis, intervention, and autonomous use of the tools of the trade" (Croissant, p. 179; Witz, 1992).

In summary, the profession of radiography and nursing are still under the purview of the physicians and radiologists and are therefore not involved in the diagnosis or decision-making processes (Sandelowski, 2000). Thus, both professions remain under the auspices of being "gendered professions," controlled by the "masculinized"

profession of medicine (Sandelowski, 2000; Croissant, 2000; Witz, 1992), where health professions as in nursing and radiography demonstrate how gender stratification exists and "access to the tools of the trade is one of the features gendered and disputed in the process of delimiting professional boundaries and identities" (Croissant, p. 177).

Interestingly, the issue of internal occupational closure to women, or the "gendered strategies of internal demarcation" as once described by Witz (1992; 1988), where male radiographers, faced with the fact that they could not keep females out of the profession, employed 'intra-occupational' control methods that were designed to keep women out of higher paying areas within radiography, were not mentioned by the female students, rather, issues of closure were noticed by the male students. Conversely, the male students did not feel "welcome" to pursue mammography and sonography, as both areas were, according to the male students, noticeably female dominated, and involved imaging "sensitive areas" of the female anatomy. The students commented on how the "nature of imaging" of the female patients "restricts," males from working in these areas, as patients, according to the ICC first year student, F8, "really request for a female mammographer." The BCC first year student, F7, commented that the patients in ultrasound would be similar, in that they would be uncomfortable with a male patient, "…you know, they want a female in there.... Let's say you're a tech, right? They want another female there. It's kinda like a privacy thing, you know."

Cockburn (1985) mentions how this closure, or restriction to mammography emerged "from the shadows and becomes one of the employer's management problems," as male radiographers in the clinical environment, when dealing with female patients,

must be "chaperoned" by a woman or another technologist. According to Cockburn, the issue of males being chaperoned during radiographic exams, as in mammography, has developed from "a situation where the individual man has to carry and answer for the relations that result from male sexual behavior" (Cockburn, p. 128). This situation of "male sexual behavior," has inadvertently worked against males in radiography, with the males in her study encountering what they considered "discrimination" when they were chaperoned while performing mammography exams on female patients (Cockburn, p. 128).

Thus, in the 21st century, and noticed by the students in this study, the restriction on males entering areas such as mammography, remains an unspoken and unwritten "rule." Males seldom cross the boundaries of entrance into mammography, and are not required, in addition to being licensed in diagnostic radiography, to have an additional certification in mammography, as do the female technologists. As females, there is pressure to be certified in mammography, as this makes the female technologists more marketable, and therefore more apt to be hired over female technologists who are not certified in mammography, in those departments where such imaging is present. The females in the BCC second and first year cohort, as well as the ICC second cohort, commented on the perception that there existed for them, as females, a sense of obligation towards training in mammography, as BCC S6 stated, "I should try it. As a female."

Furthermore, there existed an underlying "pressure" to train and become certified in mammography, for example, BCC S9 commented on how, if she decided to work at

her current training facility, they would "make her" train and work in mammography, regardless of her preference, "It's just okay. I mean once I've-I'm sure once I've taken it, completed it and if I was working here they'd probably make me do it." For ICC S1, she considered mammography training to bring a marketable skill, where work would be available as she is competing only with females for jobs in mammography, thus she would be assured of work regardless of how the job market for diagnostic might change.

In a sense, by the mere fact of being women, female technologists are those who can perform mammography, and, according to the survey data, a high percentage of female technologists are licensed in mammography and practice this in addition to diagnostic (ASRT 2001; ASRT 2004). Mammography thus becomes a "gendered skill," or, "sex-typed" (Croissant, 2000; Wajcman, 1995; Cockburn, 1985) as these are imaging skills that primarily (and logistically, based on the nature of the exams) only women can perform. Being obligated or perhaps "forced" to be certified in mammography also can be considered a form of what Witz has referred to as "intra-occupational" control, as women therefore end up being concentrated in one of the least lucrative imaging modalities that exist within radiology (ASRT, 2001; ASRT 2004).

However, while a majority of the students mentioned future plans to include advancing into other imaging modalities, as in CT, MRI, nuclear medicine, radiation therapy, cardiac-interventional, and for some of the ICC females, mammography, it is important to review where, according to national demographics, male and female technologists are in fact, distributed. Recall the ASRT (2004) longitudinal demographics conducted on the imaging profession every four years reveal what percentage of male and

female technologists work in diagnostic radiology, and the other imaging modalities. The ASRT (2004) reports that eight percent of the male technologists work in nuclear medicine, with women occupying nuclear medicine by four percent. The imaging modality radiation therapy is equivalent, with males and females at six percent women and 6 percent men; Cardio-interventional/vascular radiology consists of seven percent males versus four percent women, with CT scanning at 14 percent males and nine percent women. And last, MRI consists of 13 percent males and 8 percent females. Mammography, as we are aware, is female dominated (Reid, 2005), therefore proving how the high technology/highly computerized areas consist of more males than females, with the high touch areas/high tech areas being primarily female dominated (Reid, 2005).

In addition to being channeled into mammography, thus there being in existence a form of intra-occupational closure through this subtle yet existing measure, other forms of occupational closure and control do perhaps exist. Witz (1992) described where women were kept out of the higher paying radiography administrative leadership positions as measures to keep them out of radiography had failed, and such mechanisms were employed to limit the opportunity of women for advancement. This was detected by one of the females in the ICC second year cohort, ICC S5, who commented on there being a definitive lack of females in leadership roles at her training site, stating, "it would be nice to see more women in lead positions. Because um men are typically stronger, they get more experience in more areas…" To S5, she attributed males dominating the leadership roles to be because they are "stronger," "more reliable," and "less emotional" than women, informing me that, "typically they're [men] not as uh, I don't believe this,

but people believe that they're not as emotional. Women are more emotional. Women have, you know, children to contend with and they're typically the ones that take off to go take care of those children and uh, yeah it makes it sound stereotypical, but it's still the same unfortunately, and the extra reliability. I don't think that's always the case."

