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A Case Study on the Process of Passing a Radiography Registry Examination

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

This project study addressed the problem of the low percentage of a Mid-Atlantic university's radiography graduates passing their credentialing registry examination. The cohort had a 2014 pass rate of 83% while the majority of surrounding schools had pass rates of 100%. In order to become registered radiographers, graduates must be able to take what they have learned in their educational program and directly apply it to their professional skill set. The conceptual framework for the study was social constructivism, adapting and transforming what was new information to previous experiences and group activities. A qualitative case study research design was chosen, and interviews were conducted with 9 graduates from the 2014 radiography cohort. The interviews were recorded, transcribed, manually coded, and analyzed for emerging themes. Key results indicated the graduates needed to self-monitor, self-motivate, and self-propel to successfully pass their credentialing exam. A 3-day professional development plan for graduates was created based on the findings from the study. Passing the credentialing exam affects social change in that knowledge and education produces positive outcomes, and for allied health professionals, it produces optimum patient care. Social change is possible through education, which will enhance an individual's self-efficacy, thereby enriching the society and culture to which they contribute. This knowledge will support the local problem in that optimum performance for radiography graduates will be monitored for standards of excellence.

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Dedication

This doctoral study is dedicated to my husband and children. I am a woman confident in my ability to use words effectively. However, no words can describe the love I have for my wonderful and supportive husband. I am grateful for our happily-ever-after ending.

My children, Michael and Patrick Grosse, have been accustomed to me being in school for nearly my entire life. I hope I have instilled my desire for learning in them so that they can see how joyous life can be when acquiring new knowledge. Growth accompanies learning and forward movement. I have never found it beneficial to literally or metaphorically stand still. Journeys cannot be journeys without forward movement.

Acknowledgments

I have always loved a good story. Recently I read some lovely prose that addressed the notion that stories come to us at the time they should be told. Thank you to my parents for the stories that sustained me throughout my life. Special thanks to my mother who instills the need of education in all of her children.

Thank you to Michael Hawkes who first granted me the privilege of teaching a radiography course. He believed in me as an untested instructor and has always supported me in my educational and professional endeavors, allowing me to bravely traverse the path of education and all of the crazy stories that it holds.

Thank you to Evelyn Sears, my classmate, compatriot in this land of learning, and fellow warrior as we battled procrastination, immobility, and lack of perseverance. As our stories followed the same trail, you have been everything a friend should be.

Special thanks to my doctoral committee, the best doctoral committee, who allowed me to tell the story of my project study. Dr. Debra Beebe, fellow cheese curd lover, you have been a dedicated, compassionate, and knowledgeable leader. Dr. Jean Sorrell, an honorary Madisonian, you have been insightful, kind, and steadfast. Dr. David Bail, I appreciate your guidance and contributions. Thank you all for being in this story and for playing major, life-altering roles.

As the stories of my life continue, I thank everyone who contributed to this project study and who helped me write this chapter of my life-long book. I am grateful for the narratives that have intertwined with mine and have come to me at just the right time.

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Section 1: The Problem

Introduction

The problem studied was the low percentage of a radiography program's graduates who passed their national credentialing registry examination. A graduate must become registered by the American Registry of Radiologic Technologists (ARRT) prior to securing permanent employment. This requirement promotes standards of excellence in the profession. Approximately 12,000 graduates from 700 educational programs in the United States take the ARRT registry exam each year (ARRT, 2014). Nine radiography students at a Mid-Atlantic university were interviewed after they passed their registry exam on the initial attempt. If they had not passed their exam, additional attempts would have been necessary prior to beginning their professional practice. The graduates' perceptions were examined to find the optimum pathway to passing the national registry examination to become a registered radiographer.

Definition of the Problem

The problem at this Mid-Atlantic university was that graduates must pass their credentialing radiography registry exam prior to gaining permanent employment. A radiography student becomes eligible to be a professional radiographer after attending an accredited educational program at a technical college or university and earning an associate's degree. Radiography programs are generally 18-24 months in length. Before beginning a radiographer's professional practice, a national registry exam consisting of 220 multiple-choice questions (20 are unmarked pilot questions) must be taken within a four-hour time limit and passed with a cut score of 75%. This credentialing exam is

written and maintained by ARRT, a governing organization that promotes high standards in the medical imaging profession (ARRT, 2015m).

After graduation, the certification process can begin by scheduling the credentialing exam based on the graduate's preparedness and personal schedule. In order to schedule an examination appointment, the graduate must have applied to ARRT for certification and received their *Candidate Status Report*. This report is sent by ARRT only after graduation and educational requirements have been confirmed by the educational institution's program director, a criminal background check has been performed to ensure good moral character, and the examination fee has been paid (ARRT, 2015e). The graduate must schedule their examination at a local testing center within the next three years. Three attempts within three years is the limit. Should the graduate fail three times after three years, the radiography educational program would need to be repeated (ARRT, 2015g).

Passing the ARRT registry on the initial attempt is important because of its effect on the educational institution's pass rate. Pass rates are determined mathematically, are reported annually to the Joint Review Committee on Education in Radiologic Technology (JRCERT), and affect accreditation status. The accreditation of each educational institution is dependent on pass rates above 75% (JRCERT, 2015a).The exam results are reported as a scaled score and "a total scaled score of 75 is required to pass an examination" (ARRT, 2015c, p. 1). Table 1 indicates the credentialing exam pass rates for the radiography cohort at this Mid-Atlantic university for the past three years.

Table 1 information indicates the pass rate for 2014 was 83%. When the cohorts are small in number, as they are at this educational institution, should four or more students fail to pass their registry, the pass rate would drop to below the required 75%. This would jeopardize the program's accreditation status. Losing accreditation would mean a decrease in enrollment since student radiographers need to graduate from an accredited program to be eligible to take the ARRT registry.

Table 1. *Annual Program Summary Report*

	Mean scaled score for total test	Percent of examinees passing	Number of examinees
2012*	81.9	82	11
2013	84.9	92	13
2014**	80	83	24

*Year the program began
** Two graduating cohorts in this calendar year

There are currently 15 JRCERT accredited radiography programs in this Mid-Atlantic state. Twelve of the schools' pass rates from the last three years are shown in Table 2. The pass rate from the Mid-Atlantic university's program is not shown and three schools' pass rates were unavailable. From Table 2, only two schools, Schools C and E, have credentialing exam pass rates below 90%. To remain competitive with other programs in the region, the Mid-Atlantic radiography program studied will need to raise their credentialing exam pass rates. Their students need to perform better on the registry examination. The gap in practice would most likely be occurring in the transfer of

knowledge or application of the knowledge to be gleaned from the curriculum. Most of the neighboring programs have published a 100% credentialing exam pass rate. This includes both proprietary and state supported educational institutions.

Table 2. *Credentialing Exam Pass Rates for JRCERT Accredited Mid-Atlantic Area Radiography Schools*

Name	Pass rate 2011	Pass rate 2012	Pass rate 2013
School A	100	100	100
School B	100	100	93
School C	100	77	83
School D	100	100	100
School E	88	100	75
School F	100	100	90
School G	100	100	100
School H	97.4	96.7	97
School I	100	100	100
School J	100	100	95
School K	100	100	100

To promote high pass rates, most educational programs provide a registry review course at the culmination of the program. The Mid-Atlantic university examined in this case study provided this registry review (East Coast Polytechnic Institute University,

2015a) as the last didactic course in the curriculum, at the very end of the five semester program. In this course many mock registry exams were given to prepare the student with examples of the question format as well as the length of the timed exam. A Health and Environmental Science Institute (HESI) exam was also given which is a purchased exam that gives an individual summation of strengths and weaknesses based on the five exam content categories (Evolve/Elsevier, 2015).

ARRT publishes a handbook each year with information on the registry. It is designed to help the examinee comprehend, apply, and prepare adequately for the certification process. It also contains tips for taking the exam, descriptions regarding the examination process, and the content categories (ARRT, 2015m). Table 3 shows the content categories for the 2014 radiography exam:

Table 3. *Content Categories*

Content category	Percent of test	Number of scored questions
A. Radiation protection	22.5	45
B. Equipment operation and quality control	11	22
C. Image acquisition and evaluation	22.5	45
D. Imaging procedures	29	58
E. Patient care and education	15	30
Total	100	200

After taking the HESI exam, results were given to the student specific to the content category. For example, if the student scored poorly in the imaging procedures category which had 58 questions, approximately one-fourth of the exam, they would know to review the content extensively in this subject area.

Questions for the ARRT registry exams are written by subject matter experts in the form of volunteer committee members, survey respondents, and reviewers. Approximately every 2–3 years ARRT announces that they are in need of subject matter experts and encourages professionals in the medical imaging fields to apply (ARRT, 2015f). A small group of subject matter experts, approximately 20 in number, are then chosen based on experience, education, and geographical location. They are then trained at a conference at the ARRT offices in St. Paul, Minnesota, over a period of three days on how to write questions for each category. ARRT covers all expenses for this conference. Since many forms of an exam are developed, volunteers are always needed (ARRT, 2015f). Question writers, or item writers, serve for a one-year term and are paid for each question that is accepted as a potential item on an exam.

The process of an item advancing to appear on the registry is a complicated one, finely developed by ARRT's Psychometrics Department. Consultants from many levels of experience, from the newly graduated to those who have decades or more of experience, are asked to contribute questions or items, serve on committees that assemble and review new forms of examinations, and to perform large-scale practice analyses (ARRT, 2015d). The entire process from the creation of an item to appearing on an examination can take up to three years. Due to high levels of security, item writers

never know if their items appear on the examinations; however, they are aware that they have made important contributions.

I served as an item writer for 1 year, 2013, and submitted approximately 15 questions per month. I was able to confirm to the students the high security measures maintained by ARRT to ensure the confidentiality of the questions, success of the registry examinations, and the importance of studying all content categories. The registry serves as the final component of summative feedback and the last part of the radiography student's educational process. Without registration, a radiography graduate is virtually unemployable.

The registry exam has been in place since 1922. Today there are over 300,000 registered technologists in the United States known as RTs or radiographers (ARRT, 2015k). Its most recent format consists of 200 multiple-choice questions with 20 unidentified pilot questions administered on computer work stations at regional testing centers. The total time allowed to complete the exam is four hours, including a 20 minute tutorial on how to complete the exam. A preliminary score is given immediately following completion. The cost is $200. Should the radiography graduate fail the exam, the exam would need to be retaken at the same cost.

Rationale

Evidence of the Problem at the Local Level

The problem at the local level was that the Mid-Atlantic university wanted to produce a high performing and successful graduate. These graduates needed to successfully pass their credentialing examination in order to begin their professional

practice. There are 15 JRCERT accredited radiography programs in the state making a highly competitive environment for employment. Failing the exam is costly both in the delay in beginning the graduate's professional career and in the monetary amount of exam fees since the examinee must pay $200 each time the exam is taken. It also affects the university's pass rates which could potentially affect the accreditation status by JRCERT, the only national accrediting agency for the radiologic sciences (JRCERT, 2015b).

The school's reputation is at risk should their pass rates continue to be low. Since its radiography program first gained JRCERT accreditation in 2013, the school has yet to prove how successful the graduates will be. Health care is a field in which errors cannot be made when patients' lives are at stake. Radiographers' anxiety levels are often high concerning the quality of their work (Strudwick, Mackay, & Hicks, 2011), so a high-performing graduate needs to be produced. The world of radiology is one in which radiographers will play roles in helping patients understand their clinical images and examination data (Robinson & Oakley, 2014). As the graduate begins practice as a professional radiographer, the transition to becoming a valued team member will reflect well on the Mid-Atlantic university's radiography program.

Evidence of the Problem from the Professional Literature

The problem of passing the ARRT exam is one that every radiography graduate in the United States faces. The number of graduates who pass the exam from each cohort determines whether or not the educational program is a successful one. Licensure and obtaining a credential is a major component of professionalism (Parrish & Jensen, 2013).

The graduates must sufficiently prepare to take and pass the ARRT examination or their pathway to professional success can be severely delayed.

The graduates are at the end of their educational program when they receive this summative feedback in the form of the credentialing exam. According to Divall et al., (2014), summative feedback happens at the end of the teaching and learning process. It is feedback that determines the next phase of the students' progression, which in this case is working as a practicing radiographer. Summative feedback can prove to be difficult in any radiography program (Brackstone, 2013), but is vital in order to maintain high standards in the profession. Formative feedback is given throughout the educational program in every radiography course. Radiography programs are lockstep in that students must pass each course in order to continue in the program.

Should a student fail a radiography course, the course would need to be repeated when it is next offered, and a passing score obtained before continuing in the program. Courses are only offered within the cycle of the curriculum. Failing a course could possibly delay a student's graduation by eight months or more since retaking the course can only occur when it is offered for the next cohort. Only when each course in the curriculum has been successfully passed is a radiography student ready to take the ARRT registry exam and receive that summative feedback.

A preliminary scaled score is given at the end of the credentialing examination. Final scores are mailed to the examinee a few weeks after the exam has been taken. Table 4 indicates the percentile rank of the percentage of examinees scoring below a specified

scaled score. For instance, if an examinee scored 89, he or she scored higher than 70% of all examinees taking the registry exam during 2014 (ARRT, 2014). This summative feedback is unique to the credentialing exam and cannot be obtained from any type of evaluation done during the student's educational program.

Table 4. *Percentile Ranks for First-Time Examinees, 2014*

Percentile rank	Scaled score
95	94
90	93
85	92
80	91
75	90
70	89
65	89
60	88
55	87
50	86
45	85
40	84
35	83
30	82
25	81
20	80
15	78
10	76
5	72

Radiography programs often include an ARRT review course in their curriculum. It is placed at the end of the program, just prior to graduation. During these courses, mock registries are given to prepare the student to take a lengthy examination. However, these are recycled exams and oftentimes the student who studies arduously will see questions that have been previously used on past exams. Therefore the ARRT

credentialing exam is the only true test of a student's knowledge at the end of the program. The examinee will be given data, along with their final score, to see how they compared to examinees across the United States.

To obtain feedback on what they already know college students use a variety of strategies to pass examinations (Hartwig & Dunlosky, 2012). Learning strategies are changing due to changes in classroom instruction. Due to technology, learning can occur through online courses with technological tools to enhance instruction (Suda, Bell, & Franks, 2011). The laboratory portion of radiography programs need to be taught in a traditional brick and mortar classroom due to the hands-on nature of the profession and the need for simulating procedures in preparation for proficiency in the clinical environment. Due to the hybridization of learning techniques, both on ground and online, radiography students need to develop learning and test taking strategies best suited to their goals.

There are textbooks designed and written specifically to aid in studying for the ARRT registry. They are updated annually and provide many examples of test questions. Should the radiography student receive one or two textbooks as part of their end-of-program registry review course, the option remains for the student to purchase more of the same type of textbook to obtain more examples of test questions. There are also many online programs such as RadReviewEasy, which provide sample test questions in order for the student to effectively prepare for the exam (RadReviewEasy, 2015). Whatever means students choose should be based on their learning style, what they can afford to purchase, and their time management skills.

The purpose of the study was to have graduates provide their perceptions of how to be successful in passing the ARRT registry. The graduates' perceptions of what study skills and/or study aids should be used, how much time should be spent on studying, how to study, and when to take the examination were studied. Their perceptions of what made them successful were sought in order to provide assistance to other radiography graduates and other radiography programs. The ARRT credentialing exam can be a major obstacle that all graduates must overcome. The perceptions of how to successfully and efficiently do this were studied.

Definitions

The following terms will be used frequently in this study:

Accreditation of a program ensures protection of the consumer, quality of the educational experience, and high programmatic standards (Carter, Zabriskie, Anderson, & Janssen, 2013). The radiography program studied is regionally accredited by the Southern Association of Colleges and Schools (SACS) and nationally accredited by JRCERT. The process of becoming accredited is an arduous one, generally taking 18-24 months and involving the creation of a written self-study to support how standards of excellence are maintained, a site visit by voluntary site visitors, and a decision by the accrediting body's board of directors.

The American Registry of Radiologic Technologists (ARRT) is the national authoritative body of all radiographers. Its mission is to promote high standards of the profession by only recognizing qualified individuals to perform medical imaging (ARRT, 2015m). ARRT develops the national registry exam, certifies and registers new

radiographers, and facilitates the annual renewal of registrations by verifying adherence to continuing education requirements.

Radiography registry is the ARRT exam created to test the knowledge of graduating radiography students to ensure proficiency in the profession. Written by ARRT, it consists of 200 multiple-choice questions, along with 20 unidentified pilot questions. There are five content categories with the percentage of test questions in each category indicated as follows: Radiation Protection (22.5%), Equipment Operation and Quality Control (11.0%), Image Acquisition and Evaluation (22.5%), Imaging Procedures (29%), and Patient Care and Education (15.0%) (ARRT, 2015h). When final and official scores are given to the student, not the preliminary score given immediately upon completion at the exam center, scores in each category are disclosed.

The *American Society of Radiologic Technologists* (ASRT) is an organization that supports many facets of the radiography profession, including monitoring its member's' continuing education credits. Conference producers must request that the ASRT determine whether or not attendees may earn continuing education credits from conferences due to content and subject matter. The ASRT's mission is to "advance and elevate the medical imaging and radiation therapy profession and to enhance the quality and safety of patient care" (ASRT, 2015b, para. 1). The ASRT also wrote the curricula for all radiologic science professions (ASRT, 2015a).

A *credentialing exam* is the test that determines whether radiography graduates have accumulated the necessary knowledge to serve in a professional capacity. Similar to other allied health professions, a registered radiographer protects the public from

graduates who have not undergone the transfer of learning. A credentialing exam ensures a competent and ethical workforce (Parrish & Jensen, 2013). A radiographer must pass the credentialing exam prior to obtaining a state license and becoming registered by ARRT.

The *Joint Review Committee on Education in Radiologic Technology* (JRCERT) is the only national accrediting agency for radiography programs recognized by the United States Department of Education. Graduation from a JRCERT accredited program ensures registry candidates that they have received an education where the curriculum and clinical experiences have been evaluated according to the JRCERT's standards of excellence.

A *pass rate* is mathematically determined by dividing the number of exam candidates who passed the exam by the total number of candidates (JRCERT, 2015c). For example, if the cohort contained 15 graduates and only 13 passed the registry exam, 13 divided by 15 equals a pass rate of 87%. Pass rates are also calculated by ARRT on the Annual Summary Report of each educational institution (ARRT, 2015b). Pass rates are used by the JRCERT accrediting body to determine the success of an educational program in radiography since high pass rates correlate to retention of knowledge necessary to be a registered and ethical radiographer. JRCERT also requires pass rates to be published on the educational institution's web page so that they are public knowledge for any prospective student (JRCERT, 2015a).

A *radiographer*, referred to as a radiologic technologist prior to the 1990s, is a member of the allied health care team who takes the x-rays and performs the radiology

exams ordered by the primary physician. The x-rays are interpreted by radiologists to answer the questions asked by the ordering provider in determining diagnoses and prognoses. Radiographers provide care for the patient while the patient is in the radiology department. Radiology exams can also be done at the patient's bedside with a portable unit, so the radiographer provides care while at the patient's bedside as well. Once the images are taken, the radiographer prepares them for viewing by the radiologist who then provides a formal report to the patient's primary care physician. It is vital that the images are optimum and standardized so that pathology is not excluded from the radiographs (Jones, 2012). The radiographer performs under their scope of practice by not providing results (Sherratt, 2012), which are only provided by a radiologist.

A *radiography student* is any student in a formal radiography program. Programs range from 18-24 months and an associate's degree is generally earned upon completion. The educational culture is currently in the process of converting to all radiography programs conferring associate's degrees since it will be a requirement of ARRT in the year 2015. Those programs that currently award certificates will be forced to convert to associate degree programs. The Mid-Atlantic university studied awards an associate of applied science degree in radiography. Graduates then need to take the ARRT registry examination prior to beginning employment in the profession. All radiographers are ARRT registered which requires annual dues and continuing education credits to maintain registration. Students are vital to the future of the profession (Freeman, 2014) and must be nurtured to ensure that a qualified radiography workforce is maintained.

Study aids are what students use to study for exams. These can be pencil and paper worksheets, online quizzes, computer programs, flashcards, or any tools to help students perform better on exams without providing a significant increase in workload (Baranczyk & Gray, 2014). If students self-select their study aids, the students tend to be more successful and motivated than those students who did not use study aids in their learning and retention of information.

Study strategies vary per individual, but are what students use to retain information and become successful with examinations. Study strategies can fall into three categories: rehearsal/practice, conceptual/organized, or review of resources (McNulty et al., 2012). Academic achievement is strongly associated with effective study strategies, versus ineffective rote learning (McNulty et al., 2012). Choice of study strategies will vary with individuals and will reflect past experiences at achieving success in academic environments. Generally students are encouraged to review material periodically throughout the course of their radiography program to retain information in preparation for the credentialing exam.

Significance

This project study is important because it addresses the need to adequately prepare radiography students to pass their national registry exam upon graduation. Several radiography schools exist in the region of the country where the study was conducted, but all of the participants were from one Mid-Atlantic university. Since the allied health care market is a competitive one, a graduate must be ready to optimally perform both on the national exam and in the clinical environment. Tuition for this 18-

month program is $44,500 (ECPI, 2014b). A successful graduate can reasonably expect to obtain an entry-level annual salary of approximately $45,000 in this geographical region of the United States. Effective preparation upon graduation is critical for the graduate to be able to transition to the professional environment and begin earning income.

The significance of this project is that it can positively impact radiography graduates across the United States and thereby contribute to social change. It can have both local and global impacts on the radiography profession. Every radiography student in the country must take the ARRT registry upon graduation in order to become a registered radiographer. Every radiography student would benefit from passing the exam on the initial attempt due to the cost and time involved. Passing the registry ensures that the profession adheres to excellent standards and provides optimum patient care in the health care environment.

Guiding Questions

A radiography student begins their educational program knowing they must earn a passing grade on their registry examination at the completion of their program. This is the focus of their education. The ARRT registry must be passed in order for the radiography student to transition to a registered, professional radiographer. The number one goal is for the radiography student to become a valued and high functioning member of the allied health care team. The images the radiographer takes and presents to the radiologist provide ways to answer questions about the patient's health and thus represent a vital function in the health care process.