For S5, this observation on the lack of women in leadership positions is also described in the survey data reported by Reid (2005), where longitudinal data, demonstrates that greater numbers of males do indeed occupy the top supervisory, managerial and lead technologists positions. For example, in radiography, when compared to females, males make up the top administrative leadership positions by almost 10 percent, with females comprising five percent (Reid, 2005).

In alignment with literature on males working in female dominated professions, Williams (1992), among others, report that feminized professions offer to male's structural advantages, which tend to "enhance their careers" (Williams, 1992, p. 253). Males, who work in feminized professions as in nursing, are often placed in elevated positions based on virtue of the fact that "they are men" (Williams, 1992). Thus, within the feminized professions, men are "overrepresented in administrative and managerial capacities" (Williams, 1992, p. 256). Such overrepresentation by males in the top positions demonstrates the "preferential treatment offered to men" where they encounter what Williams coins, a "glass escalator" (Williams, p. 256). On the other hand, women who work in male dominated professions encounter a "glass ceiling" where they are "constrained by invisible barriers to promotion in their careers" (Freeman, 1990, in Williams, 1992, p. 256).

While diagnostic imaging is not one of the occupations studied by Williams, a distinction could certainly be made to the feminized professions in her study, nursing, education, social work and librarianship, where Williams found that males experience structural advantages and benefits. The literature applies to diagnostic imaging, where longitudinal data indicates more males occupying the higher paid leadership positions, and also the higher paying imaging modality areas as in CT, MRI, Cardiovascular imaging and nuclear medicine (Reid, 2005). Similarly, ICC S5 commented on this as well, where she noticed preferential hiring offered to males over females, "…the males dominant angio, they dominate surgery, well I see some females in MRI, in CT and x-ray, but I see males dominating ER. And I actually had someone tell me that they would not, they do not want to hire another woman in their department because they hired a woman and they had a bad experience with her…"

For women within radiography this is a microcosm that is reflective of the larger working world, where, historically, women have encountered crowding, barriers to higher paying occupations, and the inability to gain leadership positions (Roos and Gatta, 1999, Jacobs, 1999; Williams, 1992). Within radiography, there are three restrictive forces at work, with the first being hospital administration that places barriers and limitations to the higher paying areas for women by channeling males into such areas, thereby crowding women out. This is a smaller scenario that plays out the larger, historical picture, of women typically being crowded out or restricted from higher paying leadership positions. The second restrictive force is that within radiography, women are channeled into areas where, while there is little competition with males, there is even less

opportunity for advancement and they receive lower pay. As an example, females are almost "forced," at certain medical facilities, to sign agreements to train in mammography and are at risk to lose employment or even be hired on. The third restrictive force lies within the educational institutions, where females are encouraged to enter mammography by the educational institution faculty who are merely attempting to obtain enough female student "bodies" in order for the mammography classes to start with a sizeable population of students.

It is not surprising then to discover that males dominate the high tech/low touch/ where, consequentially, these highly computerized areas, when compared to CR/DR and mammography, are not considered or viewed as "dummied down" by computerized equipment that, according to Zuboff (1987) have taken over the work normally conducted by people, not only by "automating," but "informating" (Zuboff, 1987).   With CT scanning, where, in the past each individual "slice" or scan of a cross section of body had to be captured carefully through proper imaging, clear instructions for the patient to eliminate breathing motion, and through careful observation of patients, now each individual "slice" are images are taken in one quick scan, and reconstructed by the high powered, efficient computer. In reality, patients can be scanned in under 15 minutes, and the scans are of high diagnostic quality.   It is not so much that the operation of the technology is difficult, it has shifted to the technologists learning the skill of interpreting cross-sectional anatomy, and the computer does the rest.

However, the males in this study, it can be safe to assert, do not act without some accord, and are not hapless recipients of where they will eventually work. While they

were encouraged to move into other, high technology, low touch areas, it was determined, through their discourse, that the majority of the males desired to move into the higher technology imaging modalities, as in CT, MRI, nuclear medicine and cardiovascular imaging because of the nature of the work, higher pay, and sophisticated, highly computerized technology. They expressed interest in working in the imaging modalities, because diagnostic radiology has proven to be difficult, stressful, highly physical, "blue collar work" where there is greater risk of radiation exposure.

In truth, while the imaging modalities were considered attractive areas to work based on the "cool," or "neat" technology, areas that command better pay, described as stress-free environments, and the technologists are viewed by other medical staff as "professionals," there is a key point to draw out – that the modalities, as in CT, MRI and nuclear medicine, to name a few, were considered attractive perhaps because the males considered these areas to not be under the constant scrutiny and control of radiologists, thus less subjugated. When compared to diagnostic, the BCC male students described the modalities as those areas where the technologists are treated with respect, not looked upon or treated as "grunts," there is teamwork with other departments, in particular physicians and nurses, and the special imaging techs are independent, and autonomous. In diagnostic imaging, radiographers are the controlled "grunts," of the radiologists and considered as subordinates to other members of the healthcare system, specifically, the (female) nurses.

There is a gendered discourse present, established through the student conversations centered on the imaging modalities, where the males considered working in

these areas to gain autonomy and respect, this was not, however, a focus of discussion for the females. The underlying issue here is the male "resistance" to work in subjugated areas, as in diagnostic. This gendered discourse is similarly described by Weis (1990), in her study of males and females at a working class school situated in a de-industrialized and economically repressed area. The males in her study rejected and resented the institutional authority, yet tended to look at "schooling in highly utilitarian terms," recognizing that school will provide work and economy (Weis, 1990, p. 24). The male students in Weis's study exhibited "resentment toward authority" that Weis described as being "linked to perceived institutional control" with an elaboration of a "them versus us ideology which typified the struggle between capital and labor" (Weis, p. 18). The act of resentment towards "institutional authority" was not evident with the females in the study, and is distinctly, Weis states, a "male purview, tied at least theoretically to the historic struggle between capital and labor" (Weis, p. 61).