Since the credentialing exam can be seen as a barrier to the student becoming a radiographer after graduation, a great deal of time is spent studying and learning about the registry exam. A review course to prepare the student for the ARRT exam is a part of most of the curricula in radiography programs across the country. Software programs, available for purchase, also exist to aid in the student's preparation. Some students elect to take a short break following graduation to devote all of their time to studying for the registry exam. . It is an exam that induces high anxiety levels since the results can alter a graduate's career path, earning potential, and overall direction for the future.

The guiding questions for this study were:

1. What study skills and study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam?
2. What factors in their student experiences do radiography graduates perceive as having been most important in helping them successfully pass their national registry examination?

I asked nine of the 2014 radiography graduates what they perceived were the most successful strategies for passing their registry exam and what study skills and aids they perceived to be the most effective in this process.

Review of the Literature

The strategy used to research available literature were the databases in ProQuest Central, Proquest Nursing and Allied Health Source, and Health & Medicine Complete. The terms used were:

radiography, radiography program, credentialing exam, allied health, social constructivism, case study, and *radiology.* Electronic peer reviewed journals and traditional textbooks were used to support information. Since the radiography profession is one involving many governing bodies, the ARRT, ASRT, and JRCERT websites were frequently referenced. Emphasis was placed on the social constructivism conceptual framework.

Two Phases of Learning

Good, Ramos, and D'Amore, (2013) stated that allied health students must be successful in two phases of learning. They have a pre-clinical phase of didactic classes and a clinical phase for the direct application and understanding of the knowledge they have acquired in their pre-clinical curriculum. This is true of radiography students at this Mid-Atlantic university. There are designated clinical instructors at each affiliated clinical site who evaluate the student's performance and provide necessary communication to the clinical coordinator of the medical radiography program. These clinical instructors must be registered radiographers and be familiar with the educational process. They must be able to evaluate each student for competency via a radiology examination that the student performs independently with the clinical instructor observing in order to ensure patient safety.

A competency evaluation involves a three-phase paradigm: the student first observes a radiologic examination, and then assists with an examination performing approximately 75% of the exam, and then the student performs the exam independently with the clinical instructor in close observation range. In order to pass the clinical

component of the radiography program the student must demonstrate competence in 6 mandatory general patient care activities, 31 mandatory imaging procedures, 15 elective imaging procedures, one elective imaging procedure from the head section, and two elective imaging procedures from fluoroscopy studies (ARRT, 2015o). The clinical instructor also provides a mid-term and final evaluation on each student after each clinical rotation. Should the radiography student fail a clinical rotation, they would also fail the clinical course causing a delay in their graduation.

Radiography students are generally kinesthetic learners (Samarakoon, Fernando, & Rodrigo, 2013) since it is a hands-on profession, involving touching both patients and the equipment required to procure a radiographic image. For radiography students to transfer that hands-on knowledge to a multiple choice exam may prove to be problematic. The format of the ARRT registry examination consists of only multiple-choice questions. Therefore, the radiography graduates' test-taking history was evaluated.

Social Constructivism

The conceptual framework for this study was social constructivism since the students in the radiography program were generally nontraditional, seeking a career change, and they constructed meaning from their varied past life experiences (Merriam, Caffarella, & Baumgartner, 2007; Owen, 2014). Social constructivism has been used in adult education due to the students' diversity in background, education, and experiences. Since the radiography cohorts are diverse in terms of age, background, and ethnicity, how they constructed meaning from their past experiences is what connects them to their success with present experiences in their educational environment.

The radiography students began their curriculum with direct instruction. As Moalosi (2013) detailed, there are four characteristics of lessons involving direct instructions:

1. Objectives are stated. Students need to be told what they should be learning.
2. Prerequisites are reviewed: Skills and concepts from previous lessons are reviewed.
3. New materials are presented to contribute to the learning process.
4. New learning probes are conducted to assess levels of understanding.

These four characteristics were followed as students learned how to take radiography exams. First the objectives were stated, the radiography exam was demonstrated by the instructor, and a *simulated* patient (either a volunteer student or a mannequin) was used so that the student knew what should be learned. Skills from previous lessons or exams were then reviewed. New directions and material were given depending on the anatomy and positions of the subject to be taught. Assessments were conducted to ensure a high level of understanding regarding the new radiography exams. Direct instruction was necessary in order for radiography students to learn the practice of optimum patient care. Simulation was necessary prior to performing the exam in the clinical environment on a live patient. Once that instruction was converted to knowledge, the learning theory of social constructivism became effective.

Social constructivism starts with real world tasks, also called authentic tasks, and combines them with the students' own experiences to enhance their construction of knowledge (Moalosi, 2013). This requires the student to be engaged in activities, to have

support from their facilitators, and then to be able to perform activities alone. This follows the way radiography exams are learned. First the student must be engaged while watching how the x-rays should be performed. Then they have support while they practice the exams in the simulation lab and from a clinical instructor while in the clinical environment. Teachers scaffold the students (Moalosi, 2013), providing guided practice as the students transition from developing understanding to automatically performing a skill.

The radiography students began their curriculum by learning through direct instruction. Experiential learning, however, also had an impact on the way they learned. Philosopher John Dewey discussed educators as facilitators who helped connect learning with students' experiences and cooperative environments, not merely dispersers of information (Caufield & Woods, 2013). The facilitators begin as holders of information; as the student learns, that information is transferred to retained knowledge.

Self-Reflection

Fenwick further developed the concept of experiential learning to five perspectives, one of which is constructivist. A major concept of experiential education is that the students reflect on their concrete experiences in order to build new ones (Caufield& Woods, 2013). From the constructivist perspective, the student will reflect on lived experiences, generalize those concepts to form mental structures, and then store them as concepts to be applied to new situations. This learning can be rooted in a situation that occurs in social settings. Social Constructivism connects learning to social settings and experiences.

According to al Mahmud (2013), many other philosophers and educators have developed the ideas associated with the basics of social constructivism. This philosophy of learning has roots in the eighteenth century with the works of Giambattista Vico. Constructivism and reflectivism include the concept that humans can understand only what they themselves have constructed. Other great philosophers and educationalists such as Piaget, Vygotsky, John Dewey, Jerome Bruner, and Ulrick Nelson have contributed to the basics of these ideas. Constructing their own knowledge enables students to construct their own solutions to problems. The solutions then become part of students' own experiences (al Mahmud, 2013).

Social constructivism is a conceptual framework based on the premise that new knowledge is built on prior knowledge (Hinshaw, Burden, & Shriner, 2012). Optimal learning occurs through active interaction with the material to be learned. Teachers take on the role of a facilitator or supporter, coaching and modeling techniques. This is what occurs in a radiography simulation lab. Hands-on activities are associated with constructivism since they are both interactive and social (Hinshaw, Burden, & Shriner, 2012). Other activities that would be successful for social constructivist learners would be group work and activities that build trust. Constructivism requires a safe and comfortable learning environment for optimal learning to occur.

Social constructivism is a shared learning experience which is optimum for the returning adult student population at this Mid-Atlantic university. Mbati (2013) discussed the emphasis of social constructivism on social transformation. Drawing from the works of Leo Vygotsky, a Russian psychologist, and Jean Piaget, he states that the common

thread is one of learning by creating new knowledge based on what has been previously learned. This has been described as a four step process:

1. Prior knowledge is recalled and elaborated.
2. The student differentiates between the prior and new knowledge.
3. The student interprets and modifies prior knowledge in terms of new knowledge.
4. Self-reflection occurs so that the student is aware that learning has taken place (Mbati, 2013).

Self-reflection is a strong component of social constructivism.

Stressing the social context, Bay, Bagcecci, and Cetin (2012) state that social interaction creates a positive effect on learners. Working in collaborative groups allows members to see different angles and to create meanings from shared perspectives. The authors also cited Vygotsky and discussed how a child's learning potential develops as the child interacts with other knowledgeable individuals. Achievements of human beings occur as acts of cooperation (Bay et al., 2012). Problem solving and metacognitive awareness skills improve in a group situation.

Students are empowered when they reflect on their own learning processes. Douglas and Morris (2014) discussed how the constructivist theory of learning helps students build their own understanding of a subject through engaged activities rather than passively accepting information that is given to them. Students should not be seen as empty vessels for instructors to fill with information. If given autonomy over their learning, students become intrinsically motivated with a sense of power, competence,

relatedness, or purpose (Douglas & Morris, 2014). The authors went so far as to discuss allowing students to develop their own course requirements in order to increase internal motivation. Although not entirely possible in a radiography program where the curriculum is dictated by the ASRT (ASRT, 2015a), certain guidelines could be developed with the aid of a facilitator familiar with the required curriculum components.

In a Turkish study conducted by Özar (2012), the curriculum process was developed by the learner and informed by the needs of society. The curriculum was based on demands from the academic world, government, business sector, religious institutions, society, parents, and Non-Government Organizations. In that study, the classroom was not a place where the students were considered empty vessels to be filled with information but one where the students were actively engaged with their own learning process to create their own knowledge. Students were also encouraged to reflect on their own learning experiences. The students' perceptions of the world changed because they were able to accommodate new ideas and discard old ones. Özar, (2012) stated that one of the fundamental characteristics of social constructivism is that the learner is active in the learning process so as to be able to construct his or her personal knowledge.

For radiographers, social constructivism enhances their ability to be successful in a dynamic career influenced greatly by technology. Globalization and the increase of communication technology have created rapid changes in medical fields (Bassot, 2012). Radiologists are now able to interpret images sent via secured wireless technology to greatly speed and enhance the interpretation of radiographs (Coulborn et al., 2012). More profound technical improvements are certain to occur in the near future. Due to the

dynamic technical changes, radiography is a profession that requires its participants to be lifelong learners. They have to be active participants in constructing their careers (Bassot, 2012). The world is complex and change is constant. Radiographers have to be able to smoothly adapt to those changes.

Social constructivism provides an underlying structure for adaptation to change and helps to create a viable solutions (Buckley, 2013). Social constructivism also brings objectivity to problems that can then lead more quickly to resolution. With guidance from authority figures, valid principles help to solve common moral problems which can provide a positive approach to ethics, shining light on solutions in an objective manner (Buckley, 2013).

The Rise of E-Learning

With the rise of E-learning, there are new forms of learning and problem solving. Wang, Yu, and Wu (2013) described new forms of learning as being more interactive as learners construct new ideas based on their existent knowledge and personal histories. Social constructivism places the importance of learning on the learner rather than the instructor. Teachers must therefore strategize to make learning activities student-centered. Group work and social interaction are vital in the learning environment. Collaboration among learners creates active learning as students will effectively learn from social interactions. Social media can be the catalyst in a learning environment as it promotes interactions among learners (Wang et al., 2013).

In the online environment, there are new challenges and trends. Social constructivism is the popular learning theory for online learning (Liang & Chen, 2012).

Online learning requires new ways to think and learn since online classrooms lack the face-to-face interaction of the traditional brick and mortar learning environment. Social constructivism, placing the learning in a social dimension, allows students to adapt to the online environment. As new trends emerge in online learning, students can once again use the framework of social constructivism to balance individual learning with social interactions so that change is able to easily occur.

Bryant and Bates (2015) echoed the ability of social constructivism to exist in the online environment. Learners make sense of the world around them by working to construct knowledge through interaction with others such as text messaging and social media. This is the process of knowledge in the current generation (Bryant & Bates, 2015). In the online environment instructors should strive to optimize interaction between learner and instructor through effective communication. Interaction would be frequent and varied by the use of synchronous and asynchronous methods in order for social constructivism to occur (Bryant & Bates, 2015).New pathways of learning can be created along with the formation of new ideas through interaction and the ability to challenge what is known.

Assundani and Kilbourne (2014) looked at social constructivist learning as a tool for creating one's own identity in relation to a larger social structure. Constructivism promotes learning in the workforce thereby providing the ability to solve ill-defined problems, promoting creativity and adaptability when working in teams (Assundani & Kilbourne, 2014). Social constructivism can greatly impact the future of learning since humans tend to move in social circles, sharing ideas and visions for the future.

Reinforcing those ideas come in the form of self-reflection. Cseh, Davis, and Khilji (2013) presented a study involving in-depth interviews with 24 global leaders and their mindsets. The results were that human resource development professionals facilitated self-reflection and reflection with others to develop learning processes. Self-reflection and social constructivism was the framework that allowed the participants of this study to find meaning in their learning. A global leadership mindset helped develop learning environments and a learning culture in the global workplaces.

Globalization's influence in higher education and social constructivism would create a transition from the traditional model of learning to a socially influenced model. Mbatha (2014) describes three types of interaction in this new model of learning. The first would be learner-content, involving the learner and the course content. The second would be learner-instructor, involving the learner and whoever prepared the subject material. The third would be learner-learner, involving interaction between one learner and another. Some type of interaction would need to take place for learning to occur (Mbatha, 2014). This last type of interaction would place both learners on even ground and would ease the ability of interaction for non-traditional students. For some non-traditional students who are close in age to the instructor, even ground would promote learning and ease of communication in the educational environment between two people from the same generation.

In looking at human resource development and adult education, Watkins and Marsick (2014) discussed both fields due to their commonalities in social constructivism and knowledge. Due to society's evolution, adult education has grown and provided a

broader base for the adult population (Watkins & Warsick, 2014). Those adults who chose to obtain more education were able to move up the social, intellectual, and economic ladders. Social constructivism is at the core of these ladders since the adults took an active role in shaping their identities and co-constructing the knowledge that they obtained.

Group work is again enforced by Schulze (2012) in that social constructivists emphasized the social contexts of learning so that knowledge is built through social interactions. Students were able to gain support from other students as they were learning. Cooperative learning in groups reinforced learning so that over the course of a learning program the instructor was able to change from providing only direct instruction to providing a means of support in the learning environment. Students learned to habitually help each other so that the group's overall knowledge base was enhanced (Schulze, 2012).

Aula and Mantere, (2013), discussed reputation in terms of social constructivism and learning. The authors stated that reputation can be defined as a developing set of narratives, beliefs, and expectations between an organization and the public (Aula & Mantere, 2013). The way an organization is interpreted by different publics is how a reputation is built or destroyed. The social constructivist view would be that reputations cannot be directly managed since they are built with individuals' perspectives. They can be influenced with positive communicative actions. Reputations of both organizations and individuals will be important as radiography graduates build their professional practices.

Walsh (2012) used social constructivist theory to address hybridity as a combination of nature and culture. He claimed that social networks created this hybrid since social constructivism is more action than potential, and more concerned with choices. Choices that are rooted in what the individual's experiences dictate are what help create a culture influenced by nature and society (Gamage & Wickramasinghe, 2014). Within that society are learning communities that could then be classified as a hybrid of the students' experiences and culture (Walsh, 2012)

Social Constructivism in Health Care Professionals

Application of social constructivist learning theories can be seen in health care professionals. According to Thomas, Menon, Boruff, Rodriguez, and Ahmed (2014), knowledge translation (KT) is a process that occurs through social and environmental interactions. Similarly, in a mutually created social context knowledge can easily be exchanged between researchers and health care professionals. KT is an active learning process shaped by health care professionals' applications of social constructivist learning theories (Thomas et al., 2014).

In the health care setting, radiographers work as part of an allied health care team. A radiographer will never be determining a patient's prognosis by him or herself, but will need the assistance of the patient's health care provider, nurse, and other health care team members. Team-based learning (TBL) follows the principles of constructivist learning, according to Hrynchak and Batty (2012). In TBL, the teacher is the facilitator who encourages students to explore their understandings with new experiences so that a new mental framework can be built from previous life experiences. Active learning occurs

from group interaction. Teamwork skills are built and strengthened. Self-reflection is important in order to evaluate new experiences during group work and feedback among group members can strengthen relationships within the team. TBL strengthens health care education.

Social constructivism allows a group of adults to procure meaning from their more experienced peers which leads to a transfer of knowledge within the social learning environment (Moalosi, 2013). The health care environment is usually a social one, involving many hospital departments such as radiology, laboratory, and the nursing care units. Learning from more experienced peers would also encourage students to take responsibility for their own learning, to exchange ideas, and to collaborate with others to solve problems (Moalosi, 2013). The health care environment is in essence a high functioning group activity and every member of the group can benefit from learning from each other.

Social constructivist learning theory aids in self-management of diseases. Debussche et al. (2012), conducted a study on structured self-management of Type 2 diabetes. The way the patients managed their disease was enhanced by social constructivist learning theories. They felt empowered and their self-efficacy was enhanced through skill mastery, problem solving, decision making, and action planning (Debussche et al., 2012). Social constructivist learning theory is effective not only for students in an educational institution but for those requiring disease education for optimum control and disease management.

Social Constructivism as an Ineffective Learning Tool

For those educational situations in which students are given complete autonomy over a discussion board or a classroom, social constructivism would be ineffective. Thormann, Gable, Patricia, and Blackeslee (2013) analyzed online courses and supported a student moderator in the online discussion boards. The presence of an instructor seemed to inhibit student interaction. All students were required to moderate during the course. This would prove to be difficult in the radiography environment since facilitators need to follow the curriculum set by the ASRT and to adhere to learning objectives (ASRT Curricula, 2015). In the analysis conducted by Thormann et al. (2013) the facilitator rarely gave direct instruction which is necessary in many parts of the radiography curriculum.

The majority of radiography students can be considered non-traditional learners in that they have turned to the radiography field for a career change. In degree granting programs, more than 40 % of students are non-traditional adults, 25 years or older (Frazier, Young, & Williams, 2012). These adults are balancing jobs, school, and familial commitments. The motivation to succeed must rise above all of these commitments. Current literature on social constructivism shows a direct link between positive emotions, self-regulated learning, and academic achievement (Mega, Roncoi, & De Beni, 2014). Motivation plays a large role in the success and academic achievement of students in adult education as does social constructivism in applying what they have learned to their own reality and experiences.

External Motivation

Malcolm Knowles's andragogy model discusses motivation in the sixth assumption. External motivation for adult students would be better jobs, higher income potential, and promotions. Internal motivators would be increased job satisfaction, self-esteem, and quality of life (Knowles, Holton, & Swanson, 2005). Since the radiography cohorts are small, usually less than 15 members, there would be a fair amount of pride to be cultivated from a passing registry score (Yogarabindranath, 2013). Pride, along with the aforementioned external and internal motivational factors, would play a large part in the desire to pass the registry examination on the initial attempt.

Critical Review of the Broader Problem

Dillon and Hoyson (2013) address how nurses transition from graduation to employment in terms of steps the nursing graduates need to take prior to securing permanent employment as a licensed nurse. These authors state specifically what needs to be done before graduation, how to apply for certification, how to take the credentialing exam, and how to apply for licensure (Dillon & Hoyson, 2013). This process is similar to what radiography graduates experience. As nurses transition to the professional environment and become licensed, so must the radiography graduate transition with ARRT registration. The nursing profession's requirements of licensure confirms that other members of the allied health care team must be licensed or registered to promote standards of excellence. The local problem of radiography students from the Mid-Atlantic university passing their credentialing exam may be similar to other allied health care fields.

Regarding other patient care professions, Boyleston and Collins (2012) expressed concerns that health professionals from allied health, nursing, medical, and pharmacological fields were not prepared to meet patient needs and the needs of a changing health care system. They recommended that an accreditation council be created for dental hygienists in order to advance the profession (Boyleston & Collins, 2012). This council exists for the radiography profession in the form of the JRCERT which oversees educational programs, requiring a set percentage of pass rates for accreditation purposes.

For many professions, the definition of professional is one that would be dependent on the credentialing process (Williams, 2014). Williams (2014) stated that 31 million Americans work in a professional occupation in which the members are linked by a required type of degree accompanied by a credentialing exam. The exam serves as a commitment and dedication to the profession. A credentialing exam ensures that special knowledge and training has taken place (Williams, 2014). It also promotes a professional attitude. The implications of the credentialing process invoke standards of excellence.

Implications

The implications of this project study are wide reaching since the ARRT is one of the oldest and the second largest certifying agency in the allied health professions (Gurley & Callaway, 2011, p. 212). Some of the professions that work together as an allied health team are: physicians, nurses, physical therapists, occupational therapists, speech pathologists, social workers, radiographers, and respiratory therapists (Pearce, Phillips, Dawson, & Leggat, 2013). Other professions that may be placed in the allied health culture are laboratory technicians, medical technicians, audiologists, physician

assistants, and pharmacists (Pittman, Frogner, Bass, & Dunham, 2014). Any of the aforementioned allied health professions requiring a credentialing exam may benefit from this project study focusing on radiography graduates.

Once radiography graduates have passed their credentialing exam, there are several opportunities available to branch out to other modalities. The first registration is referred to as a primary pathway and all primary pathways require certification. The student must have completed an accredited educational program within the last three years and have earned an academic degree prior to becoming certified. The primary pathways are Radiography, Nuclear Medicine Technology, Radiation Therapy, Magnetic Resonance Imaging, and Sonography (ARRT Certification, 2014). All primary pathways require the student to pass a credentialing exam at the end of the educational program in order to become registered.

Becoming registered in more than one modality usually brings increased earning potential due to being more employable and having more credentials. For example, a radiographer registered in both radiography and mammography could work in the general area of radiology in the morning and mammography in the afternoon. This would eliminate the need to hire two different radiographers for two different modalities and could reduce the amount of monies designated for staff salaries in the radiology department. In a competitive market, radiographers need to be as employable as possible. Being registered in two or even three modalities increases the knowledge base and the value of the radiographer in terms of job security.

There are also post-primary pathways for certification in that the radiographer is registered in a primary category and has earned additional credentials in another modality. A radiographer desiring to practice mammography would first need to pass a credentialing exam in one of the primary pathways and then pass an additional credentialing exam in mammography, a postprimary pathway. Being credentialed in magnetic resonance imaging can be via a primary pathway or a post-primary pathway exam. There are educational programs in many of these modalities throughout the United States. Since this project study will determine how to succeed at passing the radiography credentialing exam, the same techniques can be applied to other credentialing exams given by ARRT, as well as credentialing exams in other allied health professions.