Recall that the BCC second and first year males, for example S7 and F3, described diagnostic imaging utilizing a discourse reflective of defying "institutional" or in this case, "medical" authority and "subjugation." A good example of this defiance can be interpreted within the resentment towards how nurses perceive radiographers, and how a historic power struggle still exists, with radiographers overshadowed by the "bastion" of medicine, the powerful and at times, "temperamental" nurses. For example, S1 commented on how radiographers are "subjugated" by nurses, and how this form of subjugation has rendered radiographers, for years, to be the "the red headed step children of nurses" where, according to S1, nurses and all others within the medical arena, in

particular physicians, consider radiographers as controlled allied health workers who merely and take the radiographs, and stated, "we are a nurse and you are just, you just take x-rays."

F8, also expressed how radiographers are "subjugated," through the perceptions of the medical staff, where radiographers are not visualized or treated as professionals, commenting that "…I found out recently that it's not really a profession, you know, because ah, we're not professionals, because you still take orders or something like that…is it that, we take orders, or we can't give order, or.... Like nurses -- Nurses, ah.... Yeah, nursing is a profession, while x-ray tech is not considered a profession. That's what I perceive...." Thus the radiographers are the picture takers, controlled or subjugated by others, most notably the physicians and nurses.

Furthermore, in defiance of medical authority, a number of the male students, as in S7 and F3, commented on how they preferred to work in the imaging modalities where they worked unsupervised, wore "professional attire," not scrubs, and considered the "grunts," who must take the orders. Recall that S7 described radiographers as the "blue collar workers" to the "other people that are in the medical field…which is not a bad thing but… the procedure doctors, you know, the doctors always want something done and they see you, and they see you as a grunt."

Similarly, F6 described how radiographers present the radiographs to radiologists and must respond to them, or are "subjugated" by them, through interaction where radiographers are issued the "orders," and direction, "…there's some [film/exams] that we need to show the radiologist...we need to go to the radiologist. Usually a tech tells us

just to go to the radiologist, 'Show him the film, and see what he says,' and that's what we get to do, show the radiologist. They let us know what needs to be done, or they're gonna be there. I mean, it's totally up to their discretion what's gonna be done." In contrast to diagnostic, F3 described the techs in, nuclear medicine, for example, as those who get to relax, and do their jobs while listening to music, "…you just get to chill out and listen to music while the dye sets in for the whole time…the nuclear medicine tech, uh, said, 'Yeah, it's really, you know, relaxing.' He's, like, 'I just listen to music all day, and the exams take a while.' So he's, like, 'You just kinda listen to music and get your stuff done, and....'" Similarly, F7 commented on how the technologists conduct the exams without supervision and act autonomously, with the ability to "inject" and wait. "…You know how many patients you have a day. Let's say there's a schedule for it, you know, and let's say you inject the contrast media, the nuclear isotope, you know, radiation. It's just kinda calm. There's not a r-- You don't have to rush. You know how many patients you have…" The male students desired to work alone, be in control of their day, be in charge of the exams, and not fall under the purview of the radiologists. In contrast, the female students wished to work in the imaging modalities based on concerns towards time spent with their families, to achieve higher pay to support themselves and their families, and to further their careers. They did not describe the technologists as "grunts," and they did not concentrate on similar aspects of the imaging modalities as the male students did. Once again there are connections to the work of Weis (1990) and her study on the working class high school males and females at "Freeway." Consequently, Weis discovered that a noticeable difference existed between male and females when

school authority and authority figures were discussed, and, subsequently, there were noticeable difference among the males focused on working in the imaging modalities, where they desired to work in these areas in order to be respected, to work alone and to be in control of their environment. The females did not focus on such aspects and did not mention this in their dialog when discussing the imaging modalities or their future career moves.

To conclude, this study can represent that there is and will continue to be changes to the profession, as proven by changes in gender make up of the field, demonstrated by the by the national data trends (Reid, 2005). Furthermore, we not only know that the gender make up is changing, we know too, how this is and will continue to impact women in the profession. It is reasonable then, to predict that as more males enter the profession, they may continue to occupy the higher paying, high technology – low touch modalities, and women may stay concentrated within diagnostic and mammography, the low paying, high touch/low tech areas,

The powerful medical community continues to play the role of gatekeeper, in a sense, for they to, mandate, allow for and encourage the burgeoning sex segregation that exists within the profession, through inadvertent mechanisms of   intra-occupational control, occupational segregation and subjugation much like those mechanisms once described by Witz (1992).

Additionally, there is the aspect of "deskilling" taking place within the workforce, as CR/DR takes over and replaces conventional radiography, most likely to influence, albeit negatively, the profession, by leading to a redefinition of the field, and

restructuring of the work environment, as radiography is "dummied down" by the automated/informated systems that have replaced the cognitive function needed to perform diagnostic radiography. Thus, women do not necessarily benefit as well as they could from this feminized profession, and while they are provided opportunity, economic resources and occupational mobility within imaging, it is not necessarily good enough, as there are in existence, restrictions. Moreover, women are associated with those modalities that are defined as "women's work," and their chances of sharing an occupation, or in this case, the higher paying imaging modalities, with men continues to decline, while, subsequently, men benefit. Described adequately by Jacobs (1999), who states that in the working world, "men's chances of sharing a field with women has increased markedly" and continues to do so (Jacobs, 1999, p. 127).