Once a radiography student has passed their credentialing exam, they become a registered radiographer. They are then required to earn 24 continuing credits each biennium, every two years, regardless of the number of modalities in which they are registered. These continuing education credits can be earned at conferences or workshops that have been deemed acceptable by the ASRT, the society that monitors and approves many aspects of continuing education for radiographers (ARRT, 2015i). Because of the continuing education requirements, the field of radiography requires life-long learning. The standards of excellence must be maintained and radiographers must stay current on any changes that occur in the profession.

To address the problem of passing the ARRT Radiography registry examination, the analyses of the data were shared with the Mid-Atlantic university's campus president and radiography faculty. The perceptions of the participants will have an impact on those

about to take the registry exam or are about to start preparing for the registry exam. Professional registration will be an asset to the graduates' careers and will lead to greater job opportunities and job security (Parrish & Jensen, 2013). Passing the registry is indeed a sign of success, a benchmark every new graduate wishes to meet.

The findings suggested pathways that were successful for many graduates. The participants generally recommended waiting one month before taking the registry and other graduates may wish to follow this recommendation. The participants also found Rad Review Easy helpful with the studying process. Using this program may prove helpful to other new graduates. Health care is a field in which no one wishes to make errors (Strudwick, Mackay, & Hicks, 2014). Failing the registry examination on the initial attempt could be construed as a serious error impacting future employment opportunities.

The findings indicated a need for assistance in studying for the registry and transitioning to the professional environment. Participants stated that studying was an arduous and isolated journey. Support for this journey would be found in the project deliverable of a professional development plan (PDP) for recent radiography graduates (Appendix A). The graduates generally stated that they felt they were adequately prepared for the registry examination due to their instructors' efforts. This confirms that the instructors were effective in their teaching methods. What the graduates needed were more tools for the studying process which could be delivered during a PDP for radiography graduates.

Summary

Due to the significance of the credentialing exam in the student radiographer's pathway to professional status, research was done to learn of the graduates' perceptions regarding pathways to success on the registry. The project study centered on the study skills, and study aids used to obtain a passing score. Upon becoming a registered radiographer, the student will transition into a credentialed member of an allied health profession.

In the field of radiography, passing a registry exam can lead to becoming credentialed in other modalities such as Computerized Tomography, Mammography, and Magnetic Resonance Imaging. Once certification has been earned in one of the primary pathways (Radiography, Nuclear Medicine Technology, Radiation Therapy, MRI, or Ultrasound) a second certification may be obtained. Working in the advanced modalities requires more education and experience. Having more of these credentials is accompanied by higher earning potential, responsibilities, and increased job security. Passing the entry-level radiography registry would provide the confidence for a radiographer to pursue more education in another modality and to pass another credentialing exam in that area of radiology.

Once the credentialing exam pass rates are raised for this Mid-Atlantic university it will be more competitive with its neighboring schools and its graduates will be considered more employable. The reputation of the school will also increase. Since there are five radiography programs within 100 miles of the university in question, competition is high among the graduates for employment, especially when the schools' graduations

occur within a few months of each another. Traditionally a school's reputation increases when the learning environment or teaching quality increases (Chen & Ming, 2014). It will also increase if the pass rates increase and the graduates easily find employment.

Research gathered from the qualitative interviews points to the need for a PDP for graduates as they prepare to study for their ARRT registry exam. A three-day program to review study skills, study aids, and software programs would provide tools for the graduate. This program, outlined in Appendix A, would provide learning activities, PowerPoint presentations, individual and group work on how to successfully prepare and pass the registry exam. Themes that emerged from the qualitative research indicated that the graduate must self-monitor, self-motivate, and self-propel towards radiography registration. A PDP for graduates would assist in this portion of the learning journey.

Section 2 contains the interview questions for the recent radiography graduates. It also contains the methodology, e-mails to recruit participants, and consent forms to be used in the study. Section 3 contains details on the project study. Section 4 consists of self-reflection, applications to social change, and what was learned from the project study. As the study progressed, information was gleaned from the research and the participants in the study. A direct pathway was found for preparing, studying, and passing the national registry exam. The study showed was to decrease anxieties for the examinees and how to provide confidence as the graduates strived for passing scores as they transition into the professional radiography environment.

Section 2: Methodology

A qualitative case study design was used to best answer the guiding questions. A group of nine examinees who took the 2014 ARRT registry were interviewed to see what they did to successfully prepare for the examination. The data collection consisted of interviews which were manually coded and analyzed for emerging themes. The objective of this section is to provide the questions used in the interviews, the consent form, and the e-mail sent to all interviewees. This section will show the framework for the research design, identify the participants, and present the data that were collected and analyzed.

Research Design

A qualitative case study research design was the most effective for this project study. Interviews with the graduates to gain in-depth meaning from their experiences led to answers to the guiding questions. Data was collected through recorded interviews. These interviews were analyzed and summarized for findings, focusing on the meaning behind the answers the interviewees provided (Merriam, 2009). Qualitative research lends itself to inductive reasoning or how people interpret their experiences (Merriam, 2009). It is the method most associated with improvisation and coming to conclusions based on what the data reveals, in this case by carefully summarizing the interviews and the field observations that were made. It is research that is born from a research question and is guided by what is learned as the research progresses.

Research Approach

Since a bounded system was studied, a qualitative case study research design was appropriate. A case study called for one defined group, so the criteria for participants

were that they had to be a graduate of the 2014 radiography program who passed the registry on the initial attempt. This was an instance of looking at a process or concern which justified the case study approach (Merriam, 2009). A case study best examines a contemporary phenomenon within a real-life context (Lauckner, Paterson, &Krupa, 2012).

Each participant in this group was interviewed to learn about their experiences passing the registry examination. This research focused on the participants' discovery, insight, and comprehension of the examination process and how they successfully studied for and succeeded at passing the ARRT registry examination (Merriam, 2009). The underlying theory behind this group of students is social constructivism, how students construct meaning from their worlds and experiences, a an approach commonly used with non-traditional students. Qualitative research focuses on how people interpret their experiences to find meaning. That meaning was examined during the research process with these two guiding questions:

1. What study skills and study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam?
2. What factors in their student experiences do radiography graduates perceive as having been most important in helping them successfully pass their national registry examination?

Description of Qualitative Design

A case study involves a bounded system, that is, a limit to the number of people who could be interviewed (Merriam, 2009). The limit was radiography graduates from a

Mid-Atlantic university who took the 2014 ARRT registry exam and passed on the initial attempt. Cranley et al. (2012) states that case study research can contribute to a more detailed understanding of a particular group. To better understand this group of radiography graduates, recorded interviews were conducted for data collection. Field notes were also taken during the interviews.

Justification of Design

A quantitative research design would not be appropriate for this research study. Quantitative research studies involve summarized numerical data (Funk, Bogich, Jones, Kilpatrick, & Daszak, 2013) and no numerical data needed to be gathered to answer the guiding questions. There were no theories to be tested and no hypotheses created prior to the start of the research project (Merriam, 2009). There was no experimental research, as is customary in quantitative design, nor dependent and independent variables. The data from this research study was in the form of interviews and participants' perceptions, not in the form of surveys and statistical data.

Other types of qualitative research such as ethnographic studies, grounded theory, phenomenological studies, mixed methods, or action research were also not applicable to this research project. Ethnography involves interactions in a cultural group with larger societal influences or focusing on socio-cultural communities (Gagnon et al., 2013). Grounded theory involves collecting data to use the findings in one particular context that would lead to a development of a theory and/or is concerned with a social phenomenon (Thai, Chong, & Agrawal, 2012). A phenomenological study focuses on the participants' experiences and their perception of reality, an in-depth understanding of a particular

phenomenon (Singh, 2013). Case studies have specific boundaries; in this case, the boundary is a group of graduates who have taken and passed the ARRT radiography registry exam.

A mixed-methods analysis would involve collecting both quantitative and qualitative data from the participants. The data would be more diverse involving interviews, observations, and questionnaires (Heyvaert, Maes, & ONghena, 2013). Questionnaires were not used in this study since perceptions were analyzed from open-ended questions. Since the focus was the participants' perceptions, it was important for the participants to use their own words to describe their experiences instead of choosing from a multiple-choice question on a survey.

Action research is used for current practices within a classroom, school, or district. It is a process teachers use to test theories and to study student learning in relation to classroom instruction (Little, 2012). This type of research would not provide the answers to the guiding questions. Since this research focused on one bounded group, case study research was what best led to the answers to the guiding questions.

Participants

A qualitative study generally uses the term participants since they have volunteered to be studied and are willing to lend their experiences to the research project (Merriam, 2009). The 2014 graduates from a Mid-Atlantic university were asked to participate. Face-to-face or video calls were conducted and audio-recorded. Some of the participants were not available for a face-to-face interview; therefore, video calls were

made using Oovoo, a novel video chat platform (Woodard & Omolo, 2013), and Skype. Skype offered the opportunity to collect data via a synchronous approach (Janghorban, Roudsari, & Taghipour, 2014). The participants received no compensation for their participation. They knew the title and purpose of the research study so that they were aware of the contribution they made in finding answers to the guiding questions.

Criteria and Justification for Selecting Participants

Purposeful sampling was used in this research study since participants needed to meet the criteria of being a 2014 graduate of the selected Mid-Atlantic university radiography program and they needed to pass the ARRT registry examination on the initial attempt. This information was available to me as a program director on an ARRT site that is password protected for each radiography program. The graduates also notified the radiography faculty when they passed their registry examination so that they could receive assistance with employment placement. The ARRT site helps maintain the program, provides contact information, lists the examinees that have passed the registry, and provides the test scores (ARRT, 2015j).

Using purposeful sampling, nine participants were identified to be part of the study. They all contributed information useful in answering the guiding questions (Merriam, 2009). Typical purposeful sampling requires a list for a criterion-based selection that reflects the average person representing the phenomenon in question (Merriam, 2009). The participants were 2014 graduates of a JRCERT accredited radiography program at the Mid-Atlantic university. They took the ARRT registry, received their official score from the ARRT, and passed on their initial attempt. The score

they received upon immediate submission of the exam was a preliminary one and unofficial. The official scores from ARRT gave a breakdown of how the examinee scored in each content category adding to the information to be discussed in the interview.

Nine graduates consented to the interview and to having it audio recorded and transcribed for this case study research (Dabson, Magin, Heading, & Pond, 2014). Interviewees provided answers based on their perception of their experiences in passing the ARRT registry, including study skills, habits, and preparations for the exam. Participants were also willing to give a brief history regarding their academic performance in their radiography program. They were advised as to their role in the research project and why their information was important to disclose (Dabson et al., 2014). Thematic saturation was reached with the nine participants.

Procedures for Gaining Access to Participants

Written permission was obtained from the campus president of the Mid-Atlantic university to contact their graduates as potential participants. The consent letter is being securely held. Before any data were collected, approval to conduct this study was obtained from Walden University's Institutional Review Board (IRB), approval #06-19-15-0165701. There was no IRB at the Mid-Atlantic university and the letter of permission from the campus president was all that was necessary to proceed with the research study. It was important to respect the privacy of both the participants and the educational institution.

The university's representative was assured that all participant responses would be kept confidential and privacy would be respected. This was stated in the letter of

permission. I have had a previous instructor/student relationships with the potential participants. Those students have since graduated and some have relocated to other areas of the United States. They were under no obligation to participate in this research study, and I am not in any on-going contact or relationship with any graduate.

Participants meeting the criteria, as gathered from the ARRT program director site, were contacted via e-mail once permission was obtained from Walden University's IRB. This e-mail (Appendix B) was sent to those graduates meeting the criteria for selection. I received only one response. Two weeks later I sent a follow-up e-mail (Appendix C) to prospective participants and received more interest. Once graduates consented to participate, interview times via telephone or e-mail were established for either face-to-face interviews or video conferences. The role of the participant was discussed so that the need for research was accepted and understood (Hill, Turner, Martin, & Donovan, 2013).

Methods for Establishing Researcher-Participant Working Relationship

A positive working relationship was established between the researcher and the participants. This began with the first interaction. Varga-Dobai (2012) stated that participants should be engaged and autonomous individuals who will contribute honest, factual statements, what they believe to be the truth. That truth is what was conveyed through their experiences. Our previous relationship was one of teacher/student. That student has now graduated and is a professional which should place both of us on equal ground. I stressed this prior to the interviews and told them that their participation will in no way have any effect on any future communication we might have. Due to our past

relationship, we had high comfort levels with each other in that we were not strangers. I maintained and nurtured a professional relationship consisting of respect, friendliness, and open communication.

Positivity in the relationship of the researcher and the participants is vital so that harmony and sustainability exist (Cousik, 2014). Comfort levels need to be high in order for honest communication to occur. The interviews were informal with open-ended questions. It was an open-ended approach (Coenen, Stamm, Stucki, & Cieza, 2012) leaving room for the participants to add what they wished to certain topics and subjects. They were free to elaborate and add personal anecdotes. The interview questions encouraged this so that any communication was acceptable with no potential offense or harm to the participant (Hallett, 2013). The relationship grew during the research process, yet it remained positive and respectful for all participants.

At the beginning of the process the participants were required to complete the consent form. This form was presented and the research study was explained in detail. Once the explanation had been given and the potential participant had asked any questions, consent was obtained. A copy was given to the participant as well as my personal contact information. Throughout the entire process, it was my responsibility as the researcher to ensure that no harm would come to the participants and all responses would be kept confidential.

Measures for Ethical Protection

All responses were kept confidential by assigning numbers to each participant. These numbers served as identification for the information gathered and stored. To

validate findings for accuracy or credibility, member checking will be used. This is a process where the participant checks the accuracy of the report and/or transcript of the interview given to them by the researcher (Creswell, 2012). All audio recordings were transcribed by me and are stored securely in my office. All electronic files are password protected. Hard copies are kept in a locked drawer and will be kept for a minimum of five years. All of this information was conveyed to the participants and a consent form was obtained prior to any data collection.

It was my responsibility as the researcher to maintain high standards of excellence in terms of confidentiality, validity, and all other processes in the research study. The interview process was conducted in a comfortable and non-threatening environment. The site of the research study was left clean and intact after all uses of data collection. The data was analyzed without bias. The participants were consistently treated with respect and formality. Only high ethics in this research study was acceptable.

Data Collection: Instrumentation and Materials

The instrumentation for the data collection for this qualitative study consisted of participant interviews. According to Merriam (2029), a characteristic of qualitative research is that it is flexible without using formal instruments. There was a formal protocol for the interview (Appendix D) and I was sure to allow time for the participant to segue to other topics if necessary. The data produced rich and thick descriptions of the perceptions being studied. The data collection was systematic and accurate. It was standardized to avoid variance which could introduce bias (Creswell, 2012). Since the

interviews were used for data collection, the interview protocol was established for consistency and a systematic process.

Data Collection Plan

The data collection plan consisted of face-to-face or video conference interviews with 2014 graduates. A list of open-ended questions was available (Appendix D), as well as leaving additional room and time for discussion. Purposeful sampling was used due to a diverse need of information-rich participants who have recently passed the ARRT registry examination (Hanson, Stephens, Pangaro, & Gimbel, 2012). Since I am employed at this educational institution as the program director, I was able to identify those graduates who had passed the ARRT registry examination on their initial attempt. A sampling group is one that is large enough to answer the research question until a saturation of themes is reached. Different methodologists recommend different sample sizes for qualitative research, from six, four or five, or three to five interviewees per case study (Marshall, Cardon, Poddar, & Fontenot, 2013).

An interview protocol was established (Appendix D) since Urquhart et al. (2010) stated that this is a component of a successful interview. I created a script to be read to the interviewee with an introduction of myself, an explanation of the purpose of the study, a place to record the date and background information of the interviewee, and the preliminary questions. The questions provided direction and support of the two main guiding questions while focusing on the subject matter, but left room for any information the interviewee felt necessary to add. One question specifically asked if the participant had anything s/he wished to add. I wanted to make sure that they felt free to contribute all

of the material that they felt was important even though there was an interview protocol in place.

These interviews were semi-structured due to the list of questions that were asked and the interview protocol that was in place. The interviewee was reminded about the confidentiality of his or her responses and the security of the data. Member checking will be described as well as follow-up information for the interviewee to receive a report of the findings of the interview to check for validity. As the researcher, I strived for neutrality by consistently reminding myself to eliminate my own biases, to be a good listener, and to be nonjudgmental (Urquhart et al., 2012).

Data Collection Strategies

The interviews were audio-recorded and hand-written field notes were taken. The purpose of the field notes were to serve as a back-up for data collection in case of a malfunction with the audio recorder. I also noted the participants' demeanor and body language at different points during the interviews. Notes helped me to record information I could later reflect on as well as any questions the participant asked (Urquhart al., 2012). I planned ahead for the transcription of the recording by reading the entire interview question, shown in Table 5, and/or clarifying any statements that the participants felt were unclear (Urquhart et al., 2012). To be courteous and to keep the interviewee

Table 5. *Relationship of Guiding Questions to Interview Questions (Appendix F)*

Guiding Questions	Interview questions
What study skills and study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam?	1. How did you prepare for the registry? 2. Did you use any software programs to help you study? 3. Were the software programs purchased by you and, if so, what was the price? 4. Was there any software program that you felt was not helpful? 5. How many hours per week did you spend on studying when you were in your radiography program? 6. How long did you wait to take your registry and why? 7. How many hours per week did you spend studying for the registry exam after graduation? 8. What would you do differently to prepare to take the registry?
What factors in their student experiences do radiography graduates perceive as most important in successfully passing their national registry examination?	1. Concerning your text taking history, have you been in previous college programs where you did well on multiple-choice exams? 2. Did you feel that your educational program adequately prepared you for the registry exam? 3. What was the subject matter you felt was most difficult? 4. What was the subject matter you felt was the easiest? 5. What are words of wisdom you would give to those who are studying to pass the ARRT registry exam? 6. What motivated you the most to pass your registry exam? 7. Was there anything you did that you feel was not helpful in passing the registry exam? 8. Why do you feel you were successful? 9. What else would you like to add?

informed, there was an introductory question and an ending question. The interviews lasted approximately 30-40 minutes. I had requested 30-60 minutes on the consent form. No interview went over the time requested.

It was important to establish a comfortable environment for the interview in terms of room temperature and seating. The interviews were conducted at a convenient location for the participants (Gàlvez et al., 2015), either at the Mid-Atlantic university or via video conferencing. For interviews that took place via videoconferencing, the participants were in their homes except for participant 8 who was in her parked car. She had previously told me that her schedule was quite hectic, so I appreciated whatever time she was willing to give to the interview. I gave all of the interviews and the participants my undivided attention with no cell phone usage during the interview. Respect for the interviewee's time and contributions were a priority. The interviewees were thanked at the end of the interview with instructions given on how to contact me should any questions arise.

Interviews were scheduled in a relaxed fashion with plenty of time before and after each interview to collect my thoughts and remain organized. According to Hetherington (2014), researchers using case study methodologies have little control over events, such as what the participants will contribute during the interviews. What control I did have was to create an interview schedule that was as stress-free as possible so that information could flow freely between the interviewee and me. Allowing 4-6 weeks to complete all interviews provided an ample amount of time.

Interviews were held until there was saturation of information. This occurred when no new information was provided by the participants or the information provided

became redundant and no new content was identified (Salgado, Moles, Benrimoj, & Fernandez-Ilimos, 2012). The research plan was to interview 10 graduates and nine responded to the e-mail invitation. Saturation of information occurred from nine interviews.

Process and Tracking System for Data Collection

The data was transferred first from the spoken to the written form in order to be analyzed and coded (Creswell, 2012). I transcribed each interview verbatim, leaving wide margins and spacing to hand-write or highlight areas when necessary. Creswell (2012) also recommended writing down auditory cues such as "[laughter]" or "[inaudible]" to provide information when the narrative did not flow smoothly or when interviewees cannot or would not respond to questions. I followed this recommendation. Since transcription is a time-consuming and lengthy process, I was dedicated to this part of the research process keeping the overall goal of the project in mind. I did purchase transcription software to accurately transcribe the interviews. However, once I was able to establish a template, transcription without the software was easily accomplished.

Following transcription, coding occurred. Coding is the interpretive analysis that occurs between data collection and data evaluation. It looks for similarities and patterns (Owen, 2014). Hand analysis had proven effective for me in the past therefore I relied on it for this project. Color coding similarities in the text helped establish categories which subsequently lead to emerging themes. For example, I used yellow to highlight a statement that reflected the participant was spending a lot of time studying and working hard. The color blue noted pride and confidence. Green was for self-monitoring strengths

and weaknesses. Pink was for past experiences in an educational environment. Dark purple was used when a participant spoke about social change. I then placed each question in a table and wrote the answers each participant gave to each question. This showed which participants answered each question in a similar manner. Another table was then created showing how many of the participants gave the same answers to the questions. Table 6 shows this information.

Table 6. *Answers to all Interview Questions*

Questions	Answers		
1 -How did you prepare for registry?	Studied Hard	Lang book	Notes
	5/9	3/9	1/9
2 Software Programs used	Rad Review Easy	None	
Results	7/9	2/9	
5 Hours/week studying when in program?	15 or more	4 to 8	Less than 4
Results	4/9	3/9	2
6. How long did you wait to take the registry?	4 weeks or more	2-3 weeks	
Results	7/9	2/9	
7. Hours studying to prepare for exam?	20-30/week	10-20/week	Less than 10/week
Results	6/9	2/9	1/9
1. Previously successful at test taking?	Yes	No	
Results	5/9	4/9	
2. Adequately prepared?	Yes	Yes and no	
Results	8/9	1/9	
3. Hardest subject matter?	Physics	Pharmacology	Physiology
Results	7/9	1/9	1/9
4. Easiest subject matter?	Anatomy and positioning	Patient care	Grid ratio (equipment)
Results	5/9	3/9	1
5. Words of Wisdom?	Study hard, take test right away	Ask questions in clinicals	Balance life responsibilities
Results	5/9	1/9	1/9
6. Motivation?	Start career, make it count	Pass on initial attempt	Family, more income
Results	6/9	2/9	1/9
7. Anything done that was not helpful?	No	Going through notes	Not eating, not sleeping, Stress
Results	6/9	1/9	2/9
8. Why were you successful?	Did the work	Good teachers	
Results	8/9	1	

Data Analysis

As the similarities in answers emerged, categories formed. To ensure that the categories remained grounded in the data, I kept comparing answers among the participants (Michaelson, McKerron, & Davison, 2015). For the first question which asked how the participant prepared for the registry, the theme of being prepared immediately emerged. Participant 1 said, “I kind of started early on, just trying to keep up with the classes and go from there. I would try to come at least an hour or two before class every day. I was always trying to spend a couple of hours before class studying.” Participant 2 and 9 used the RadReviewEasy software. Participant 2 stated he would “go over and over until [he] was getting passing scores.” The answers continued to be similar for the rest of the participants.