<div align="center">Theoretical Implications</div>

This research has several implications, most importantly; the findings are mixed with regard to gender theory. There are many different aspects to merge, where one theory stands alone and cannot possibly address the complexities of responses revealed by the students during the interviews. When considered, there are numerous aspects to address and be concerned with, and use of theoretical models that are bi-dimensional, multidimensional, or even multilevel (Korabik, 1999), and most often applied specifically to studies quantitative in design, fail to address the larger numbers of males working within imaging (when compared to male/female ratios in nursing, where nursing salaries are higher than imaging salaries), the increased convergence of males into this feminized

field, and how females, for years have dominated and continue to comprise the majority of radiographers in a technology based profession.

Moreover, and as mentioned, studies of males working in "gender nontraditional careers" are lacking, as most of the studies have concentrated on women working in male dominated occupations (Jome and Tokar, 1998; Lemkau, 1984). The current studies regarding males working in feminized professions remain inconclusive, where distinguishing characteristics of males working in such professions have emerged, with such males demonstrated more "atypical traits" than "typical traits" (Lemkau, 1984), or "male role norms" (Jome and Tokar, 1998), however, to date, there is not enough evidence to postulate that males who work in feminized fields demonstrate characteristics, or traits similar to those demonstrated by women.

Furthermore, it is difficult to account for the perspectives of a number of the women in this study. They are working within their own feminized field/gendered field, replete with patient care skills. It might have been thought that they would reveal language relative to their supposed gender roles and be more patient centered and patient focused, perhaps not so "removed." However, this was not the case. Additionally, there is no theory used that explained why one particular institutional program and the students used did not use any language reflective of patient care. There is no theory applied here that can suffice to explain the vast differences in discourse and the assumption that it is related to social background. Clearly social background is a heavy influencing factor, not gender. There is no one theory that is deemed adequate to address the differences in the discourse and language used by the BCC and ICC students, language differences that are

influences by social class, national origin, race and ethnicity and differences that could effect the care patients receive.

It is complicated even to describe what emerged, as "pieces" of the findings did not completely address the first set of research questions and just do not fit into the complex interplay of theories currently guiding research on gender. It stands to reason then, that use of gender role theories cannot, on their face, account for what emerged here. Indeed, and according to Korabik (1999), such theories need to be developed that "integrate the various levels and domains across which gender is manifested" (Korabik, p. 14-15). Additionally, studies on gender and the occupations, as in the radiography profession with its mix of patient care "feminized skills" and the technology "masculinized skills," need to take into account the cultural and class differences as demonstrated by this study, where the cultural, racial, and class structure of the students from both programs are interestingly diverse and most likely account for the differences among students during responses to the interview questions. It is not just a question of gender and our gender roles; it is a complex interplay of who we are as people, as individuals, as men and women.

Ideology can, most often, wrongly assert that we as males or females are interested in specific aspects about occupations, for example, as in technology. Cockburn (1985) asserts that it is difficult to determine if males are more interested in technology, perhaps, because while they may appear interested in technology over patient care, this can be based on societal and cultural pressure that caring for patients is feminine work

and thus is devalued. This alone can "make them more interested in the technical side rather than the caring side" (Cockburn, p. 139).

Furthermore, ideology wrongly asserts that as females, women are interested in working with patients, are not capable of handling technology, and are best at performing the work aligned to their gender. The men and women in this study fail to fit into any one theoretical category, proving the need for a multi-dimensional model, coupled with models that can address the social, cultural, and institutional influencers. It is highly possible that studies conducted on such intricate fields as in radiography and the imaging sciences can create new theory based on the levels of complexity revealed by the profession itself and those working within. It is curious as to why there are not more studies in existence that are concerned with radiology/imaging, gender and culture. Possibly this study provides the answer to my own questions, that the research is lacking based on enigmatic nature of imaging with it's mixed gender workforce, changing technology that brings a dichotomous reflection towards the nature of "skilling" or "deskilling," the mixed composition of occupational parameters, as in high touch/high technology, and the and defining nature of the field as a profession. There are multiple levels to this allied health profession, where one theory is inadequate to address so many levels, and indeed, out of each level, there is a study to be conducted, to be certain. Finally, while not necessarily demonstrated by this study, the implications of gendered strategies towards occupational closure for women do exist, thus one cannot discount Witz (1992) and her valuable work on the changes to the profession of radiography. The mechanisms employed to create internal occupational closure to women, or, the

"gendered strategies of internal demarcation" where women were restricted from obtaining higher paying positions, while not necessarily detected through the discussions with the students could be at work with the imaging arena. For, on the one hand, women were not necessarily mentored or encouraged to enter into the higher paying imaging modalities as in CT scanning, MRI and nuclear medicine, they were encouraged, or it was suggested to them, to train and be skilled in mammography. This fact alone "channels" women into this modality, and not into the other modalities. There exists an uneven distribution, controlled by societal morals and market driven, as women are more apt to obtain employment when skilled in diagnostic and mammography. It is possible that Witz' (1992) model of intra-occupational control could be expanded on for future studies of what could be considered a closure mechanism for women.

In conclusion, while some aspects of the theories utilized to guide this study can account for what was presented here, much remains to be explained, in particular with the first set of research questions. Expansion of theoretical frameworks can possibly address cross-gender/cross-culture fields, national origin, and socialization, thereby lending explanation towards the uniqueness of the students and their varying perspectives. . Furthermore, it is not possible to make any definitive conclusions at to why males or females are attracted to radiography, and certainly the males and females in this study cannot be accounted for by gender role theory. We are not as "agentic" or "communal" as depicted, rather we are , in addition to gender differences, influenced by social and cultural backgrounds, which was not addressed here. . However, application of professionalization theory offered insight, as did the various feminist theories on

technology, and in particular, Witz with her "intra-occupational" control/ closure theoretical perspective.

<div align="center">Recommendations for Future Research</div>

This study merely "scratched the surface," and, given the brief timeframe of a matter of five months did not necessarily adequately dig deep enough to acquire conclusive answers to the questions posited. Furthermore, this study utilized only one method of acquiring data, and involved interviewing relatively small sample sets of students from two schools located geographically close to one another. However, interviewing did capture valuable data that other methods could not possibly obtain, as the findings revealed data rich in personal comments, filled with stories and comments from the students that could not be revealed through other methodologies of data collection, as in survey data for example. With this being state, however, future research methods should involve a mix of obtaining data, similar to the study conducted by Seymour and Hewitt (1997), where survey data and interview data was collected over a lengthy period of time, allowing for the data to grant a complete study full of statistical quantitative evidence while not leaving out the personal qualitative data obtained from conducting interviews. Both methods, when used in conjunction with one another, are considered valuable for studies on students regarding choice of major, choice of professions, gender roles, and so forth.

Furthermore, document analysis would serve this type of study well, as newsletters, memos, hospital reports, hospital protocols, incident reports, policy reports, and hospital demographic data can reveal hiring patterns exhibited by medical facility

demographics and hospital protocol are just some of the documents that can add more to a study of this nature. Policy reports can reveal the differing layers of bureaucratic over imaging and the various modalities.

Additionally, there are other areas needing more research utilizing different data acquisition methods, as in participant observation. Much like the participant observation methods utilized by Barley (1982) where he observed, at two different medical facilities, the interactions of the technologists and radiologists while they learned to work with the new CT scanners observation of the students in action at their various clinical training sites could help triangulate or supplement statements made or not made regarding the patients. Participant observation can allow visualization on the part of the researcher to witness first hand how the students perform their skills and demonstrate their patient care values and skills that students might not be able to discuss, for the reasons or cultural, or social implications.

Participant observation can also allow for student and technologist interactions with the radiologists and physicians, where the structured hierarchical levels can play out, and one can witness how radiographers treated in the field, respected by who, and what types of interactions take place with those within the medical profession, as nurses and physicians. As our perceptions can cloud our interpretations, an uninvolved observer, would be more likely to decipher the negative or disrespectful interactions that take place.

The issue of salary and closure to the occupations could well be interpreted through use of survey data, as statistical evidence can reveal much about who works where and achieves monetary gain. While the ASRT conducts such longitudinal survey

data every four years, it does not explain why such disparities exist, in particular with mammographers and diagnostic female technologists ranked lowest on the pay scale. Survey data of students and technologists coupled with interviewing and participant observation could render a complete picture and reveal how the crowding of women into specific occupations continues to yield lower monetary gains for females. Additionally, other methods of research can reveal how even within their own feminized profession, females earn less then their male counterparts in not only the diagnostic area but also the special imaging areas. The "glass ceiling" or the hidden advantages for males working in female professions could prove to be a reality for radiography, similar to what males in nursing experience (Williams, 1992).

Lastly, major technological changes are occurring within diagnostic radiography, which, as we have witnessed through this study, carry lasting ramifications and are beginning to change the nature of the profession. In essence, the technological side of the field is altering, shifting, becoming simplified, which, in accordance with the literature, could de-professionalism the field, as those who consider the technology truly "push-button" might attempt to reduce the length of training, as in the case of the radiologists in Cockburn's (1985) study, where they considered six weeks to be adequate in length (Cockburn, p. 125). Thus, if the nature of the training changes and simplifies, most likely the salaries will reduced, and where men will no longer be interested in working in lower paying areas. Eventually, this may lead, on a larger scale, to women being crowded out of the higher paying imaging modalities as men continue to advance.

As in Barley's (1982) or Cockburn's study (1985), it is apparent that technology occasions change, just how this will occur remains to be seen and certainly studies on the field now could reveal the existence of pay disparities, and the changing nature of the profession, what will be the shape of things to come, in particular for women. Moreover, as technology advances and moves "patient care into cyberspace," (as in PACS) the ability to control such actions will most likely come under the increasing control of those who manage the regulations and rights to patient images, the administrators and physicians. And, as technology improves, modernizes and takes over more of the occupational responsibilities once delegated to people, so will the costs of medical care increase. However, as technological advances bring high paced efficiency with the ability to accomplish more while paying less, most likely, such advances can only cause profound changes to the nature of diagnostic radiography and the gender make up of its workforce.

<div style="text-align:center">Recommendations for Educators</div>

It is important to remember as educators how far our words can travel and how many students can be influenced by our comments. The BCC students demonstrated this, when they conveyed during the interviews their confusion created by one faculty member's comments regarding how radiographers are not professionals. Influence was also illustrated by how the ICC faculty instilled in their students a strong sense of patient care values. Faculty can have, whether they are cognizant or not, impact that can permeate, regardless of the beliefs that students might have. While faculty cannot change individual values and beliefs, it is paramount to share positive comments when possible,

and keep the negative opinions to a minimum. Of importance, students in any medical field have daily close contact with their patients, thus, awareness of how our comments can reach and influence numerous students is necessary. For if we are cognizant of just how far comments can travel, then we might be inclined to change what we state in order for our discussions to instead reflect strong patient care values and safety, and promote an awareness of human dignity.

Finally, the nature of our field is changing, as educators and practitioners, we know it is happening, and for better or worse, technology will continue to advance, bringing changes in the nature of education requirements, training, patient care and healthcare in general. Such changes will need to be adjusted to, beginning in the classroom with educators. Therefore, educators will serve themselves well by gaining in advance an awareness of the technological changes that are rapidly altering the profession, and, subsequently, the delivery of healthcare.