Participant 6 prepared by being dedicated and by “putting the time and effort into it. I made sure I attended classes. I made sure I didn’t miss too many clinicals. I made sure I did all the homework, the projects, everything I needed to do to pass the program.” Participant 7 said that her preparation was like “almost like a job. If I wasn’t studying, I was just eating and sleeping.” Participant 8 took a month off of work to study. “I just took it off because I wanted to really sit down and study kind of like to attack that book and it worked out well.” Participant 5 studied hard, but he also gave the unique answer of putting every aspect of his life in order. He wanted to be ready mentally in all areas of his life, “personal, financial, and everything else, overall.” He said, “Your mind needs to be focused 100% just on the registry test.” Participant 5 added “I think I took it more seriously compared to other classmates because I was focused more on taking care of my

personal issues of keeping my mind free and set and ready to go for the test. Most importantly, it was not just sleeping well and eating good, it was also being happy. I think that is the most important part." Zarshenas, Danaei, Mazarei, Najafi, and Shakour, (2014) stated that failure in learning can be attributed to the lack of a good learning environment. Participant 5's efforts were aimed at creating a good learning environment. The theme of studying hard and preparing was at the forefront of the participants' answers.

The answers for the remaining questions easily fell into categories. The questions regarding the use of software programs as study aids all centered on one program. The RadReviewEasy software program was used by seven out of nine participants. Only two out of nine did not use it and relied on their notes. In terms of hours that were spent studying while in the radiography program, four out of nine spent 15 or more hours. Three out of nine spent 4-8 hours and only two participants spent less than four hours studying. This amount increased to 20-30 hours per week for six out of the nine participants after graduation when they were studying for the registry exam. Two out of nine spent 10-20 hours per week and only one participant stated that they spent less than 10 hours per week studying.

As far as the time the participants waited prior to taking the registry exam, seven out of nine participants waited four weeks or more. Only two participants waited two to three weeks. Zarshenas et al. (2014) stated that students who spend more time studying are more successful at managing their time. Participant 5 stated: "I was hoping to take it within the first month but due to my paperwork there was a delay for about two months.

So, I was able to stretch out my studying reviews and reorganized my schedule and worked with it." He was able to reorganize his schedule and use the time wisely.

For the remaining interview questions, the majority of the participants had similar answers. Five out of nine felt that they had previously been successful at taking multiple-choice examinations. Eight out of nine felt that they had been adequately prepared to take the ARRT registry by their educational institution. Only one participant answered with a "yes and no" citing that the program had been a condensed one. She felt that some subjects were taught by skimming the surface instead of being more in-depth. Seven out of nine participants felt that the hardest subject matter was radiation physics. Five out of nine felt that the easiest subject matter was anatomy and physiology and radiographic positioning.

As the interviews reached the summary stage, the participants were asked if they had any words of wisdom for those currently studying for their registry exam. "Be prepared. Set time aside to study no matter how difficult it is, how little time you may have" was what Participant 1 said. Participant 2 said to "Find your weak points and pound them in your head. Really, really pound it in your head, even if you think you've still got it. Study the stuff that's tough." Similar words were said by Participant 3: "Stick to what [you] know and how to study." Participant 4 also stated that studying hard was necessary. She said, "Keep going over the material every day because if you don't go over something you will forget it in about two days." Adequate preparation was stated by many of the participants. Their preparations strategies varied, but they all stated the necessity of working arduously.

Several participants offered unique words of advice for those currently preparing to take the ARRT registry exam. Participant 7 said to "ask as many questions as you can while you are in your clinicals because the clinical portion, without a doubt, was the most important part of going to school. Once you are in the real world, it's not all books anymore." Participant 5 stated that "being happy was the most important, very crucial, part of passing the test. Just make sure you are taking care of everything you need to do. Not just the test, but every other aspect." Their answers were unique, yet their learning strategies positively contributed to their success on the registry exam.

As for their motivation, the answers were their families, the desire for more income, the desire to start a career, the perception that they wanted to make their education count, and the desire to pass the registry exam on the initial attempt. Participant 5 said that his motivation was "myself because I wanted a change and I have to pass [the exam] for this field. I wanted a career change. I wanted to move further into this field. This is what I like to do and I needed to get through this." Participant 2 stated that his motivation was "fear of failure" and then laughed at his own answer. Participant 3 summed up her answer with "I gave up a lot, sacrificed a lot to go to school, and so did those who helped me. I had to show them that it was not done in vain." Participant 7 said, "I used to be a truck drive and people that I was associated with growing up never thought that someone like me could ever be something in the medical field. I really wanted to see if I could even do it." Since all of the participants passed the registry exam on the initial attempt, their motivation was clear to them and their answers were easily given.

When asked if their preparations for the registry involved any actions which were not helpful, the majority of participants said no. Six out of nine said that everything they did helped their studying processes. Participant 8 said, “Everything I did was helpful.” Participant 2 said, “I wasted my time in my notes because I don’t feel like they really helped me out a whole out. I really do feel that RadReviewEasy was a great tool.” Participant 3 said that she did not eat and sleep, saying “I know it sounds silly, but you have to go in with a clear mind and with rest. If you don’t rest, you are going to be tired and exhausted and become flustered.” Participant 9 said that she could have spent more time studying, “focusing on the areas [she] was not good at.” But, she did pass on the initial attempt, so her preparation strategies were successfully in place.

One of the last questions asked was why the participant felt that they had been successful. Eight out of nine stated because they had done the work and put in the time. Participant 7, without hesitation, said, “because I had good teachers. Also, the diligence that I had to just sit there and read the books. Read it, read it, practice, practice, practice.” Participant 8 said he was successful because “he took the time to learn and ask questions when [he] was at clinicals. Participant 9 said that she had been successful due to “work ethic, wanting to pass, and knowing how hard [she] had worked to pass to get anywhere with what [she] had spent her time doing.” The preparations of all of the graduates contributed to their success in passing the ARRT registry on the initial attempt.

After looking at the answers in each interview and the first set of categories which were to put in the studying time, have pride and confidence, know strengths and weaknesses, and learn from past experiences, a set of themes surfaced based on the

interview questions. These were the self themes to self-monitor, self-motivate, and self-propel their way to becoming a registered radiographer. With the exception of Participant 6 who mentioned that he used study groups, all of the participants worked independently while preparing to take the registry exam. The journey to becoming a registered radiographer is generally an independent one since the graduate studies alone and takes the examination alone. As I reviewed the transcriptions of the interviews, I reminded myself to keep an open mind, to be ready for categories that may come as a surprise and that were not anticipated (Creswell, 2012). The three self themes soon surfaced.

In order to check the validity of the data collected, I asked the participants to review the transcriptions and emerging themes from the interview. Validating findings is of utmost importance so strategies were in place (Creswell, 2012). I took clear and legible field notes so that the notes could contribute to the interpretation of data should any questions arise. Findings were sent electronically for the participant to check for accuracy. Participants were able to see how their opinions contributed to the interpretations of the interview (Houghton, Casey, Shaw, & Murphy, 2013). I asked the participants for their response and all were in agreement with the themes that were established.

Answers to Guiding Questions

What can be difficult in qualitative research is linking the raw data retrieved from participants' interviews to the guiding questions. For the first guiding question of what study skills/study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam, the graduates answered that they had to

put in the time to study effectively. Participant 5 stated that he "spent a lot of time to work on things that needed to be done so that I could mentally be ready for the test." Participant 7 said, "I studied, studied, studied. I just kept doing question after question, reading books, asking questions." Participant 8 said that she "would go through and do all of the questions for one chapter and then go back and look at the answers and then whatever [she] got wrong [she] had a separate notebook to write all the things that [she] got wrong." Putting in the time also meant studying with a software program.

Many of the participants used the software program RadReviewEasy as a study aid in their exam preparation. Participant 6 said that he used RadReviewEasy exclusively; "I don't think I used any other software to study. I just did the RadReviewEasy online." Participant 1 stated that he "set up the RadReviewEasy in a way that worked best for [him]. [He] looked at things that [he] was unsure of and just pounded those out." Participant 7 also liked using RadReviewEasy. "It was really effective. It was really good," is how he described it. If a software program was used in their exam preparations, the participants unanimously used RadReviewEasy.

The second research question was: what factors in their student experiences do radiography graduates perceive as most important in successfully passing their national registry examination? The raw data showed that graduates had histories of being successful on multiple-choice examinations. Participant 1 stated: "I usually score well on multiple-choice exams." Participant 4 said, "I've been in other programs. I seem to do well on multiple-choice questions." Five out of the nine participants answered that they

had histories of scoring well on multiple-choice exams which would be in their favor prior to taking the registry examination.

Another factor in their experience would be the preparation provided by their educational institution. Eight out of the nine participants answered in the affirmative with only Participant 9 saying, “Yes and no. In some areas I had to self-teach based on the fact that it is an accelerated program. We didn’t have time to dive into everything.” Other factors in the participants’ experiences were subject matter, and the factor of being successful in the entire examination taking experience.

Most of the participants felt that physics was the most difficult subject. Participant 9 said, “It was probably physics, just because I don’t do math.” Participant 8 said, “The physics part was kind of tricky.” On the ARRT registry, physics would fall into the content categories of Equipment Operation and Quality Control which has 22 scored questions and Image Acquisition and Evaluation which has 45 scored questions (ARRT, 2015m). Not being strong in these categories which comprise 33% of the test would indicate a student could still receive a passing score of 75 if the test taker were strong in the other categories.

Most of the participants felt that Positioning and Patient Care and were the easiest subjects. Participant 1 stated that “patient care came pretty easily for me.” Patient 7 said that the easiest subject was “the hands-on portion. [He] really clicked with the hands-on portion” which would fall under either the Imaging Procedures or the Patient Care category. There are approximately 58 scored questions in the Imaging Procedures category and 30 scored questions in the Patient Care and Education category

(Examination, 2015). If the test taker were strong in these categories, the potential is high for the examinee to do well on 88 questions out of 220. As the answers to the questions and the raw data fell into categories, the themes began to emerge.

As previously state, the interviews were first color coded for potential categories. The first set of categories led to the first set of themes, which were to put in the studying time, have pride and confidence, know strengths and weaknesses, and learn from past experiences, which in turn led to a final set of themes. Putting in the studying time and knowing strengths and weaknesses led to the theme to self-monitor. Having pride and confidence and learning from past experiences led to the theme to self-motivate. All of the first set of categories led to the theme to self-propel.

The final set of themes lead to the identification of potential answers to the guiding questions (Gläser, & Laudel, 2013). I stayed focused during the interviews and provided efforts for the interviewee to also stay focused on the topics being discussed. What can be linked to the guiding questions and the underlying theories are what can be found from all of the audio recordings and transcriptions. Self-monitoring, self-motivating, and self-propelling their way to becoming a registered radiographer were steps to success for the research participants.

Theme: Self-Monitor

To find support of the self themes, I created tables which contained each participant's answers that supported each self theme. Every participant answered the interview questions to self-monitor throughout the program Participant 1 said:

> I kind of started early on, just trying to keep up with the classes. My scores on the practice tests dropped significantly with Rad Review which kind of scared me a little bit. But, once I started going through, like my scores initially on the Rad Review were in the 60's and 70's and once I worked with it, and spent some time with it, I was up in the 80s and 90s.

If a project was assigned for a class, he modified his learning strategies by purposely choosing a subject matter in which he considered himself weak with the intention of turning that weakness into an area of strength (Anthony, Clayton, & Zusho, 2013). He saw that project as having long-term value for his knowledge base (Schneider, & Francis, 2012). Participant 2 self-monitored by studying only questions that he had gotten wrong on the practice tests. He said, "I started to notice a trend where I was seeing similar questions. I started omitting those types of question and then adding other ones to filter out what worked best." Participant 4 self-monitored by making sure she understood concepts and was not simply memorizing facts. She stated, "I actually had to learn and retain all of the information to do well on the exam." Self-monitoring was vital for the participants as the exam drew closer.

Prior to taking the registry, participants were frequently reviewing their own strengths and weaknesses in terms of knowing the required material. Participant 5 stated that he needed to get his personal life in order to be able to take the exam. He was trying to balance his professional role with his family role (Richardson, Moyer, & Goldberg, 2012). He stated that this was the only way he could focus on the registry exam. Participant 6 used study groups to self-monitor; participant 7 found that self-monitoring

required increasing her study time. Participant 8 used a notebook to write down errors she was making. Participant 9 self-monitored by reviewing areas that she was weaker in instead of doing practice tests. By knowing their strengths and weaknesses, the research participants were able to self-monitor their preparedness and confidence for the registry examination.

Theme: Self-Motivate

The participants in this study enrolled in the radiography program with the intention to earn their associate's of science degree in Medical Radiography. The program setting studied at this Mid-Atlantic university is akin to a career college rather than a 4-year institution. In a study at a community college, Martin, Galentino, and Townsend (2014), found that only 19% of students graduated. The 2013 completion rate at the Mid-Atlantic University was 87% (ECPI, 2014a). In order to complete their radiography program, the research study participants drew from their family and their desire to persist at their goals.

Many participants stated that their motivation was their family, fear of failure, and the desire to make their education count. Participant 8 looked at her studying as if it was her job. She said, "Study as if it was your job to study and prepare. Study for at least two weeks, 2-4 weeks, I think would be good." The motivation was present during her entire program, yet increased as she neared the registry exam. Repetitiveness was a way for the participants to motivate. Participant 2 said he had to "really, really pound it into [his] head." Participant 3 said she wanted to "make it count. All the sacrifice with my son. All of my hard work that I had put in the past weeks and months" were with the goal in mind

of being a registered radiographer. Motivation from their families was what made many of the participants dedicated to their professional pursuits.

The majority of the participants, six out of nine, stated that their motivation was the eagerness to start their career. Two out of nine stated they needed motivation to reach their short-term goal was passing the ARRT registry on the first attempt (Liu, 2013). However, this goal affected their long-term career goals. One participant stated that his motivation was to earn a higher income, to have a set schedule, and to have more family time. He saw these goals as reachable when he became a professional radiographer. Beginning their career was the intention of all of the participants and their motivation increased as they prepared for the ARRT registry. Their motivation as well as their hard work was needed for the third self theme to self-propel.

Studying for the ARRT registry was done individually. They took the test individually at a regional testing center. Only one interviewee mentioned that study groups helped him with his preparation. Otherwise, the interviewees stated that it was an isolated journey. They used the motivational tools that they had during their educational program to help them finish the last part of the journey to ARRT registration.

Theme: Self-Propel

The majority of the participants, five out of nine, stated that they had histories of performing well on multiple-choice examinations. Participant 5 said:

> I've been to other programs and done well on multiple-choice tests, the process of eliminations and overall. You still have to have a solid basic information, like a basic knowledge in order to do well on multiple choice. It's not just a guessing

game only. You have to have some knowledge, as well.

Many also stated that they had good work ethic, that they had worked hard, had had good instructors in both the classroom and clinical environments, and that they wanted to score well on their registry. During the time period after graduation until they took their exam, what propelled them to success was their confidence and their knowledge. Participant #5 said what propelled him forward was wanting to make his community a better place. He said, "Hopefully what you have done for yourself benefits those around you, you're your family, your friends, and your community that motivates you to move further into the field or whatever you want to do in life." Participants were able to adequately prepare themselves and to use all of their preparation to become successful on their ARRT registry examination.

What propelled other participants was their preparation. When asked why they had been successful on the ARRT registry, eight out of nine stated that they had done the work. They had studied hard and prepared to succeed. Participant 5 stated that "you have to be proud of yourself in order to move further into your life." Talbert (2012) stated that support systems needed to be in place, in the student's personal life and in school, in order for the student to reach graduation. This was stated in Participant 8's answer that "Everyone was really helpful. All of that played a part." Since the participants went from the atmosphere of learning as a group to studying as an individual, self-propulsion was vital for this last portion of their educational journey.

Professional Development Program for Graduates

The data indicated that the participants were in a group setting for the educational program and then switched to working individually after graduation as they prepared to take the ARRT registry exam. Because of the lack of support from a group, a PDP for graduates would be beneficial. The participants' answers to how they passed the registry examination were that they needed to work hard and studying for many hours. A PDP for recent radiography graduates would ensure that the time that is spent studying is producing the desired results of understanding concepts rather than rote memorization. It would also provide support for the isolated task of taking the credentialing exam and achieving a passing score.

A PDP includes all types of professional learning including that which is above initial training (Craft as cited in Shawer, 2013). The graduates have had their initial training and they are ready to become professionals by becoming a registered radiographer. Studying for the ARRT registry needs to be an efficient process. Participant 2 stated to "Really, really pound it in your head." Participant 3 said, "I probably should have stuck to the basics on how I needed to study which is just repetition and review." Participant 4 said, "Keep going over the material every day. Keep going over it over and over." A PDP could provide ways to ensure that the way graduates are studying is optimal for the desired outcomes by encouraging students to strive for higher cognitive learning beyond memorization (Jensen, McDaniel, Woodard, & Kummer, 2014).

Creating a PDP for the radiography graduates would provide an opportunity to review learning styles as well as learning outcomes for the program. Participant 9 stated,

"I don't do math." However, there are questions on the ARRT registry that require the use of formulas and math skills. A PDP would provide a review of these skills. Reviewing learning outcomes would ensure the participants that the registry content was covered in their educational program. If graduates had the opportunity to demonstrate in a PDP what they have learned using strengths and abilities, their progress through the material review would be supported (Williams-McMillan & Hauser, 2014).

A PDP would provide support for the graduates as they transition to their new roles in society. Participant 5 stated: "I don't feel successful in this stage of the radiography field. I don't feel I am successful because there is so much more to go, not just passing the test but now I've got to work and move further into the field." Participant 7 stated: "I used to be a truck driver and people that I was associated with growing up never thought that someone like me could ever be something in the medical field." A PDP could help make the connection between academics and the real world (Venkatesh et al., 2014). It could help ease the transition to a new role in society as a professional radiographer.

The PDP would be a 3-day workshop to present the tools the graduates need to self-monitor, self-motivate, and self-propel their way to ARRT registration. A panel of graduates and experienced radiographers would open each day of the workshop to field questions and share experiences on the registration process and the role of a professional radiographer. Learning activities, both individual and group, would strengthen learning outcomes achieved as well as promote ideas to sustain the graduate as they become a registered radiographer. It would be a chance for the graduate to begin the transition to a

professional as networking and socialization could potentially lead to employment and further support in the allied health community.

Role of the Researcher

My role as the researcher was to propel the study forward, to lead the interview process towards the goal of finding the answers to the questions. I am the medical radiography program director at this Mid-Atlantic university and have known these graduates since the first day they started their radiography program. It was with great joy and pride that I witnessed them graduate and pass their ARRT registry examination. I wished for their joy to be able to be shared with other graduates as they successfully pass their registry exams. I was confident that my role as the program director did not affect the data collection since the majority of the graduates have completed their educational program and are now practicing in the radiography profession. We are now on a more even slope.

I was careful to include self-reflection in the analysis of what I heard from interviews and what was gleaned from data collection. These reflections were kept in journal form. The process of reflecting critically as a researcher makes me avoid biases and arrive at logical interpretations (Merriam, 2009). It was important as a researcher to remain neutral (Owen, 2014). Scheduling the time between each interview was necessary for self-reflection and to ponder the data that had been gathered. The answers to the questions could have been complex and I needed time to see how this complexity in passing the ARRT exam was viewed from the perspectives of the different participants

(Hetherington, 2014). I made every effort to remain objective and free of bias as I collected the data and conducted this study.

Evidence of Accuracy

Member checking was employed to check for evidence of accuracy. A brief summary was provided orally and immediately after the interview. After I transcribed the interview, a copy was sent to the interviewee with a description of the emergent themes. Emerging themes were included so that member checking would be thorough in regards to checking findings for accuracy (Creswell, 2012).

Observations written in my field notes contributed to the emerging themes in the research. I wrote “confident” for Participant 1 and 4. For Participant 2, I wrote “precise and driven.” This notes validated the categories that emerged from the interviews and lead to a report that was accurate and valid (Creswell, 2012). The same information drawn from multiple sources validated the similarities that existed in order to arrive at a clear correlation between constructs. Since I was the only coder on this research, interpretations are reliable from the texts that were analyzed (Oleinik, 2011).

Limitations

I performed qualitative research so that the participants could express in their own words their perceived truths as answers to the guiding questions (Coenen, Stamm, Stucki, & Cieza, 2012). There were some limitations. Participants may not have consistently provided in-depth answers. Open-ended questions were asked. Participants may not have been able to effectively describe their opinions or experiences. Many of the participants had never previously participated in a qualitative interview. Even though purposeful

sampling was used, some graduates relocated immediately after passing their registry exam and were not available to participate in this research study. Efforts were made to obtain participants who were information-rich.

A discrepant case emerged, as in discrepancies from other data collected (Lambert, Skinner, & Friedlander, 2012). It was still analyzed and reported. It will be included in the study. Every participant stated that their educational program adequately prepared them for the registry examination except for Participant 9. She stated that yes she was prepared, but she felt that the 18-month program was a condensed one compared to neighboring 24-month programs and that not all subject matter could be taught in-depth. This was the only major inconsistency, but it was included in the data analysis (Rodrigue, Riopelle, Bernat, & Racine, 2013). Each participant's perspective was important and unique. Not all responses contributed to emergent themes. In order to maintain high ethical standards, all cases were included.

Summary

Section 2 focused on the methodology and findings of the project. This was a qualitative case study research design and approach to arrive at answers to the guiding questions. The criteria in selecting the participants were discussed as well as measures to protect the participants' rights to confidentiality and safety. The data collection was described and justified. The procedure for gaining access to participants was discussed, as was the analysis and limitations to the study. At all times the highest of ethical standards were used in this research project.