Conclusion

In conclusion, this study provided insight into the world of students on a deeper level than perhaps my own occupational position allows. Studying these students from a researcher perspective, as opposed to interacting with students on a daily basis, allowed me to enter into their world, shedding light on their motivational factors, their interests and future career moves. I was also able to communicate with the students on a different level, instead of performing daily lecturing, educating, counseling or reprimanding actions. Consequently, I was granted the opportunity to sit back and listen as an interviewer who held no history with these students. It is refreshing to listen to students

from such an angle, and revealed much about the classroom, the training environment, the technologists and managers who train them, and what type of interaction the students have with physicians, radiologists and nurses. Furthermore, the interviews allowed for the ability to obtain a first hand perspective that the students have regarding taking images and interacting with their patients. In this study, interviewing proved to be a vital data gathering method, and while it could have been supplemented by participant observation, interviewing proved to yield rich, and "personal" data that would not have been revealed through use of other methods.

Ultimately, perhaps such a study can be inspiration for other researchers towards the allied health professions, as these fields lack in similar methodology. Moreover, the allied health professions will most likely continue to attract increasing numbers of students, as other fields become saturated. As mentioned, the allied health professions are considered by many to be a "quick fix," short term programs that lead directly to gainful employment, thereby bringing the promise of bright occupational futures. Thus, it is of essence to gain an understanding of who will be attending to the patients.

A final point to make is that interviewing methods are important to utilize in order to obtain information on males working within feminized professions, as there is a lack of this type of methodology on the subject. The studies that are in existence are primarily quantitative survey methods that cannot necessarily capture the heart of who these individuals are and why they select these particular careers. It can be stated with certainty that the gender make up of allied health, and most notably, the imaging workforce is certain to keep changing, with males and females continuously crossing

over into once male or female or dominated professions. Multiple methods of research and analysis will be needed to shed more light on gender roles, the socialization process, culture, institutional and situational effects.

APPENDIX A:

DATA COLLECTION INSTRUMENT - INTERVIEW QUESTIONS

1. Tell me about you – what is your age, ethnicity, and gender?

2. Tell me about your home life – what is it like?

3. Tell me about your family, your parents, brothers, and sisters?

4. Do any family members have a college degree, if so who and what level of degree?

5. Who influenced you to enter into radiography?

6. How and why did they influence you?

7. What subjects did you like in school? Where you good at them?

8. What subjects did you dislike? Why?

9. What type of games did you play as a child?

10. As a child, what career(s) did you dream of ?

11. What are your hobbies?

12. Why did you choose to study radiography (reference to technology or patients)?

13. What interests you about the program itself?

14. Can you describe any negative experiences while in the program?

15. Can you describe any positive experiences while in the program?

16. What interests you about the profession (ask about technology)?

17. How do you view the technology that you are involved with in your training?

18. What would you consider to be a good day as a technologist?

19. Did you have many negative experiences while out in the field? If so, can you describe these?

20. Did you have many positive experiences while out in the field? If so, can you describe these?

21. If you had an additional hour in your day as a technologist, how would you spend it?

22. What are your future interests (career goals) upon graduation?

23. Why did you choose those future interests? Did anyone encourage/mentor you on these interests?

24. What imaging modalities are you interested in?

25. Why are you interested in those particular modalities? Did anyone encourage/mentor you on these particular modalities?

26. Do you know the pay scale for radiographers and the specific imaging modalities?

27. Do you think that radiographers in the specific imaging modalities receive adequate pay for the work they perform? If not, then why?

28. Anything else you would like to talk about regarding your experience training as a student in Radiography?

REFERENCES

Abbott, A. (1988). <u>The System of Professions, an Essay on the Division of Expert Labor</u>. The University of Chicago Press, pp. 1-3, 15-20, 33-34.

<u>American Medical Association Health Professions Career and Education Directory</u> (2001). pp. 312-313.

American Society of Radiologic Technologist (2001) <u>Radiologic Technologist Wage and Salary Survey</u>, November, pp. 14 –27, 77 – 82.

American Society of Radiologic Technologist (2004). <u>Radiologic Technologist Wage and Salary Survey</u>, July, pp. 25-55.

American Registry of Radiologic Technologists. (2006). <u>Educator Update</u>, March, p. 2.

American Registry of Radiologic Technologists. (2006). <u>Certification Handbook and Application Materials for Radiography Exams administered in 2006</u>. pp. 1-10.

American Registry of Radiologic Technologists. (2002). "Content Specifications for Mammography." http://www.arrt.org. Accessed April 10, 2006.

Ahn, J. (2003). "Think Outside the Box," <u>Advance for Imaging and Radiation Therapy Professions</u>, April 21, p. 34.

Ballinger, P. and E. Frank (2003). <u>Merrill's Atlas of Radiographic Positions and Radiologic Procedures</u>, CV Mosby co. pp. 329-349.

Barley, S. (1986). "Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments," <u>Administrative Science Quarterly</u>, Vol. 31, pp. 78-108.

Barley, S. (1996). The New World of Work, British North American Committee, pp. 4-49.

Berg, B. (1999). Qualitative Research Methods for the Social Sciences, Simon and Schuster, Massachusetts.

Bernard, H. R. and P. Pelto. (1987). Technology and Social Change. Waveland Press, Prospect Heights, Illinois, p. 301.

Blossfield, H. and Y. Shavit (Eds.) (1993). Persistent Inequality, in M. Winslow (1995). Where the Boys are: The Educational Aspirations and Future Expectations of Working Class Girls in an all-female high school, pp. 55.

Brint, S. (1994). In an Age of Experts: The Changing Role of Professionals in Politics and Public Life, in Rhoades, G. (1998). Managed Professionals, Unionized Faculty and Restructuring Academic Labor, State University of New York Press, pp. 20-23.

Brown, B.L. (1999). Vocational Certificates and College Degrees, ERIC Digest no. 212, pp 1-7.

Brown, C. (1973). "The Division of Laborers: Allied Health Professions," International Journal of Health Services, Vol. 3, No 3, pp. 435-443.

Burgess, R. (1984). In the Field: An Introduction to Field Research, George Allen & Unwin, pp. 102-106.

Burris, B. (1993). Technocracy at Work, State University of New York Press, pp. 113-125.

Radiologic Health Branch. Califonia Department of Health Services (1983). Minimum Standards for Radiologic Technology Programs, pp. 1-12.

Carwile, L. (2003). "Increasing Diversity in Radiologic Technology," Radiologic Technology, Journal of the American Society of Radiologic Technologists, pp. 85-89

Carli, L, and A. Eagly. (1999). "Gender Effects on Social Influence and Emergent Leadership" in G. Powell, eds. Handbook of Gender and Work, Sage Publishers, London, pp. 203 - 213.

Chaisson, G.M. (1976). " Student Selection: Logic or Lottery," Journal of Allied Health, vol. 5, pp. 7-16.

Cockburn, C. (1988). "The Gendering of Jobs: Workplace Relations and the Reproduction of Sex Segregation," in S. Walby, eds, Gender Segregation at Work, Open University Press, Philadelphia, PA, pp. 29-42.

Cockburn, C. (1985). "Technology and Caring: New Developments in Medical X-ray," in Cockburn, Machinery of Dominance: Women, Men, and Technical Know-how, Pluto Press, London, pp. 112-141.

Colley, A. (1998). "Gender and Subject Choice in Secondary Education," in Radford, J. eds, Gender and Choice in Education and Occupation, Routledge Press, NYC, NY, pp. 18-35.

Croissant, J. (2000). "Engendering Technology, Culture, Gender and Work," Knowledge and Society, Vol. 12, pp. 173-191.

Cullen, L. (2003). "Now Hiring!" Time, Nov 24, pp. 48-53.

Delpit, L. (1988). "The Silenced Dialogue: Power and Pedagogy in Educating Other People's Children." <u>Harvard Educational Review</u>, Vol 58, No. 3, August, pp. 280-298).

Eagly, A. (1987). <u>Sex Differences in Social Behavior: A Social Role Interpretation</u>, Lawrence Erlbaum Associates, Publishers, N.J., 7-25.

England, P. (1992). <u>Comparable Worth, Theories and Evidence</u>, Aldine De Gruyter, NY, pp. 18 – 19, 40-41.

Farineau, J. (2004). Communication via personal discussion . November 22, 2004.

Gagliardo, J. (2006) Communication by email correspondence, March 11, 2006.

Gaul, P. (2004). Communication via personal interview, November 11, 2003.

Goodson, V. (2001). Telephone interview, January 27, 2004.

Goodson, V. (2004). Communication by email correspondence, March 10, 2004.

Greenfield, H. (1969). <u>Allied Health Manpower: Trends and Perspectives</u>, Columbia University Press, 64-94.

Grubb, N. and Associates. (1999). <u>Honored but Invisible, an inside look at Teaching in Community Colleges,</u> Routledge Press, NY, pp. 3-5.

Gurley, L. and W. J. Callaway. (2002). <u>Introduction to Radiologic Technology</u>, Mosby Pub, pp. 3-15, 87-89, 317-342.

Harvey, D. (2006). "Remote Reading, PACS and Teleradiology let Radiologists Work Almost Anywhere," <u>Radiology Today</u>, April 10, Vol 7, No. 7.

Hearn, J and S. Olzak. (1981). "The Role of College Major Departments in the Reproduction of Sexual Inequality," <u>Sociology of Education</u>, Vol. 54, No. 3, pp. 195-205.

Hernaman-Johnson, F. (1919). "The Place of the Radiologist and his Kindred in the World of Medicine, " <u>Archives of Radiology and Electrotherapy</u>, Vol. 24, No. 232, Nov. pp. 181-187.

Hollenbeck, K. (1993). <u>Postsecondary Education as Triage: Returns to Academic and Technical Programs</u>, in M. Winslow (1995). <u>Where the Boys are: The Educational Aspirations and Future Expectations of Working Class Girls in an all-female high school</u>, pp. 55-56.

Integrative Postsecondary Data Set, <u>http://nces.ed.gov/ipeds</u>, accessed September 10, 2002.

Integrative Postsecondary Data Set, <u>http://nces.ed.gov/ipeds</u>, accessed February 10, 2006.

Jacobs, J. (1999). "The Sex Segregation of Occupations: Prospects for the 21st Century," in Gary Powell, eds. <u>Handbook of Gender and Work</u>, Sage pub. London, pp. 125-139.

Jensen, S. (1989). "Predictors of Success for Allied Health Students," <u>Journal of Studies in Technical Careers</u>, V. 11, No 4, Fall, pp. 297-303.

Jome, L, and D. Tokar. (1998). "Dimensions of Masculinity and Major Choice Traditionality," <u>Journal of Vocational Behavior</u>, No. 52, pp. 120-134.

Joint Review Committee on Education in Radiologic Technology. (2002), "Standards for an Accredited Education Program in Radiologic Sciences," pp. 1-12.

Joint Review Committee on Education in Radiologic Technology website, http://<u>www.jrcert.org</u>, accessed February 13, 2006.

Kaiser Permanente Hospital San Diego Occupational Mammography requirements. (2006).

Kellison, J. (1998). "Trends in College Degrees" Occupational Outlook Quarterly, v. 42, n. 2, Summer.

Kelly, A, in Radford, J. eds. (1998). Gender and Choice in Education and Occupation, Routledge Press, NYC, NY.

Kempner K, and C. Taylor. (1993). "Dynamics of Enrollment and Program Choice in Community Colleges," Community College Journal of Research and Practice, 17, pp. 415-432.

Korabik, K. (1999). "Sex and Gender in the New Millennium," in Gary Powell, eds. Handbook of Gender and Work, Sage pub. London, pp. 125-139.

Larkin, G.V. (1983). Occupational Monopoly and Modern Medicine, Tavistock Pub, London.

Larkin, G.V. (1978). "Medical Dominance and Control: Radiographers in the Division of Labour," Sociological Review, Vol 26, pp. 843-856.