Due to the answers collected for the guiding questions, a Professional Development Program for graduates will be created. Participant 7 stated: “If I wasn’t studying, I was just eating and sleeping.” Participant 9 gave this advice: “Try not to overthink it. I think they threw in a lot more tricky [questions to make you] second guess yourself.” These statements were anxiety-filled. A PDP would assist with easing the anxieties associated with a credentialing exam. The answers for the first research question regarding what study skills and study aids are helpful in passing the registry exam stated that graduates unanimously felt that a purchased software program called RadReviewEasy was a beneficial tool to use.

Graduates also stated that they needed to self-monitor and self-motivate. Participant 9 stated that she had “to self-teach or self-review” certain subjects that were unclear to her. Participant 8 stated that she self-motivated because she “didn’t want everything to be in vain. The program was so long and [she] missed so much time.” Tools on how to do both of these tasks would be helpful for the participants and could be presented in a professional development program for graduates. The answers for the second research question on what factors in their experiences were important to successfully pass the ARRT registry centered on spending the time studying, taking study breaks, and being healthy physically and mentally to prepare for success. These are more tools that can be given to graduates as they prepare for the registry exam as they need to self-propel their way to becoming a registered radiographer.

A three-day PDP for graduates would be able to help graduates review the tools necessary for intensive studying as well as motivational tools for this learning journey.

Graduates were in groups throughout their educational program, yet the journey became an isolated one once the degree was earned. The journey to registration, passing the registry exam, was one that was done individually. Giving them the necessary tools for success will assist them in having a successful experience on this journey.

To provide an easy transition to their professional role, Section 3 will describe the project outcome, a professional development plan. The answers to the guiding questions indicated that support was needed for the graduates as they created study plans for their credentialing exams. A review of the literature reviewed approaches to learning and study skills that could be given at a three-day professional development program for graduates. This would assist in the skills that need to be built for the transition to the professional environment, along with creating a professional identity.

Section 3: The Project

Indications for a Professional Development Plan

Based on the findings from the qualitative interviews, a PDP will assist the graduates in their preparation strategies to take the ARRT registry examination. The focus of the project study sought to answer two guiding questions:

1. What study skills and study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam?
2. What factors in their student experiences do radiography graduates perceive as having been the most important in helping them successfully pass their national registry examination?

Participants answered the first question by stating that RadReviewEasy was used as a study aid. The study skills used were mainly time and memorization. The student experiences regarding the second research question were that they needed to work hard and put in the time. The focus while studying had to be the registry examination. The majority of radiography students are kinesthetic learners due to the hands-on nature of the profession (Boctor, 2013). As these kinesthetic learners graduated from their educational program and transitioned to studying independently; very little guidance or suggestions existed to support them in their credentialing exam preparations. A goal of the PDP would be to deliver suggestions to graduates on how to obtain additional support.

Many of the participants knew that they had to work and study hard for their credentialing exam. Participant 1 stated that he "had the goal all the way through to score well on [the registry exam]." He self-monitored consistently throughout his curriculum. A common theme that developed was that students had to focus and put in a lot of study time. Participant 5 stated that "your mind needs to be focused 100% just on the registry test." However, studying arduously does not necessarily equate to studying effectively so that optimum retention of material transpires. Students who regulate their learning use strategies to remain engaged and on task (Anthony, Clayton, & Zusho, 2013). However, being on task needs to include effective transfer of knowledge and students may or may now know how that exactly occurs.

Review of the Literature for Professional Development Program

A PDP to teach graduates how to efficiently self-monitor, self-motivate, and self-propel their way to a successful score on the ARRT registry exam would provide support

and mitigate anxieties in the preparation process. Participant 7 stated: “If I wasn’t studying, I was just eating and sleeping.” Preparation for the credentialing exam did not require sacrifice as described; it required effective preparatory techniques. Passing a credentialing exam is essential to advance in a professional field (Washington, 2013). The strategy to pass that exam needs to be more clearly defined and a PDP would help with this definition. A literature review was done to effectively research the construction of a PDP. The multidisciplinary databases of ProQuest Central and EBSCO were used and terms such as *PDP, graduates’ workshop, study skills, time management, motivation,* and *credentialing exam preparation* were entered to find recent scholarly articles. The creation of a PDP will give the graduates learning tools to work towards a successful outcome on their registry examination.

Approaches to Learning

When looking at student learning strategies, examinations are used as a way to earn grades and assess course goals (Newton & Martin, 2013). Consequently, credentialing exams as summative feedback can be a way to earn a final grade, assess programmatic goals, and set standards of excellence. The radiography credentialing exam is a well-designed assessment tool, created by ARRT, to recognize qualified individuals in medical imaging (ARRT, 2015n). To ensure that student learning is effective, for pre-graduation, post-graduation, and pre-registration, the levels of Bloom’s taxonomy can be referenced as shown in Table 7.

Table 7. *Bloom's Taxonomy (Atherton, as cited in Newton & Martin, 2013).*

Cognitive level	Characteristics of levels
Level 1 Knowledge	Recall specific facts or information.
Level 2 Comprehension	Construct meaning from information, interpret facts.
Level 3 Application	Use information, required knowledge, and concepts in new situations.
Level 4 Analysis	Recognize patterns, identify how separate pieces of information relate to one another.
Level 5 Synthesis	Form a complete concept from different elements of knowledge.
Level 6 Evaluation	Discriminate between ideas, address value of evidence, analyze meaning of theories.

Graduates may be at levels 1, 2, and 3, able to recall facts, construct meaning from information, and use that information. However, they need to also process information at the higher levels of 4, 5, and 6. The questions on the registry exam assess knowledge and cognitive skills typically required of an entry level radiographer (ARRT, 2015m). For cognitive skills to be fully developed to pass the registry exam and perform as an entry level radiographer, graduates need to be processing information at higher levels. Their preparations for the registry examination need to incorporate these learning strategies.

Deep Versus Surface Learning

Approaches to learning have been placed into different classifications. Deep learning is where students study to gain a true understanding of the subject; surface learning is where students learn by rote memorization strictly for recall of material for an exam; strategic learning is where students learn material in a way to efficiently pass an assessment and could be a combination of deep and surface (Weller et al., 2013).

Participants in this research study made comments about memorization. Participant 3 stated: “I started to memorize the questions instead of truly knowing them. I would [give] the same answer and it was the same wrong answer. The more I would do it, the more I would mess up.” Participant 4 also made a reference to memorization: “Going over and over the material, repetitiveness really helped a lot stick in [my] memory.” Surface learning was the predominant form of learning for this participant.

A study by Weller et al., (2013) regarding approaches to learning for anesthetists’ final exams showed that students prepared for their final exam by studying multiple-choice questions on other exams. The participants in this research study did this via the use of RadReviewEasy. “I set up the RadReviewEasy in a way that worked best for me,” said Participant 2, “I liked the way the Rad Review was going for me.” Participant 3 said, “I took every question on Rad Review and would read questions two to three times. I went through the entire question bank on there a couple of times.” This learning approach would fall into the surface learning category since graduates were memorizing questions and answers, versus gaining a true understanding of the subject matter which would be considered deep learning.

To promote deep learning as well as deeper understanding of the subject matter on the ARRT registry exam, a PDP would promote and align learning strategies. Student learning is an active process, incorporating problem-solving and application (Hutchins & Friedrichsen, 2012). A PDP for recent graduates could assist in the active learning process. While learning strategies can be defined as techniques or skills that students use in order to accomplish a learning task (Conti & McNeil, 2012), organizing those skills

would make learning more effective and economical in terms of time management. The graduates have, after all, a limited amount of time between graduation and their scheduled registry examination.

Skills Building

The objectives of the PDP would be to provide ways to study and manage time by offering skill building exercises (Hurst, Cleveland-Innes, Hawranik, & Gauvreau, 2013). A study by Hurst et al., (2013) provided a skills building workshop where graduate students learned about work/study/life balance, visioning, and priority and time management. They were also given career advice and how to network for employment opportunities. The PDP was also an informal way to socialize and develop camaraderie for those with similar career goals (Hurst et al., 2013). The camaraderie would be beneficial as they prepared to enter the professional environment.

Students graduating in 2015 are frequently prepared to be professionals, armed with the background knowledge necessary in their chosen field. However, personal skills development can be over-looked. A vital part of creating a well-rounded graduate, a PDP can provide a link between higher education, student experiences, and employment practices (Pang & Hung, 2012). A new professional should have the tools of communication, learning, problem solving, teamwork, and self-management should they want to be perceived as high performing professionals (Pang & Hung, 2012). A PDP can review these skills and provide ways to obtain them prior to entering the professional environment.

Formation of Professional Identity

One aspect of becoming a professional is forming a professional identity (Ullrich et al., 2014). Experienced radiographers at the PDP, serving as instructors, could impress upon the radiography graduate what is necessary for them to know and learn while becoming a professional. A study by Ullrich et al. (2014), showed that a PDP for newly graduated scientists identified that they needed to know and understand their discipline, have a mastery of the literature, and acquire research skills (Ullrich et al., 2014). For the newly graduated radiographer, a PDP would review that they need to know and understand all of the radiographic procedures, what topics need to be monitored for life-long learning, and acquire patient care skills. Reviewing these subjects would be beneficial preparation for the ARRT registry exam.

As the graduate transitions to the professional radiographer, s/he needs to adopt the mindset of a life-long learner. Twelve continuing education credits will be required each year by the ARRT in order to maintain registration (ARRT, 2015i). An entry-level radiographer will need to plan accordingly in order to submit 12 CE credits annually. Through a PDP goals that are specific, measurable, and attainable, such as earning CE credits, can be created (Loveland, 2012). The themes to self-monitor, self-motivate, and self-propel can be used for the PDP to guide the goal of successfully becoming a registered radiographer.

There should be three components of a PDP. The first part is to set goals. The second part is the connection between goals and standards (Loveland, 2012). There are national as well as state standards for a professional radiographer. Both begin with ARRT

registration. State licensing laws differ from state to state; approximately two-thirds of the states of laws covering the practice of radiologic technology (ARRT, 2015r). This information can be distributed at a PDP and would be of interest to those graduates who plan on relocating prior to beginning their professional practice. The third component of a PDP is to identify the training that will help the participant meet his or her goal (Loveland, 2012). This training would follow the themes that emerged from the data collection of to self-monitor, self-motivate, and self-propel the graduate's way to becoming a registered radiographer.

Theme: Self-Monitor

Another objective of a PDP would stress the importance of taking responsibility as a professional. Professionals work diligently to ensure that knowledge and skills are up-to-date and conform to current best practices (Ludlow, 2014). The field of radiography has tremendously evolved since its inception and will continue to evolve. It is the radiographer's responsibility to evolve as the field responds to new laws, new research, new technologies, and new initiatives (Ludlow, 2014).

With the responsibility of life-long learning comes the necessity to self-regulate. Self-regulated learning is a critical skill that needs to be encouraged in allied health fields (Alegria et al., 2014). Self-regulating or self-monitoring allows the professional to be aware of what needs to be learned and how to go about acquiring that knowledge. Participant 1 stated: "The material is there. It's presented to you and you have to take personal responsibility to do well." Self-monitoring can also be used for specific behaviors.

Self-monitoring can assist in professional behaviors that need to be acquired. It involves the individual observing his or her own behavior for the purpose of producing and assessing behavior change. A student can increase behaviors, such as studying or exercising, or decrease behaviors, such as smoking or overeating. Self-monitoring allows individuals to be more in control of their own behavior (Rouse, Everhart-Sherwood, & Alber-Morgan, 2014). A PDP could encourage graduates to self-monitor in order to adopt desired behaviors which would contribute to success in the professional environment.

Self-monitoring or self-regulating occurs when learners set goals specific to a task and use strategies to complete the task (Madonna & Philpot, 2013). Some adjustments may need to be made, as long as the goal remains within reach. Self-monitoring would involve evaluating and understanding thought processes, evaluating actions taken that proved ineffective, and planning alternative paths to success (Madonna & Philpot, 2013). Participant 6 stated that he "ended up [studying] on the weekend because [he] had to work on week days." He determined that studying during the week was not working, therefore changes were made so that he could devote his weekend time to his preparation strategies. Learning strategies also included motivation to reach the participants' goals.

Theme: Self-Motivate

Research participants generally used their experiences to gain confidence in their efforts to enter the professional environment. Participant 2 stated: "I've never ever failed any classes. I think that I've done really well, relatively." Motivation can stem from internal or external factors or a combination of the two. Promoting internal motivational factors in academic settings generally produces positive academic outcomes (Trevino, &

Defreitas, 2014). The PDP's objectives can help examine participants' internal and external motivational factors.

The objectives of the PDP can create motivation within the course of the three-day program. Support can come in the form of the environment, from PDP's learning activities (Eisele, Grohner, Beausaert, & Segers, 2013). The instructors, as well as other participants, can bring motivation to the graduates to reach their personal goals of passing the registry exam. Motivational factors can be simple and obvious. Participant 9 stated that she wanted to pass because she "didn't want to have to retake it. [She] wanted a job." Factors can also be complex. Participant 8 stated: "The program was so long and I missed so much time with my family driving back and forth. My motivation was to get it done." When other participants' motivational factors are identified, commonalities can be seen and shared.

Professional development is a means to improve student learning and works best if embedded in the daily work of the participants (Casey, Starret, & Dunlap, 2013). The daily work of these participants will be in the health care environment and in the radiology department. These participants are aware that a high performance on an exam is going to be extremely important to secure their position in the radiology department for their future life (Hjeltnes, Binder, Moltu, & Dundas, 2015). In order to use the motivation that is either internal or external and maintain it throughout their preparation for the registry, the graduates needed sustenance to propel them forward all the way to a passing score on the registry examination.

Theme: Self-Propel

What will propel graduates into becoming confident entry-level professionals is preparation that goes beyond scoring well on the registry exam. The graduates need high quality, focused professional development (Casey, Starrett, & Dunlap, 2013). They also need to review the leadership roles they can transition into once they are a registered radiographer. What the PDP can provide is learning to collaborate with peers, planning and preparing staff development, and developing a knowledge base (Casey et al., 2013). All of these are valuable skills for a leader in the radiology department environment.

Some of the graduates may have an interest in transitioning to health care administration. The PDP can introduce managing versus leading to explore leadership roles and how to achieve them. Work flow in the radiology department can frequently be interrupted by unplanned events such as patient safety or staffing issues (Miltner, Jukkala, Dawson, & Patrician, 2015). The more preparation the graduate has for the professional environment, the more potential exists for him/her to transition successfully to a registered radiographer.

Radiographers need to be lifelong learners due to the continuing education credits required each year to remain registered (ARRT, 2015i). The conceptual framework of Social Constructivism can assist with this lifelong learning in that the focus of learning is on the learner and sense making (Hinshaw, Burden, & Shriner, 2012). In the PDP, social constructivism can be briefly discussed to inform graduates that new knowledge can be built on old knowledge and that optimum learning can be achieved with active interaction with the material (Hinshaw et al., 2012). In the professional radiography environment,

radiographers are actively taking care of patients and taking images throughout their workday, so being active is required for working and learning.

Project Description

The purpose of the PDP is: to create an environment in which the participants can engage in higher-order cognitive activity; to find, experience, and share internal and external factors; and to see a glimpse into the professional environment they will one day inhabit as a radiography professional. The PDP will focus on the participants and their perceived professional development goals which would first include passing the registry examination on the initial attempt.

Resources Needed

The needed resources for the PDP will be:

- The venue, a large classroom at the Mid-Atlantic university along with smaller classrooms for smaller group activities
- Instructional technologies such as PowerPoint projectors and internet availability
- Office supplies such as markers, pens, paper or notepads, radiography faculty to serve as instructors and facilitators
- Career Services personnel to provide support
- Corporate donations for meals and snacks
- Experienced radiographers to serve on discussion panels
- A small group of student volunteers to help with preparations and clean up at the end of the PDP program

An invitation to participate in the PDP will be extended to the Mid-Atlantic university's recent radiography graduates as well as the graduates from neighboring radiography programs (Attachments B, C, and D at the end of Appendix A). The PDP will be successful with all of these resources in place.

Potential barriers to this plan would be limited financial support, limited technologies, limited space, limited participants, and limited instructors and facilitators. The Mid-Atlantic university's classrooms need to be reserved and their instructional technologies need to be working efficiently. This will be a learner centered PDP therefore the instructors need to be comfortable using the projectors and the internet for support (Reid, 2014). The Career Services department at this Mid-Atlantic university need to ensure that proper advertising occurs so as to provide timely registrations for all graduates currently preparing for the registry examination. There are contact people and established relationships with the corporations who would potentially donate to the PDP to avoid the limitation of inadequate funding. Should donations be less than the amount needed, the lunches and snacks would not be available for the participants. They would have to bring a brown bag lunch. Optimally, corporate support will be secured.

Implementation for the PDP will take approximately 60 days and will begin with establishing monetary support. Corporate funding will first need to be obtained to cover the cost of providing lunches and breaks to the participants. Philips, X-ray Visions, and Rad-Aid will be asked to provide donations. Philips is a health care business and makes radiography equipment (Philips Healthcare, 2015). X-ray Visions is a vendor of X-ray equipment in the United States' Mid-Atlantic region (ARRT, 2015l). Rad-Aid is a non-

profit public service group that provides radiology and imaging support in resource-limited regions world-wide (Rad-Aid.org, 2015). All three corporations will be given the opportunity to create a display table at the PDP in exchange for their support. They will also be listed as a corporate sponsor on the advertising flyer (Attachment A).

Once corporate funding has been secured, the next steps will be to reserve the venue, distribute flyers electronically and manually, send electronic invitations to perspective faculty/facilitators and to perspective participants. Table 7 shows the timeline for implementation of the PDP.

Table 8. *Timeline for Implementation.*

Days from day 1	Activity
60	Secure Corporate Support/Funding
50	Decide on date for PDP, reserve rooms, obtain permission from university's administration
45	Invite faculty/facilitators from Mid-Atlantic University and neighboring programs
30	Issue invitations to prospective participants, issue invitations to radiographers to serve on discussion panel
21	Contact caterers/food suppliers to secure luncheon and snack items
14	Collect and evaluate RSVP's
7	Finalize all details from caterers, administration, addr1ess any issues
1	Prepare classrooms and meeting rooms. Prepare supplies for distribution.

Allowing enough preparation time will ensure the success of the PDP. The roles and responsibilities of everyone involved will be carefully identified.

Roles and Responsibilities of Students

Students must be willing to be positive and to be open to learning new study skills and strategies for their preparation for the ARRT registry exam. Instructors will do their best to provide students with the best possible learning experiences (Trees, 2013). Facilitators must effectively keep to the schedules and serve as moderators of discussion panels or small group activities. It will be everyone's responsibility, students and instructors included, to behave in a professional and respectful manner. Students need to develop strong ethical and professional values (Sabatino, Rocco, Stievano, & Alvaro, 2015) and instructors can serve as examples of those professional values in this PDP program which will serve as the beginning of the graduates' transition to the professional environment.

Project Evaluation Plan

The PDP's evaluation will be goal-based with objectives established for each day of the program and evaluation collected from the participants at the end of each day. The goals will for the PDP program will be:

- To provide tools for graduates to be able to self-monitor, self-motivate, and self-propel through the process of becoming a registered radiographer, to assess their strengths and weaknesses, self-reflect to find what will provide motivation to them when necessary, and self-propel through the entire process of becoming a registered radiographer;
- To review the format of both the questions and content categories of the ARRT registry examination to raise comfort levels with test taking

abilities;

- To define future roles as graduates transition to the professional environment in order to develop professional ethics and skills.

The PDP is goal-based on the research that was conducted and what the participants need to know (Adam, 2013). The participants will be submitting a daily evaluation stating how much knowledge they have gained regarding the daily objectives. This type of evaluation will be used because it can be completed quickly and can efficiently convey what the participant has or has not learned. It is formative assessment for the participants which are usually embedded in a classroom activity, designed to guide instructional decisions, and are armed to gather information about what participants know and can do (Divall et al., 2014). The overall evaluation goals are to see what quickly and efficiently provides information to the participant which will lead to a successful transition for the participants and the stakeholders.

Stakeholders

Stakeholders in higher learning education can be defined as those who play a role in the development and maintenance of quality education such as students, parents, employees and potential employers of the graduates, academic administrators, faculty, and staff (Anis, Abdullah, & Islam, 2014). Stakeholders in the PDP program are the participants, the instructors/facilitators, and the educational institutions from which the participants have graduated. The quality of education can be measured by the satisfaction or views of the stakeholders and whether or not learning objective are met. It will be the PDP's intent to meet all of the learning objectives.

Project Implications

The goal of the PDP is to provide a successful transition to being a registered radiographer. The impact it will make on social change is that it will provide tools that can contribute to improved performance for the participant and improved patient safety (Tarnow, Gambino, & Ford, 2013). A high performing allied health care professional benefits anyone who needs medical care, especially those who need it in emergency situations. Ultimately, it will be a family member or a loved one's health that is at stake. The professional responsible for that family member's care needs to be a high performing individual, perhaps one who has benefitted from a PDP.

Once the PDP has successfully been developed and implemented, the potential exists for it to become an annual event for future radiography cohorts. Other topics can be incorporated such as how to study if the initial attempt was unsuccessful, other efficient pathways to advanced modalities, and effective teamwork. Just because health care professionals are well trained in their professions does not ensure that the team will work cooperative and cohesively towards the common goal of avoiding errors and maintaining the health of a patient (Cowie et al., 2014). There are options for more topics to be incorporated into future PDP programs.

The importance of this project to local stakeholders is that it will contribute to the high-performing graduate. Other radiography programs exist in the same geographical area as the Mid-Atlantic university. Competition is high for employment. If all educational institutions are producing high-functioning graduates, the radiography profession will be enhanced and standards of excellence will be maintained. The

radiography profession has evolved from hospital based certificate programs to the requirement of an associate's degree in order to be eligible to take the ARRT registry exam (ARRT, 2015a). The future may bring the requirement of a baccalaureate degree as the technology and the profession evolves. In the large context, a PDP may be a requirement in terms of transition to the professional environment and it may also serve as the transition to a higher educational degree as the needs of the health care community may dictate.

As the health care community changes due to technological developments and/or governmental legislation, the radiographer needs to continue to evolve and adapt. The transition from the classroom to the clinical environment requires adaptation. The information of the material from textbooks and the didactic classroom needs to be applied to patient care and the professional environment. A high-performing graduate will easily adapt to becoming a lifelong learner and a successful radiographer. The tools to transition from a graduate to a professional will assist both the educational and the health care fields.

Section 4 contains personal reflections and conclusions of this project study. Strengths and limitations will be discussed, as well as recommendations for alternative approaches. A great deal of personal growth occurred during the course of this project study. This will be documented with the importance of the work. Scholarly attributes were acquired, which were beneficial to both the researcher and the radiography graduates.

Section 4: Reflections and Conclusions

In any radiography program students have two types of courses. They have classes in their clinical environment where they are supervised by a clinical instructor as they learn and refine the radiology procedures. There also have the didactic courses which take place in the classrooms and simulation laboratory (ECPI University, 2015b). For a study done by Michaelson, McKerron, and Davison (2015), there were two themes: organic learning (implicit) and didactic learning (explicit). Organic learning was what occurred through experiences that arose naturally from the course of everyday life. Didactic learning occurred in both formal and informal contexts. Learning in all contexts was deliberate, with the intention to teach the learner (Michaelson et al., 2015). Didactic learning occurs in the radiography program which adds to the strength of the program. At the end of the program, the graduate was poised to enter the professional environment.

With two types of learning occurring, high potential exists for retention of information and pathways to success. This success was the desired outcome as the graduates prepared for the ARRT registry examination and the transition to be a registered radiographer. The pass rate for this Mid-Atlantic university in 2014 was 83% while many neighboring programs posted pass rates of 100%. To be a viable participant in a highly competitive market, the radiography cohort at this Mid-Atlantic university had to have optimum skills and tools to pass their ARRT radiography registry examination.

Project Strength and Limitations

The project is strong in that its outcome could bring success to many members of different radiography cohorts as well as future cohorts. With the deliverable of a PDP for

graduates, the transition from a radiography student to a radiography professional can be easily made given that the tools and learning plans are in place. Limitations for the project included that participants could not effectively express their perceptions on successfully passing the ARRT registry examination.

Other limitations centered on how the participants learned. By using their personal experiences to help the participants acquire new knowledge, social constructivist theory was used. The knowledge from their educational program was constructed through their personal histories and experiences, transferring new knowledge into acquired knowledge (Hu & Zhang, 2015). If participants were not able to use their experiences to adapt to new concepts, learning may not have occurred. Rote memorization may have helped the participants remember answers to the questions for surface learning, but they would not have understood the concepts rooted in deep learning.

Recommendations for Alternative Approaches

Based on the data collection, alternative approaches to the project deliverable could have been made. Many students stated that RadReviewEasy was used in their studying efforts. Participant 3 stated: “I felt that the RadReviewEasy was a little easier for me. I took every question and would read questions 2-3 times. I went through the entire question bank on there a couple of times.” Participant 4 said, “I did RadReviewEasy. That was very helpful.” RadReviewEasy was a program that was paid for by the students or instructors. A curriculum change would be necessary for this program to be financially supported by the Mid-Atlantic university. However, a

curriculum change would not have provided the transition to the professional environment, as the PDP would.

Another alternative approach would be to address the participants' responses regarding the most difficult and easiest subjects. Seven out of the nine participants stated that physics was the hardest subject matter. Participant 2 stated: "Physics was the hardest because I felt we weren't prepared enough for it. I think there wasn't a whole lot of meat and potatoes with that. I felt like it was a crash course versus more in detail. But then again there's not a whole lot of physics that we actually truly apply." The easiest subject matter was anatomy and radiographic positioning, according to five out of nine of the participants. Participant 4 said, "Positioning was the easiest; that came with doing it over and over again." The approaches to adjust these opinions would be in altering the way the information was delivered.

To change the delivery of information, a curriculum change would be necessary. There may possibly be ways to adjust how physics is taught so that the majority of the participants would not feel it is the most difficult subject matter or a way to adjust radiographic positioning so that the majority did not feel it was the easiest subject, but that would again require a curriculum change with different course objectives. Since the physics questions account for 33.5% of the registry examination (ARRT, 2015m), the project deliverable of a PDP would better contribute to successful ARRT registry exam results.

Scholarship, Project Development, Leadership, and Change

In choosing to study perceptions on passing the ARRT registry, this qualitative research project became my first step towards learning the research process. I learned how to be a scholar. I learned how to find emerging themes from the words of the participants and how to answer the guiding questions from those themes. Of course the many steps were explained to me and placed before me, but I learned how to perform research only after experiencing it first-hand.

That experience is a gift to be opened again and again. I now see what can be accomplished from a research project and I intend to participate in more projects. I have grown and gained experience as a scholar, an educator, and a project developer. I have experienced joy while learning. Prior to this research study I was a strong student and writer. I feel even more empowered as a student and writer now due to what I have learned from this research process.

I would not have predicted that I would gain so much information from my participants. They matured immensely from the time I last saw them until I reconnected with them for their participation in this research study. They exhibited strength of character and ethics. They were driven, intelligent individuals who had a goal and reached it through arduous work and dedication. What I discovered was that their preparation for the registry examination was viewed as somewhat of a rite of passage. It was an honor for me as an educator to assist with that passage.

If I could have hand-picked the participants based on their performance in their radiography program, the participants I would have picked are not the ones who

volunteered. I learned that success and maturity cannot always be foretold. I need to be more open as to how students can grow. Participant 1 was always a leader in the classroom, scoring nearly perfect on his exams. I would have hand-picked him. However, Participant 7 barely made it through the program. What I learned from him during this research, due to the questions that I asked, was about his impoverished background and his desire to prove people wrong. He proved that he could succeed when his neighbors thought him incapable of success. That drive was a spotlight on what education can do to change a person previously considered to have a bleak future. I am glad I was able to see his past, his present, and his successful future.

My personal growth that occurred during this project was accompanied by pride and wonderment. As an instructor I have heard many clichés that exist about teachers changing students' lives for the better and making an impact on the world. In this project, I saw it firsthand. While interviewing the participants, who were graduates of a program in which I was the director, I saw how they had changed from students to professionals. One young woman entered the program with adolescent behaviors: giggly, unfocused, and unsure of herself. When that same young woman volunteered and participated in the project study, she was confident, polished, already accomplished in her career, and seeking new challenges. I was lucky to have been a part of that transformation.

Another participant spoke to me about contributing to his community and it was with great pride that I saw him as a fine example of social change. His ethics will contribute to the standards of excellence in the radiography field. I remembered him as a

respectful student. Now I think of him as a responsible and trustworthy product of the radiography program. He is a future leader of his profession.

The project deliverable was born from the answers given to me by the participants. I can now see how a PDP can help many radiography graduates and can contribute greatly to the success of those currently struggling to pass their ARRT registry examination. It will incorporate learning with enjoyment, knowledge with experiences, and scholarship with camaraderie. I view the PDP as becoming an essential part of any radiography program, the final stop on a lengthy educational train ride, the last words spoken before going into battle. I will be the general, amassing the troops. However, that battle will be easily won. I am a stronger leader now and I have developed a program to aid in their victories.

Reflection on the Importance of the Work

Passing the ARRT registry exam is of utmost importance since it allows the radiographer to be credentialed and consequently to begin professional practice. Passing on the initial attempt affects pass rates, accreditation, and the standards of both the educational program and institution. Assisting graduates to cross the bridge from a graduate to a professional will improve many lives: students, faculty, and the health care community. Graduates will become better radiography professionals and teachers will become better teachers. Great teaching emerges from sound core knowledge combined with self-reflection and analysis (Stefanich, 2014). Contributing to the positivity in radiography graduates' lives will have profound effects on the radiography instructors and faculty.

I learned from this research that my words have not gone unnoticed. When I heard the participants say, “you have to take personal responsibility to do well” and “I was constantly trying to give it my best,” I knew they had been listening when I had spoken those words in the classroom. I had known that being an instructor would allow me to make an impact on students’ lives. I learned during this project study that this was very much true.

Many of the graduates had difficulty securing full-time employment, and were working two or three part-time jobs. I was grateful for the time they could spare to participate in the interview. I was grateful that they wanted to help me. I was grateful I was able to see the professional radiographer that they had become. Very few instructors are able to see the change from a student to a graduate to a professional. In this aspect, I have been given many gifts and many glimpses into transformations that occurred with a bit of my assistance.

Implications, Applications, and Directions for Future Research

It was a pleasant surprise when Participant 5 commented on social change during his interview. When asked why he felt that he had been successful in passing the registry exam, he stated:

> Hopefully what you have done for yourself benefits those around you like your family and your friends, and your community that motivates you to move further into the field or whatever you want to do in life. It is very important to feel that you’re proud, that you’ve done something successful.

His comments represented the impact for social change. He began first by naming the impact at the individual level, then included the family level, then moved to his community or society. He spoke of future growth and moving further into the field.

Moving further into the field impacts positive social change for organizations and society. Participant 7 spoke of future growth. He said, “I have to continue training. I mean that is all on me. I thought of even going for MRI.” These participants were at the entry-level for radiography. Should they decide to grow into another modality, it will impact the profession, the organizations where they are employed, and the health care community.

High performing students transition into high performing graduates who contribute to social change by being dedicated and engaged members of their profession. When they are health care workers, they contribute to optimum patient care and a safe health care environment. This impact is on all levels: individual, familial, organizational, and societal. The potential is there for those professionals to make the world a better place by doing the best job that they can on a daily basis.

Passing their credentialing exam gives them passage into the health care profession of radiography. The study boundaries were for radiographers but could be expanded to other health care professions requiring credentialing exams such as nurses, surgical technologists, or respiratory therapists. It could also apply to different modalities of radiology such as Computerized Tomography, Mammography, Magnetic Resonance Imaging, or Angiography. Since health care is a field that is highly scrutinized by many governing and accrediting bodies such as The Joint Commission (The Joint Commission,

2015) and Occupational Safety and Health Administration (OSHA) (OSHA, 2015), patient and worker safety cannot be taken too lightly or for granted.

The methodology behind radiography instruction should consistently contain hands-on activities. Radiography students are generally kinesthetic learners who learn by touch due to the nature of the profession. Tactile, kinesthetic, and group learning styles are mutually related (Lee & Kim, 2014), so the methodologies to teach radiographers should include these kinds of learning activities. The theory behind teaching in radiography is social constructivism since the cohorts consist of non-traditional students seeking a career change. Their experiences will assist them in their transfer of knowledge. If those experiences are in healthcare, empirical methods will also assist with transfer of knowledge.

Future research could be in the other modalities' credentialing exams and any difficulties in obtaining passing scores. Other career pathways for radiographers could also be explored such as health care administration, computer technologies, and education. Regardless of the research, the mindset that the preparation for the credential exam does not need to consist of suffering, akin to a type of fraternity pledging of going without sleep, or a sacrifice to be experienced only by the most highly evolved on the evolutionary spectrum. Methodical and pragmatic preparation is what is needed for the registry examination. Learning can transpire and confidence can be instilled in this type of preparation without undue suffering of going without food and sleep. The bridge from graduation to professional practice can be traversed peacefully.

Conclusion

This project was based on graduates having to pass their radiography credentialing exam. Nine participants, members of the 2014 radiography cohort of a Mid-Atlantic university were interviewed and asked their perceptions of how to best prepare and pass the ARRT registry examination. From the participants' answers, categories formed and themes emerged to self-monitor, self-motivate, and self-propel their way to radiography registration. What was witnessed during the interviews were the emergence of budding professionals, entry-level registered radiographers with high ethics, skills being polished with determination, and mindsets ready to conquer their profession to evolve into accomplished radiographers.

As an instructor, I saw the transformation from graduate to professional. I heard the determination in their voices to pass the test on the initial attempt and the desire to deliver health care in the most caring and efficient possible ways. The pass rates need to improve; efficiency in preparation needs to improve. But what is already in place is the drive to succeed. What is already admirable is the desire to contribute to optimum patient care and responsibly deliver diagnostic radiographic images. The registry documents that knowledge has been effectively delivered and stored. It provides credentials to ensure that our friends and family members are being cared for by consummate professionals who have studied, learned, and absorbed all of the content from the registry examination's content categories. The transformation from the graduate to the professional radiographer has been completed and the health care community can be

assured that standards of excellence will be effectively and caringly secured and maintained.

References

Adam, M. (2013, May 13). NMSU: An institution of opportunity for many Latinos. *The Hispanic Outlook in Higher Education, 23,* 30-32.

Alegría, D., Boscardin, C., Poncelet, A., Mayfield, C., & Wamsley, M. (2014). Using tablets to support self-regulated learning in a longitudinal integrated clerkship. *Medical Education Online, 19*. http://dx.doi.org/10.3402/meo.v19.23638

al Mahmud, A. (2013). Constructivism and reflectivism as the logical counterparts in TESOL: Learning theory versus teaching methodology. *TEFLIN Journal, 24*(2), 237-257.

American Registry of Radiologic Technologists. (2014). *Primary exam results*. Retrieved from https://www.arrt.org/pdfs/Examinations/Annual-Reports/Annual-Report-of-Primary-Exams-2014.pdf

American Registry of Radiologic Technologists. (2015a). *Academic degree requirement effective 2015 for primary certification.* Retrieved from https://www.arrt.org/Certification/Academic-Degree-Requirement

American Registry of Radiologic Technologists. (2015b). *Annual program summary report*. Retrieved from https://edweb.arrt.org/Content/Reports/AnnualSummary.aspx

American Registry of Radiologic Technologists. (2015c). *Annual report of post-primary examinations.* Retrieved from https://www.arrt.org/pdfs/Examinations/Annual-Reports/Annual-Report-of-Post-Primary-Exams-2013.pdf

American Registry of Radiologic Technologists. (2015d). *Are you up to the test?* Retrieved from https://www.arrt.org/examination/volunteers

American Registry of Radiologic Technologists. (2015e). *ARRT Certification*. Retrieved from https://www.arrt.org/Certification

American Registry of Radiologic Technologists. (2015f). *ARRT seeks item writers to develop exam and assessment questions*. Retrieved from https://www.arrt.org/News/articles/2012-08-30-Volunteers.aspx

American Registry of Radiologic Technologists. (2015g). *Certification and registration rafter educational program completion: three-year limit for eligibility.* Retrieved from https://www.arrt.org/Education/Five-Year-Rule

American Registry of Radiologic Technologists. (2015h). *Content specifications for the radiography examination.* Retrieved from https://www.arrt.org/pdfs/Disciplines/Content-Specification/RAD-Content-Specification.pdf

American Registry of Radiologic Technologists. (2015i). *Continuing education (CE) requirements.* Retrieved from https://www.arrt.org/Registration/Continuing-Education(CE)-Requirements

American Registry of Radiologic Technologists. (2015j). *Educators and students*. Retrieved from https://www.arrt.org/Educators-Students

American Registry of Radiologic Technologists. *Examination*. (2015k). Retrieved from https://www.arrt.org/Examination/

American Registry of Radiologic Technologists. (2015l). *History*. Retrieved from https://www.arrt.org/About-ARRT/History

American Registry of Radiologic Technologists. (2015m). *Mission*. Retrieved from https://www.arrt.org/About-ARRT/Mission

American Registry of Radiologic Technologists. (2015n*) Radiography certification and registration.* Retrieved from https://www.arrt.org/Certification/Radiographer

American Registry of Radiologic Technologists. (2015o) *Radiography didactic and clinical competency requirements.* Retrieved from https://www.arrt.org/pdfs/Disciplines/Competency-Requirements/RAD-Competency-Requirements.pdf

American Registry of Radiologic Technologists. (2015p). *Radiography examination*. Retrieved from: https://www.arrt.org/pdfs/Disciplines/Content-Specification/RAD-Content-Specification.pdf

American Registry of Radiologic Technologists. (2015q) *Results-2011*. Retrieved from https://www.arrt.org/pdfs/examinations/annual-reports/annual-report-of-primary-exams-2011.pdf

American Registry of Radiologic Technologists. (2015r). *State licensing*. Retrieved from https://www.arrt.org/state-licensing/

American Society of Radiologic Technologists. (2015a). *ASRT curricula*. Retrieved from http://www.asrt.org/educators/asrt-curricula

American Society of Radiologic Technologists. (2015b). *ASRT mission, vision, core values, value propositions and commitment to human rights*. Retrieved from http://www.asrt.org/main/about-asrt/mission-vision

American Society of Radiologic Technologists. (2015) *Radiography certification and registration.* Retrieved from http://www.asrt.org/docs/default-source/educators/ed_curr_rad2012approved_013012.pdf?sfvrsn=2

Anis, A., Abdullah, Z., & Islam, R. (2014). Defining quality education in higher learning institutions: divergent views of stakeholders. *International Journal of Arts &*(1), 375-385.

Anthony, J. S., Clayton, K. E., & Zusho, A. (2013). An investigation of students' self-regulated learning strategies: Students' qualitative and quantitative accounts of their learning strategies. *Journal of Cognitive Education and Psychology, 12*(3), 359-373.

Assudani, R., & Kilbourne, L. (2014). Enabling entrepreneurial minds: using appreciative inquiry as a pedagogical tool for uncovering self-awareness and for generating constructivist learning. *Journal of Entrepreneurship Education*, 17(2), 52-61.

Aula, P., & Mantere, S. (2013). Making and breaking sense: An inquiry into the reputation change. *Journal of Organizational Change Management, 26*(2), 340-352. http://dx.doi.org/10.1108/09534811311328380

Baker, J. H., & Sax, C. L. (2012). Building a culture of evidence: A case study of a California community college. *Journal of Applied Research in the Community College, 19*(2), 47-55.

Baranczyk, M. C., & Gray, M. J. (2014). A comparison of study aids on exam performance. *International Journal of Business and Social Science,5*(8).

Bassot, B. (2012). Career learning and development: A social constructivist model for the twenty-first century. *International Journal for Educational and Vocational Guidance, 12*(1), 31-42. http://dx.doi.org/10.1007/s10775-012-9219-6

Bay, E., Bagceci, B., & Cetin, B. (2012). The effects of social constructivist approach on the learners' problem solving and metacognitive levels. *Journal of Social Sciences, 8*(3), 343-349.

Boctor, L. (2013). Active-learning strategies: The use of a game to reinforce learning in nursing education. A case study. *Nurse Education in Practice, 13*(2), 96-100. http://dx.doi.org/10.1016/j.nepr.2012.07.010

Boyleston, E. & Collins, M. (2012). Advancing our profession: Are higher educational standards the answer? *Journal of Dental Hygiene (Online), 86*(3), 168-78.

Brackstone, C. (2013). Student without portfolio? *Imaging & Therapy Practice.* 27-30.

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment. *TechTrends, 59*(2), 17-22. http://dx.doi.org/10.1007/s11528-015-0834-1

Buckley, M. (2013). A constructivist approach to business ethics. *Journal of Business Ethics,* 117(4), 695-706. http://dx.doi.org/10.1007/s10551-013-1719-x

Carter, M. J., Zabriskie, R. B., Anderson, L., & Janssen, M. (2013). History of

accreditation: COAPRT model. *Therapeutic Recreation Journal, 47*(3), 156-168.

Casey, P. J., Starrett, T. M., & Dunlap, K. (2013). Residual effects of a professional development project for aspiring school leaders. *Academy of Educational Leadership Journal, 17*(2), 81-93.

Caufield, J., & Woods, T. (2013). Experiential learning: Exploring its long-term impact on socially responsible behavior. *Journal of Scholarship of Teaching and Learning*, *13*(2), 31-48.

Chen, C., & Ming, L. C. (2014). The risks and opportunities of the University of Science and Technology: The concept and application of school effectiveness. *Journal of International Management Studies, 9*(2), 65-74.

Coenen, M., Stamm, T. A., Stucki, G., & Cieza, A. (2012). Individual interviews and focus groups in patients with rheumatoid arthritis: A comparison of two qualitative methods. *Quality of Life Research, 21*(2), 359-70. http://dx.doi.org/10.1007/s11136-011-9943-2

Coulborn, R. M., Panunzi, I., Spijker, S., Brant, W. E., Duran, L. T., Kosack, C. S., & Murowa, M. M. (2012). Feasibility of using teleradiology to improve tuberculosis screening and case management in a district hospital in Malawi. *World Health Organization. Bulletin of the World Health Organization, 90*(9), 705-11.

Cole, S. A. (2012). *Surveying radiography faculty to examine age, tenure, gender, and resistance to change* (Order No. 3499590). Available from Dissertations & Theses @ Walden University. (944324210).

Conti, G. J., & McNeil, R. C. (2012). Theme of issue: Learning strategies in adult learning. *Journal of Adult Education, 41*(2), 2-I,II.

Cousik, R. (2014). Research in special education: Using a research poem as a guide for relationship building. *The Qualitative Report, 19*(26), 1-16.

Cowie, N., Bowen, A., Kuling, S., Premkumar, K., Burbridge, M., & Martel, J. (2014). Health quality improvement using instructional communication and teamwork videos: An outcome study. *Creative Education, 5*(1), 36-45.

Cranley, L. A., Birdsell, J. M., Norton, P. G., Morgan, D. G., & Estabrooks, C. A. (2012). Insights into the impact and use of research results in a residential long-term care facility: A case study. *Implementation Science, 7,* 90. http://dx.doi.org/10.1186/1748-5908-7-90

Creswell, J. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research* (Custom Ed.). Boston, Massachusetts: Pearson Education, Inc.

Cseh, M., Davis, E. B., & Khilji, S. E. (2013). Developing a global mindset: Learning of global leaders. *European Journal of Training and Development, 37*(5), 489-499. http://dx.doi.org/10.1108/03090591311327303

Dabson, A. M., Magin, P. J., Heading, G., & Pond, D. (2014). Medical students' experiences learning intimate physical examination skills: A qualitative study. *BMC Medical Education, 14,* 39. http://dx.doi.org/10.1186/1472-6920-14-39.

Debussche, X., Collin, F., Fianu, A., Balcou-Debussche, M., Fouet-Rosiers, I., Koleck, M., & Favier, F. (2012). Structured self-management education maintained over two years in insufficiently controlled type 2 diabetes patients: The ERMIES randomized trial in reunion island. *Cardiovascular Diabetology*, *11*, 91. http://dx.doi.org/10.1186/1475-2840-11-91

DiVall, M., Alston, G. L., Bird, E., Buring, S. M., Kelley, K. A., Murphy, N. L., . . . Szilagyi, J. E. (2014). A faculty toolkit for formative assessment in pharmacy education. *American Journal of Pharmaceutical Education*, *78*(9), 160-169.