Lemkau, J. (1984). "Men in Female-Dominated Professions: Distinguishing Personality and Background Features," Journal of Vocational Behavior, No. 24, pp. 110-122.

London, H. (1978). The Culture of a Community College, Praeger Publishers, N.Y, pp. 1- 11.

Long Beach City College Website, http://www.lbcc.cc.ca.us/2003, accessed January 19, 2003.

McGrath, D. and M. Spear. (1993). <u>The Academic Crisis of the Community College</u>, State University of New York Press.

Menville, L.J. (1934). "Selection, Education, and Supervision of X-ray Technical Workers, " <u>Radiology</u>, Vol. 23, pp. 230-232.

Miles, M and A. M. Huberman. (1994). <u>Qualitative Data Analysis</u>, Sage Publications, pp. 25-30.

Mittlehauser, M. (1998). "The Outlook for College Graduates, 1996-2006: Prepare Yourself," <u>Occupational Outlook Quarterly</u>, V. 42, no 2, summer. pp 1-7.

Morgan, F. (2002) National Center for Education Statistics, Postsecondary Studies Division, personal communication via email, October 8, 2002.

Morgan, F. (2006). National Center for Education Statistics, Postsecondary Studies Division, personal communication via email, February 13, 2006.

Pasadena City College Website, <u>http://www.paccd.cc.ca.us</u>, accessed February 10, 2001.

Pasadena City College Website, catalog information, (<u>http://www.paccd.cc.ca.us/instadmn/compsvcs/kiosk/CATALOG/C5Aradiologictechnology.htm</u> 2001).

Raymond, M. (2006). "Candidate Volume Increases for Primary Categories in 2005," <u>ARRT Educator Update</u>, March, p. 2.

Reid, J. (2005). "ARRT Gender Comparison," <u>Radiologic Technology, Journal of the American Society of Radiologic Technologists</u>, Vol. 77, No. 6, November/December, p. 143-146.

Rhoades, G. (1998). <u>Managed Professionals, Unionized Faculty and Restructuring Academic Labor</u>, State University of New York Press, pp. 20-23.

Roos, P. and M. L. Gatta. (1999). "The Gender Gap in Earnings: Trends, Explanations and Prospects," in Gary Powell, eds. <u>Handbook of Gender and Work</u>, Sage pub. London, pp. 95-121.

Roybal-Jones, R. (2003). "A Peek Inside the Classroom," <u>American Society of Radiologic Technologist Scanner</u>, Vol. 35, No. 11, pp. 6-8.

Saia, D.A. (2006). <u>Radiography Program Review and Exam Prep</u>, McGraw-Hill, pp. 36-37.

San Diego Mesa Community College Website, http://intergate.sdmesa.sdccd.cc.ca.us/ 2003.

Sanchez, T. (2003). "Workplace Changes: R.T.s go With the Flow," <u>American Society of Radiologic Technologists Scanner</u>, Vol. 35, No. 10, July, pp. 6-7.

Seymour, E. and N. Hewitt. (1997). <u>Talking About Leaving, Why Undergraduates Leave the Sciences</u>, Westview Press.

Singleton, R and B. Straits. (1999). <u>Approaches to Social Research</u>, Oxford University Press, pp. 320-323.

Snow, D. L. Zurcher, and G. Sjoberg. (1982) <u>Interviewing by Comment, an Adjunct to the Direct Question</u>, Qualitative Sociology, 5, pp. 285-311.

Spires, L. (2001). personal interview conducted via telephone.

Stroh, L. and A. Reilly. (1999). "Gender and Careers: Present Experiences and Emerging Trends, in Gary Powell, eds. <u>Handbook of Gender and Work</u>, Sage pub. London, pp. 307 – 324.

Thottam, J. (2003). "Health Kick," <u>Time</u>, Nov 24, p. 55.

Tysinger, J, and M. Whitside (1987). "A Review of Recruitment and Retention Programs for Minority and Disadvantages Students in Health Professions Education," <u>Journal of Allied Health</u>, vol. 16, pp. 201-217.

VanDerLinden, K. (2002). "Credit Student Analysis: 1999 and 2000. Faces of the Future: A Portrait of American's Community College Students," ERIC Document, #ED 453 820, pp. 1-17.

Wajcman, J. (1995). "Feminist Theories of Technology," <u>Handbook of Science and Technology studies</u>, Sage publications, pp. 189-193.

Walby, S, "Introduction," in S. Walby, eds. (1988). <u>Gender Segregation at Work</u>, Open University Press, Philadelphia, PA, pp. 1-13.

Warren, J. (1991). "The Changing Characteristics of Community College Students," in W. Deegan, D. Tillery and Associates, <u>Renewing the American Community College</u>, Jossey Bass Pub, pp. 53-76.

Weis, L. (1990). <u>Working Class Without Work, High School Students in a De-industrializing Economy</u>. Routledge Press, New York, pp. 20 – 25, 54 – 66, 150- 153.

Williams, C.L. (1992). "The Glass Escalator: Hidden Advantages for Men in the 'Female' Professions," <u>Social Problems</u>, Vol. 39, no. 3, Aug. pp. 253-265.

Williams, L. and W. Villemez. (1993). "Seekers and Finders: Male Entry and Exit in Female-Dominated Jobs," in C. Williams, ed, Doing "Women's Work:" Men in Nontraditional Occupations, Sage Pub, London, pp. 64-90.

Witz, A. (1992). Professions and Patriarchy, Routledge Press, NYC, NY, pp. 1-7, 147 – 153, 168-191.

Witz, A. (1988). "Patriarchal Relations and Patterns of Sex Segregation in the Medical Division of Labor," in S. Walby, eds, Gender Segregation at Work, Open University Press, Philadelphia, PA, pp. 74-90.

Zuboff, S. (1988). In the Age of the Smart Machine, the Future of Work and Power. Basic Books, pp. 3-12.