Douglass, C., & Morris, S. R. (2014). Student perspectives on self-directed learning. *Journal of the Scholarship of Teaching and Learning*, 14(1), 13-25.

East Coast Polytechnic Institute University. (2014a) *Medical Radiography Program.* Retrieved from http://www.ecpi.edu/documents/RAD-Program-Effectiveness-Data.pdf

ECPI University. (2014b). *Radiography*. Retrieved from http://www.ecpi.edu/programs/radiography-associate-degree

ECPI University. (2015a). *Core Curriculum*. Retrieved from http://www.ecpi.edu/programs/radiography-associate-degree

ECPI University. (2015b) *Radiography: A.A.S. in Medical Radiography.* Retrieved from http://www.ecpi.edu/programs/radiography-associate-degree

Eisele, L., Grohnert, T., Beausaert, S., & Segers, M. (2013). Employee motivation for personal development plan effectiveness. *European Journal of Training and Development, 37*(6), 527-543. http://dx.doi.org/10.1108/EJTD-02-2013-0015

Evolve/Elsevier. (2014). Health and Environmental Science Institute exam. Retrieved from https://evolve.elsevier.com/studentlife/faq.html#hesi

Fowler, D. L. (2014). Career coaching: Innovative academic--practice partnership for professional development. *The Journal of Continuing Education in Nursing, 45*(5), 205-9; quiz 210 -1. http://dx.doi.org/10.3928/00220124-20140417-02

Frazier, B. R., Young, C. C., & Williams, D. R. (2012). Profiles of non-traditional adult MHA and MBA students and their choice of degree program. *The Journal of Health Administration Education, 29*(3)

Freeman, C. (2014). Welcome to the student issue. *Imaging &Therapy Practice.* 3.

Funk, S., Bogich, T. L., Jones, K. E., Kilpatrick, A. M., & Daszak, P. (2013). Quantifying trends in disease impact to produce a consistent and reproducible definition of an emerging infectious disease. *PLoS One, 8*(8) http://dx.doi.org/10.1371/journal.pone.0069951

Gagnon, A. J., Carnevale, F., Mehta, P., Rousseau, H., & Stewart, D. E. (2013). Developing population interventions with migrant women for maternal-child health: A focused ethnography. *BMC Public Health, 13*, 471. http://dx.doi.org/10.1186/1471-2458-13-471

Gàlvez, P., Valencia, A., Palomino, A. M., Cataldo, M., & Schwingel, A. (2015). Communicating about eating behaviors. A qualitative study of Chilean women

and their health-care providers. *International Journal of Qualitative Studies on Health and Well-being, 10*. doi:http://dx.doi.org/10.3402/qhw.v10.25979

Gamage, H. R., & Wickramasinghe, A. (2014). Researching peculiarity of entrepreneurs: from positivism to social constructivism. *Journal of Entrepreneurship Education, 17*(2), 91-100.

Gläser, J., & Laudel, G. (2013). Life with and without coding: Two methods for early-stage data analysis in qualitative research aiming at causal explanations. *Forum: Qualitative Social Research, 14*(2)

Good, J. P., Ramos, D., & D'Amore, D. C. (2013). Learning style preferences and academic success of preclinical allied health students. *Journal of Allied Health, 42*(4), e81-90.

Gurley, L. T. & Callaway, W. (2011). *Introduction to Radiologic Technology* (7th Ed.). Maryland Heights, MO: Elsevier Mosby.

Hallett, R. E. (2013). Interrupting life history: The evolution of relationship within research. *The Qualitative Report, 18*(14), 1-16.

Hanson, J. L., Stephens, M. B., Pangaro, L. N., & Gimbel, R. W. (2012). Quality of outpatient clinical notes: A stakeholder definition derived through qualitative research. *BMC Health Services Research, 12*, 407. http://dx.doi.org/10.1186/1472-6963-12-407

Harvey-Lloyd, J., Stew, G., & Morris, J. (2012). Under pressure. *Synergy*, 9-11, 13-14.

Hartwig, M. K., & Dunlosky, J. (2012). Study strategies of college students: Are self-testing and scheduling related to achievement? *Psychonomic Bulletin & Review*, 19(1), 126-34.

Heyvaert, M., Maes, B., & Onghena, P. (2013). Mixed methods research synthesis: Definition, framework, and potential. *Quality and Quantity, 47*(2), 659-676. http://dx.doi.org/10.1007/s11135-011-9538-6

Hill, E. M., Turner, E. L., Martin, R. M., & Donovan, J. L. (2013). "Let's get the best quality research we can": Public awareness and acceptance of consent to use existing data in health research: A systematic review and qualitative study. *BMC Medical Research Methodology, 13*, 72. http://dx.doi.org/10.1186/1471-2288-13-72

Hinshaw, R. E., Burden, R., & Shriner, M. (2012). Supporting post-graduates' skill acquisition using components of constructivism and social learning theory. *Creative Education, 3*, 874-877.

Hjeltnes, A., Binder, P., Moltu, C., & Dundas, I. (2015). Facing the fear of failure: An explorative qualitative study of client experiences in a mindfulness-based stress reduction program for university students with academic evaluation anxiety. *International Journal of Qualitative Studies on Health and Well-being, 10* http://dx.doi.org/10.3402/qhw.v10.27990

Hobson, E. H., Johnston, P. E., & Spinelli, A. J., (2015). Staging a reflective capstone course to transition PharmD graduates to professional life. *American Journal of Pharmaceutical Education, 79*(1), 14-23.

Houghton, C., Casey, D., Shaw, D., & Murphy, K. (2013). Rigour in qualitative case-study research. *Nurse Researcher, 20*(4), 12-7.

Hrynchak, P., & Batty, H. (2012). The educational theory basis of team-based learning. *Medical Teacher, 34*(10), 796-801. doi:10.3109/0142159X.2012.687120

Hu, J., & Zhang, M. (2015). Research on the construction of liberal arts graduate student learning situation-A case study of the tourism management major in Guangdong province. *Higher Education Studies, 5*(2), 1-9. http://dx.doi.org/10.5539/hes.v5n2p1

Hurst, D., Cleveland-Innes, M., Hawranik, P., & Gauvreau, S. (2013). Online graduate student identity and professional skills development. *The Canadian Journal of Higher Education, 43*(3), 36-55.

Hutchins, K. L., & Friedrichsen, P. J. (2012). Science faculty belief systems in a professional development program: Inquiry in college laboratories. *Journal of Science Teacher Education, 23*(8), 867-887. http://dx.doi.org/10.1007/s10972-012-9294-z

Janghorban, R., Roudsari, R. L., & Taghipour, A. (2014). Skype interviewing: The new generation of online synchronous interview in qualitative research. *International Journal of Qualitative Studies on Health and Well-being, 9* http://dx.doi.org/10.3402/qhw.v9.24152

Jensen, J. L., McDaniel, M. A., Woodard, S. M., & Kummer, T. A. (2014). Teaching the test...or testing to teach: Exams requiring higher order thinking skills encourage

greater conceptual understanding. *Educational Psychology Review, 26*(2), 307-329. http://dx.doi.org/10.1007/s10648-013-9248-9

Joint Review Committee on Education in Radiologic Technology. (2015a). *2014 JRCERT standards for an accredited educational program.* Retrieved from http://www.jrcert.org/programs-faculty/jrcert-standards/

Joint Review Committee on Education in Radiologic Technology. (2015b). *About.* Retrieved from http://www.jrcert.org/about/

Joint Review Committee on Education in Radiologic Technology. (2015c). *Primary exam program effectiveness data*. Retrieved from http://www.jrcert.org/resources/program-effectiveness-data/

Joint Review Committee on Education in Radiologic Technology. (2015d) *Standards for an accredited educational program in radiography.* Retrieved from http://www.jrcert.org/sites/jrcert/uploads/documents/2011_Standards/Standards_2014-Radiography.pdf

Knowles, M. S., Holton, E. F., III, & Swanson, R. A. (2005). *The adult learner* (6th ed.). New York, NY: Elsevier Publishing.

Lambert, J. E., Skinner, A. H., & Friedlander, M. L. (2012). Problematic within-family alliances in conjoint family therapy: a close look at five cases. *Journal of Marital and Family Therapy*, *38*(2), 417-28.

Lauckner, H., Paterson, M., & Krupa, T. (2012). Using constructivist case study methodology to understand community development processes: Proposed

methodological questions to guide the research process. *The Qualitative Report, 17*(13), 1-22.

Lavian, R. H. (2013). 'You and I will change the world 'student teachers' motives for choosing special education. *World Journal of Education, 3*(4), 10-n/a.

Lee, B., & Kim, H. (2014). What can we learn from our learners' learning styles? *English Language Teaching, 7*(9), 118-131.

Legg, J. S., PhD., Aaron, L., PhD., & Dempsey, M. C., M.S. (2013). Patient safety perceptions among vascular interventional technologists. *Journal of Allied Health, 42*(2), 106-11.

Liang, R., & Chen, D. V. (2012). Online learning: Trends, potential and challenges. *Creative Education, 3*(8), 1332-1335.

Little, M. E. (2012). Action research and response to intervention: Bridging the discourse divide. *The Educational Forum, 76*(1), 69-80.

Liu, Y. (2013). Applying comprehensible input and culture input methodology to inspire college students' learning motivation. *Theory and Practice in Language Studies, 3*(11), 2072-2077.

Loveland, T. (2012). Professional Development Plans for Technology Education: Accountability-Based Applications at the Secondary and Post-Secondary Level. *Technology & Engineering Teacher, 71*(7), 26-31

Ludlow, B. L. (2014). On Taking Responsibility. *Teaching Exceptional Children, 46*(6), 145. doi:10.1177/0040059914538413

Madonna, S., Jr, & Philpot, V. D. (2013). Motivation and learning strategies, and academic and student satisfaction in predicting self-efficacy in college seniors. *Quarterly Review of Distance Education, 14*(3), 163-168,179-180.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research? A review of qualitative interviews in IS research. *The Journal of Computer Information Systems, 54*(1), 11-22.

Martin, K., Galentino, R., & Townsend, L. (2014). Community college student success: The role of motivation and self-empowerment. *Community College Review, 42*(3), 221-241.

Mbatha, B. (2014). Global transition in higher education: From the traditional model of learning to a new socially mediated model. *International Review of Research in Open and Distance Learning, 15*(3)

Mbati, L. (2013). Online social media applications for constructivism and observational learning. *International Review of Research in Open and Distance Learning, 14*(5).

McNulty, J. A., Ensminger, D. C., Hoyt, A. E., Chandrasekhar, A. J., Gruener, G., & Espiritu, B. (2012). Study strategies are associated with performance in basic science courses in the medical curriculum. *Journal of Education and Learning, 1*(1), 1-12.

Mega, C., Ronconi, L., & De Beni, R. (2014). What makes a good student? How emotions, self-regulated learning and motivation contribute to academic achievement. *Journal of Educational Psychology. 106* (1). Pp. 121-131.

Merriam, S. (2009). *Qualitative research: a guide to design and implementation* (2nd Ed.). San Francisco: Jossey-Bass

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide (3rd Ed.).* San Francisco: Jossey-Bass.

Michaelson, V., McKerron, M., & Davison, C. (2015). Forming ideas about health: A qualitative study of Ontario adolescents. *International Journal of Qualitative Studies on Health and Well-being, 10.* http://dx.doi.org/10.3402/qhw.v10.27506

Miltner, R. S., Jukkala, A., Dawson, M. A., & Patrician, P. A. (2015). Professional development needs of nurse managers. *The Journal of Continuing Education in Nursing, 46*(6), 252-258. http://dx.doi.org/10.3928/00220124-20150518-01

Misfud, L. (2012). Creating a learning environment. *Synergy*, 25-29.

Moalosi, W. T. S. (2013). Effects of direct instruction and social constructivism on learner's cognitive development: a comparative study. *Academic Research International, 4*(6), 301-305.

Morrison, G., John, S. D., Goske, M. J., Charkot, E., Herrmann, T., Smith, S. N., . . . Carbonneau, K. (2011). Pediatric digital radiography education for radiologic technologists: Current state. *Pediatric Radiology, 41*(5), 602-10. http://dx.doi.org/10.1007/s00247-010-1904-3

Newton, G., & Martin, E. (2013). Blooming, SOLO taxonomy, and phenomenography as assessment strategies in undergraduate science education. *Journal of College Science Teaching, 43(*2), 78-90.

Oleinik, A. (2011). Mixing quantitative and qualitative content analysis: Triangulation at work. *Quality and Quantity, 45*(4), 859-873. http://dx.doi.org/10.1007/s11135-010-9399-4

Owen, G. T. (2014). Qualitative methods in higher education policy analysis: Using interviews and document analysis. *The Qualitative Report,19*(26), 1-19.

Özar, M. (2012). Turkish curriculum: Claimed to be based on constructivism. *International Journal of Business and Social Science, 3*(18).

Pang, E., & Hung, H. (2012). Designing and evaluating A personal skills development program for management education. *Journal of College Teaching & Learning (Online), 9*(3), 159.

Parrish, B., P.E., & Jensen, C., P.E. (2013). Licensure: Toward technical competence and ethical professionalism. *Chemical Engineering Progress, 109*(3), 57-62.

Pearce, P., Phillips, B., Dawson, M., & Leggat, S. G. (2013). Content of clinical supervision sessions for nurses and allied health professionals. *Clinical Governance, 18*(2), 139-154. http://dx.doi.org/10.1108/14777271311317927

Pearson Vue. (2015). *ARRT certification testing*. Retrieved from http://www.pearsonvue.com/arrt/

Philips Healthcare. (2015). Connecting hundreds of millions of devices. Retrieved from http://www.usa.philips.com/healthcare

Pittman, P., Frogner, B., Bass, E., & Dunham, C. (2014). International recruitment of allied health professionals to the United States: Piecing together the picture with imperfect data. *Journal of Allied Health, 43*(2), 79-87.

Proyer, R. T., Ruch, W., & Buschor, C. (2013). Testing strengths-based interventions: A preliminary study on the effectiveness of a program targeting curiosity, gratitude, hope, humor, and zest for enhancing life satisfaction. *Journal of Happiness Studies, 14(*1), 275-292. http://dx.doi.org/10.1007/s10902-012-9331-9

Rad-Aid.org. (2015). Introduction and brief history. Retrieved from http://www.rad-aid.org/about-us/

RadReviewEasy. (2015). McGraw-Hill's RadReviewEasy The #1 choice for ARRT exam preparation! Retrieved from http://www.radrevieweasy.com/public/about.aspx

Recker-Hughes, C., Dungey, J., Miller, S., Walton, A. & Lazarski, J. (2015). A novel approach to clinical instructor professional development: A multi-session workshop with application of skills in a student standardized patient exam. *Journal of Physical Therapy Education, 29*(1), 49-59.

Reddy, S., Reddy, P., & Reddy, D. (2014). A comparative study on sources of stress and coping styles between graduation and post-graduation students. *Indian Journal of Health and Wellbeing, 5*(8), 942-947. R

Reid, P. (2014). Categories for barriers to adoption of instructional technologies. *Education and Information Technologies, 19*(2), 383-407. http://dx.doi.org/10.1007/s10639-012-9222-z

Richardson, H. B., Moyer, A. M., & Goldberg, A. E. (2012). "You try to be superman and you don't have to be": gay adoptive fathers' challenges and tensions in balancing work and family. *Fathering, 10*(3), 314-336.

Robinson, L., & Oakley, J. (2014). Digital and M-health. *Imaging & Therapy Practice,* pp. 25-29.

Rodrigue, C., Riopelle, R., Bernat, J. L., & Racine, E. (2013). How contextual and relational aspects shape the perspective of healthcare providers on decision making for patients with disorders of consciousness: A qualitative interview study. *Narrative Inquiry in Bioethics, 3*(3), 261-273.

Rouse, C. A., Everhart-Sherwood, J., & Alber-Morgan, S. (2014). Effects of self-monitoring and recruiting teacher attention on pre-vocational skills. *Education and Training in Autism and Developmental Disabilities, 49*(2), 313-327.

Sabatino, L., Rocco, G., Stievano, A., & Alvaro, R. (2015). Perceptions of Italian student nurses of the concept of professional respect during their clinical practice learning experience. *Nurse Education in Practice, 15*(4), 314-320. http://dx.doi.org/10.1016/j.nepr.2014.09.002

Salgado, T. M., Moles, R., Benrimoj, S. I., & Fernandez-llimos, F. (2012). Exploring the role of renal pharmacists in outpatient dialysis centers: A qualitative study. *International Journal of Clinical Pharmacy, 34*(4), 569-78. http://dx.doi.org/10.1007/s11096-012-9645-z

Samarakoon, L., Fernando, T., & Rodrigo, C. (2013). Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC Medical Education, 13,* 42. http://dx.doi.org/10.1186/1472-6920-13-42

Schneider, M., & Francis, C. (2012). Motivation for class team projects in agroecology: Potentials for super teams. *NACTA Journal, 56*(4), 89-91.

Schulze, S. (2012). Empowering and disempowering students in student-supervisor relationships. Koers, 77(2), 1-8.

Seyal, A. H., & A Rahman, M., Noah. (2015). Understanding learning styles, attitudes and intentions in using e-learning system: Evidence from Brunei. *World Journal of Education, 5*(3), 61-n/a. http://dx.doi.org/10.5430/wje.v5n3p61

Shawer, S. F. (2013). Accreditation and standards-driven program evaluation: Implications for program quality assurance and stakeholder professional development. *Quality and Quantity*, *47*(5), 2883-2913. http://dx.doi.org/10.1007/s11135-012-9696-1

Sherratt, M. (2012). Radiographer comment scheme. *Synergy*, 9-13.

Singh, A. A. (2013). Transgender youth of color and resilience: Negotiating oppression and finding support. *Sex Roles, 68*(11-12), 690-702. http://dx.doi.org/10.1007/s11199-012-0149-z

Stefanich, G. (2014). Making a difference. *Science and Children, 51*(5), 8-9.

Strudwick, R., Mackay, S., & Hicks, S. (2011). Is there a blame culture in diagnostic radiography? *Synergy*, 4-7.

Suda, K., Bell, G. C., & Franks, A. S. (2011). Faculty and student perceptions of effective study strategies and materials. *American Journal of Pharmaceutical Education*, 75(10), 1-201.

Talbert, P. Y. (2012). Strategies to increase enrollment, retention, and graduation rates. *Journal of Developmental Education, 36*(1), 22-24,26-29,31,33,36.

Tarnow, K., Gambino, M., & Ford, D. J., (2013). Effect of continuing education: Do attendees implement the tools that are taught? *The Journal of Continuing Education in Nursing, 44*(9), 391-396. http://dx.doi.org/10.3928/00220124-20130701-68

Thai, M. T. T., Chong, L. C., & Agrawal, N. M. (2012). Straussian grounded-theory method: An illustration. *The Qualitative Report, 17*(26), 1-55.

The Joint Commission. (2015). *About the Joint Commission*. Retrieved from http://www.jointcommission.org/about_us/about_the_joint_commission_main.aspx

Thomas, A., Menon, A., Boruff, J., Rodriguez, A. M., & Ahmed, S. (2014). Applications of social constructivist learning theories in knowledge translation for healthcare professionals: A scoping review. *Implementation Science, 9*, 54. http://dx.doi.org/10.1186/1748-5908-9-54

Thormann, J., Gable, S., Patricia, S. F., & Blakeslee, G. (2013). Interaction, critical thinking, and social network analysis (SNA) in online courses. *International Review of Research in Open and Distance Learning, 14*(3).

Trees, K. (2013). Effectively teaching diverse student groups: A reflection on teaching and learning strategies. *Australian Journal of Adult Learning, 53*(2), 234-252.

Trevino, N. N., & Defreitas, S. C. (2014). The relationship between intrinsic motivation and academic achievement for first generation Latino college students. *Social Psychology of Education : An International Journal, 17*(2), 293-306. http://dx.doi.org/10.1007/s11218-013-9245-3

Ullrich, L., Dumanis, S. B., Evans, T. M., Jeannotte, A. M., Leonard, C., Rozzi, S. J., . . . Forcelli, P. A. (2014). From student to steward: The interdisciplinary program in neuroscience at Georgetown University as a case study in professional development during doctoral training. Medical Education Online, 19 http://dx.doi.org/10.3402/meo.v19.22623

Urquhart, R., Kendell, C., Sargeant, J., Buduhan, G., Johnson, P., Rayson, D., . . . Porter, G. A. (2012). How do surgeons decide to refer patients for adjuvant cancer treatment? protocol for a qualitative study. *Implementation Science, 7*, 102. http://dx.doi.org/10.1186/1748-5908-7-102

Varga-Dobai, K. (2012). The relationship of researcher and participant in qualitative inquiry: From "self and other" binaries to the post structuralfeminist perspective of subjectivity. *The Qualitative Report*, *17*(47), 1-17.

Venkatesh, V., Rabah, J., Lamoureux-Scholes, L., Pelczer, I., Urbaniak, K., & Martin, F. (2014). Development, implementation, and evaluation of a professional skills development program: The case of Concordia university's GradProSkills. The *Canadian Journal of Higher Education, 44*(3), 39-53.

X-ray Visions, Inc. (2015). *Our history.* Retrieved from http://xrayvisions.net/about-us/our-history/

Walsh, L. (2012). Accountability: Towards a definition of hybridity for scholars of transnational rhetorics. *Rhetorica, 30*(4), 392-II.

Wang, J., Yu, W. W., & Wu, E. (2013). Empowering mobile assisted social E-learning: Students' expectations and perceptions. *World Journal of Education*, 3(2), 59-n/a.

Washington, V. (2013). CDA 2.0: Supporting people and advancing our field. *YC Young Children, 68*(4), 68-70.

Watkins, K. E., & Marsick, V. J. (2014). Adult education & human resource development: Overlapping and disparate fields. *New Horizons in Adult Education & Human Resource Development, 26*(1), 42-54.

Weller, J. M., Henning, M., Civil, N., Lavery, L., Boyd, M. J., & Jolly, B. (2013). Approaches to learning for the ANZCA final examination and validation of the revised study process questionnaire in specialist medical training. *Anaesthesia and Intensive Care, 41*(5), 631-40.

Williams, J. J. (2014). Teaching the professions. *Radical Teacher,* (99), 69-75,94.

Williams-McMillan, Y., & Hauser, G. M. (2014). The impact of a system-wide community college professional development program on pedagogical practice: an assessment of faculty perspectives. *International Journal of Arts & Sciences, 7*(2), 617-627.

Woodard, J., & Omolo, D. O. (2013). Interactive radio and video help researchers to engage with farmers. *Appropriate Technology*, *40*(2), 47-49.

Yogarabindranath, S. N. (2013). Intrinsic motivation: How can it play a pivotal role in changing clinician behaviour? *Journal of Health Organization and Management, 27*(2), 266-72. http://dx.doi.org/10.1108/14777261311321815

Zarshenas, L., Danaei, S., Mazarei, E., Najafi, H., & Shakour, M. (2014). Study skills and habits in shiraz dental students; strengths and weaknesses. *Journal of Education and Health Promotion*, *3*, 44. http://dx.doi.org/10.4103/2277-9531.131931

Appendix A: Professional Development Program for Radiography Graduates

Project: Professional Development Program for Radiography Graduates

"Self-Monitor, Self-Motivate, & Self-Propel to ARRT Registration and Beyond"

By

Encarnita Chamberlain

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

Walden University

Table of Contents

Professional Development Plan for Radiography Graduates

This professional development plan (PDP) was developed to serve as a transition for the radiography graduate, from graduation to registration. It will provide study tools to prepare for the ARRT registry examination, as well as learning activities, and discussion panels. The radiography student was in a cohort throughout their radiography program. After graduation, the preparation is an individual one. As the graduate loses the support of a group and the opportunity to see their instructors on a daily basis to ask any questions that may arise, this program will provide support to contribute to the success of earning a passing score on the registry exam.

Purpose

The purpose of this PDP is to provide a 3-day workshop filled with activities, learning tools, and exercises to recent radiography graduates. The workshop will ease the transition from a graduate to a professional radiographer. The road to becoming a registered radiographer may be an isolated one since students often study independently for their registry exam. Qualitative interviews indicated that students studied arduously and for long periods of time, often 6-8 hours each day. These graduates can benefit from professional development in order to make their studying time more productive and enjoyable. The conceptual framework of social constructivism indicates that the students' life experiences would contribute to their learning and retention of information, therefore panels of previous graduates would be incorporated into the workshop to share their experiences.

The PDP will provide educational tools for recent radiography graduates to enable them to self-monitor their strengths and weaknesses while studying for the ARRT registry exam, to self-motivate as graduation approaches and they will soon lose easy access to their instructors, and to self-propel themselves as they need to continue to study for their registry exam.

Background

- This project is a result of the findings from qualitative interviews with members from the 2014 radiography cohort from a proprietary Mid-Atlantic university. Qualitative interviews asked questions to support two guiding questions: (1) What study skills/study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam? (2) What factors in their student experiences do radiography graduates perceive as most important in successfully passing their national registry examination? The answers to the first guiding research question was that the students used RadReviewEasy, an online question and answer bank, to practice answering questions similar to what are on the registry examination. The answers to the second guiding research question were that their experiences were long, arduous hours of studying and preparation with internal and external motivational factors assisting the graduates in reaching their goals.
- Nine interviews were done to gather data on the perceptions of recent graduates who passed the ARRT registry exam on the initial attempt. The data was then analyzed for emerging themes.

- The findings of the study revealed that students needed to self-monitor to determine strengths and weaknesses in subject matter, to self-motivate while they were studying and preparing to take the registry, and to self-propel in the time between graduation and the actual exam since they were often alone in their studying efforts.

Target Audience

- All recent radiography graduates studying for their registry exam will be invited to participate in the planned PDP.

Goals

- To provide tools for graduates to be able to self-monitor, self-motivate, and self-propel through the process of becoming a registered radiographer. Graduates will need to assess their strengths and weaknesses, self-reflect to find what will provide motivation to them when necessary, and self-propel through the entire process of becoming a registered radiographer.
    - To review the format of both the questions and content categories of the ARRT registry examination to raise comfort levels with test taking abilities.
    - To define future roles as graduates transition to the professional environment in order to develop professional ethics and skills.

Learning Objectives

Learning Objectives will be different for each day:

Day 1: Participants will be able to:

- Define what is involved in self-monitoring
- Define how to identify strengths and weaknesses
- Discuss how to self-evaluate learning styles for more effective study skills
- Discuss self-reflection and how it relates to learning
- Discuss ways self-monitoring affects success with the ARRT registry

Day 2: Participants will be able to:

- Define what is involved in self-motivation
- Discuss ways to find and retrieve motivation
- Discuss ways to refresh and rejuvenate focus while studying
- Discuss ways self-motivation affects success with the ARRT registry

Day 3: Participants will be able to:

- Define what is involved to be able to self-propel
- Discuss ways to find support after graduation
- Discuss more approaches to effective study habits
- Discuss success stories from those who have passed the ARRT registry examination
- Be able to create a study schedule from the current time until the scheduled date of the ARRT registry examination

Review various career paths and leadership roles

Implementation

The PDP for graduates will be offered as a three-day program sponsored by the radiography and Career Services departments following graduation. Information will be given prior to graduation via instructors and flyers (Attachment A) posted throughout the campus. Invitations will also be sent to neighboring schools (Attachment B) and will be open to other radiography programs. Participants will be able to register online and in the career services department. E-mails (Attachment C) will be sent soon after graduation as reminders for graduates to register. Classrooms will be reserved on campus to accommodate approximately 20-30 participants. Snacks and lunch will be catered by the university with the cost being incorporated into the program fee. Corporate donations will off-set any costs of the program.

Workshop Director/ Instructor Guidelines-Day 1: Self-Monitor

- Welcome participants. Introduce instructors and administrative staff. Identify everyone in a leadership role who can assist and answer questions.
- Describe the goals and purpose of the program
- Review learning objectives
- Encourage participation and engagement
- Review classroom guidelines: no cell phone use, no food or drink
- Review schedule for the day
- **Initiate Icebreaker:** Beach Ball activity-Throw the ball to a participant whereupon they have to state their name, where they are from, their favorite

radiography subject, and favorite radiography exam. They then toss the beach ball to another participant until everyone has introduced themselves.

- **Learning Activity #1:** A small panel of recent graduates who passed their ARRT registry on the initial attempt will be invited (Attachment D) to participate in a short (30-45 minutes) question and answer session. They will individual introduce themselves and give pointers on the theme for the day: Self-monitoring.
- **Power Point Presentation:** How to self-monitor. This has been occurring throughout their program, but will be described and reviewed. How to keep it going towards successful outcomes will be shown as well as presentations of different learning styles. Questions and discussion will be encouraged during the presentation.
- **Learning Activity #2:** Small groups (3-4) to discuss and identify learning styles, characteristics on how a learner responds to his/her learning environment (Seyal & A Rahman, 2015). These may change according to individuals' needs as they transition from a student to a graduate.
- **Learning Activity #3:** Audience discussion of strengths and weaknesses facilitated by an instructor. Discuss how to identify strengths and weaknesses in in subject matter as well as how to use both to the individuals' advantage.
- **Learning Activity #4:** Discussion of self-reflection techniques, scheduling study time and down time, and ways to accomplish to-do lists.
- **Learning Activity #5:** Discuss when and how to make the appointment time for the ARRT registry examination and obstacles to success.

- **Review of Day 1:** Review the day's goals and learning activities. Disburse evaluation forms and encourage participants to complete them.

Schedule: Day 1

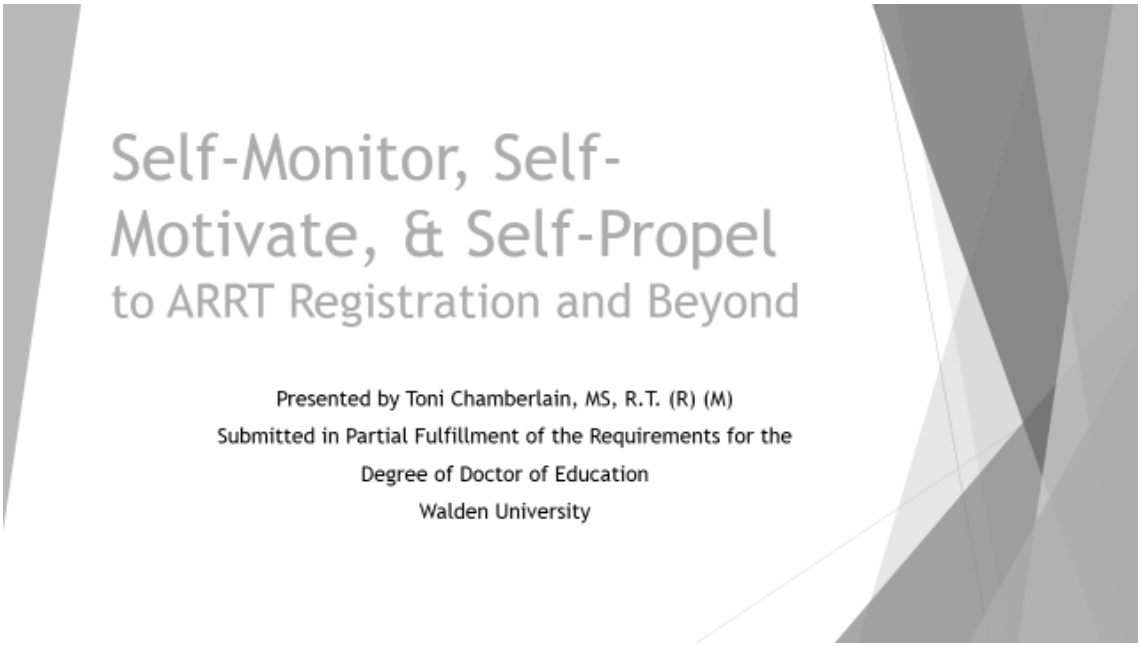
Day 1	Learning Activities	Time
Registration and Coffee 8:00-8:30 am **Day 1 Objectives 8:30-9:00 am**	Large group (all members): PowerPoint: Overview of the 3-day workshop, purpose of the Professional Development Plan. Icebreaker: Beach Ball introductions	**60 minutes**
Learning Activity #1 9:00-9:45 am	Large group: Panel of previous graduates who recently passed their registry exam.	**45 minutes**
9:45-10:00 am	**Break**	**15 minutes**
10:00-10:45 am	Large group: Power Point Presentation- How to self-monitor. Address different learning styles	**45 minutes**
10:45-11:30 am Learning Activity #2	Small group (3-4) discussion on different learning styles and how to take advantage of them	**45 minutes**
11:30am -12:15pm Learning Activity #3	Large group: Audience discussion of strengths and weaknesses facilitated by an instructor.	**45 minutes**
12:15-1:00 pm	**Lunch-** catered sub sandwiches	**45 minutes**
1:00-1:45 pm Learning Activity #4	Small group: Discussion of self-reflection techniques, scheduling study time and down time, and ways to accomplish to-do lists	**45 minutes**
1:45-2:30 pm Learning Activity #5	Large group: Discuss when and how to make the appointment time for the ARRT registry examination and obstacles to success.	**45 minutes**
2:30-2:45 pm	**Break**	**15 minutes**
2:45-4:00 pm	General Tutoring Sessions	**75 minutes**
4:00-4:30 pm	Reconvene. Participant evaluations and summary of Day #1	**30 minutes**

Materials Needed (same for each day)

- Note pad and pens/pencils for each participant
- Dray Erase marker
- *Post-it* notes
- Computer access
- Whiteboard
- Handout of PowerPoint Presentations
- Evaluations

Paper, pens, notepads, and *Post-it* notes will be kept on a table in the rear of the main classroom. Computer access will be in the library or computer lab.

Day 1-Introduction of Program



Be positive and keep the energy flowing since we will have a lot to cover in a short amount of time.

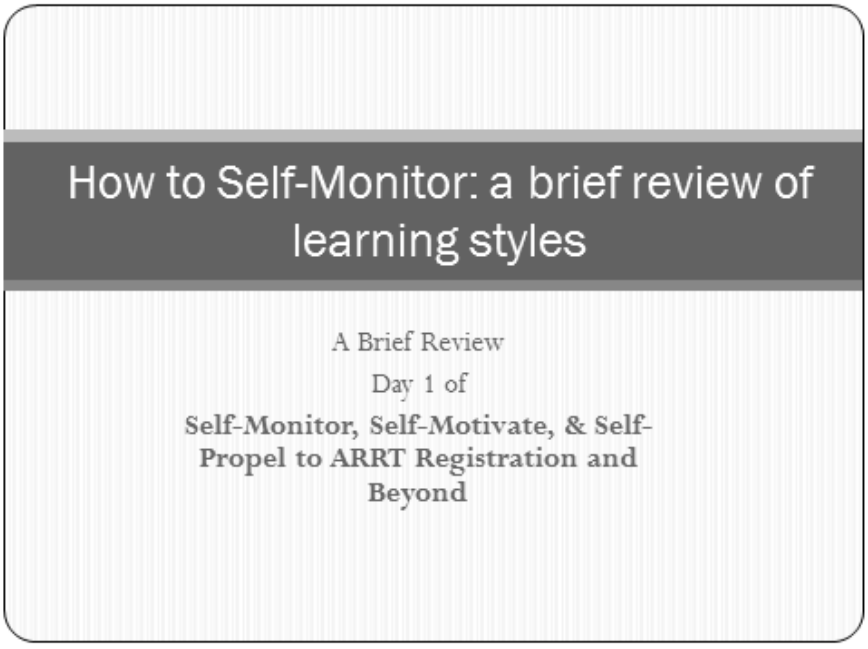
Remind participants to be their own advocate in their learning. Provide overview of the program. Handout schedules.

Learning Activity Description #1

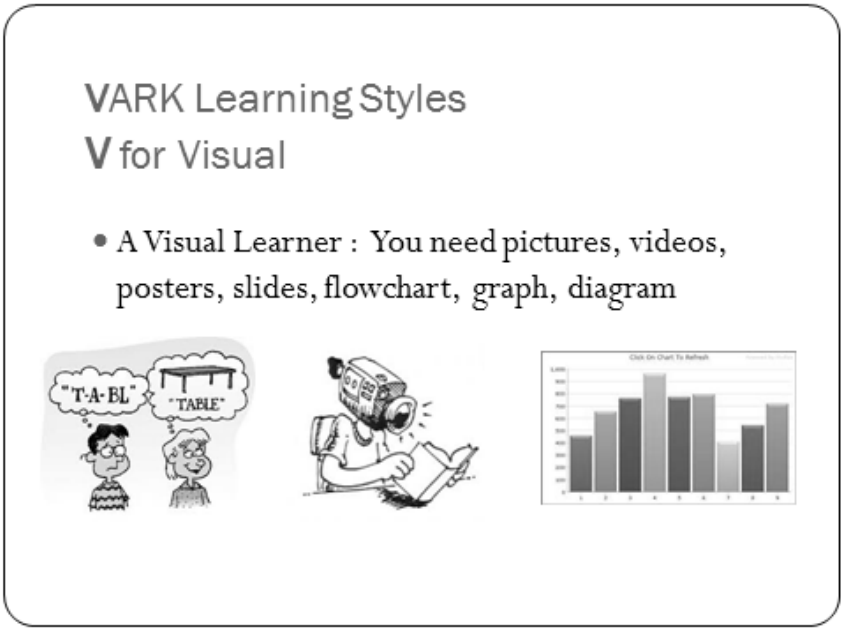
Entire group (all participants): Panel of radiographers who were registered within the past year. Facilitator will introduce members of discussion panel.

Objective	To gain perspectives from those who have recently passed their ARRT registry exam.
	To witness how others have experienced self-monitoring
	To be able to ask questions regarding the studying experience

Power Point Presentation for Learning Activity #2

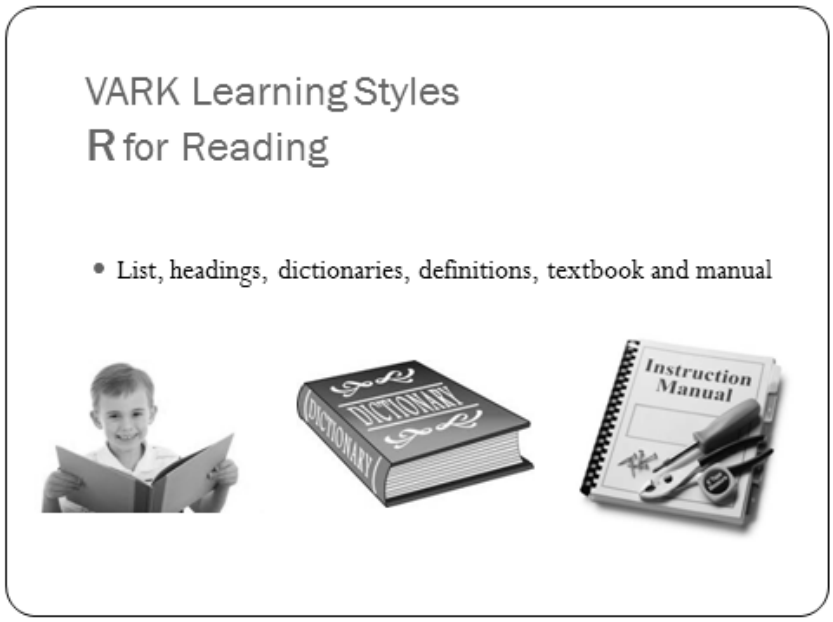


This is a brief review since you have been learning all of your life and up to this point. Feel free to ask questions as we go. As you review, I hope you will be able to reflect your best way to learn and how you apply it to all areas of your life.

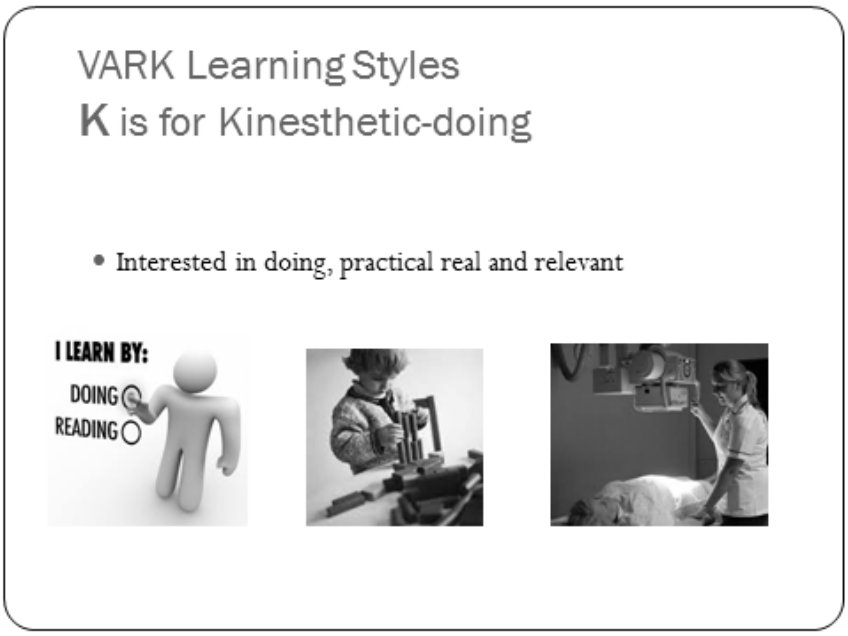


Do you need to see something to be able to learn about it? Do you need a need a graph or a visual to be able to understand all of the concepts? What is important to see?

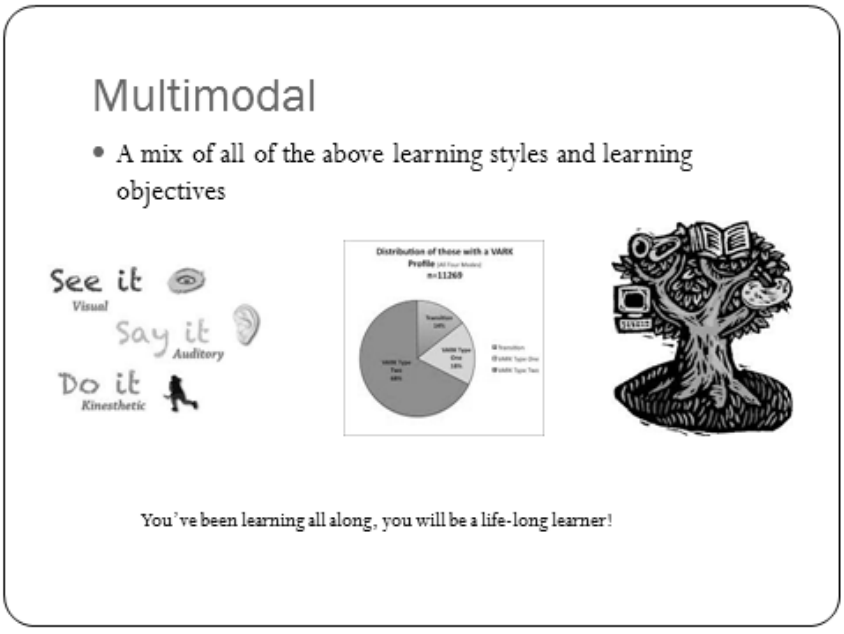
Do you need to study with music playing? Does that help you to learn? Do you need auditory stimulation to grasp concepts? Remember what has helped you in the past.



Is this your learning style? Must you read the instruction manual prior to using a new appliance? If this is your learning style, do you need a hard copy book or can you read a document electronically? If you are “old school” and need to hold a book in your hand, think of transitioning to electronic books. It is the future.



This is the category that should apply to most of you in this room. We are a hands-on profession and touching is part of what we do all day long.



Are you a combination of all of the above? Do you switch learning styles dependent on the subject matter? What works best for you? Think about what has worked in the past and if it can be changed in the future.

How do you Self-Monitor?

- Strengths
- Weaknesses
- Obvious and hidden
- Self-evaluate. Be honest. Be truthful.
- Seek assistance
- Review, review, review
- Tutoring available at the end of the day

This has been occurring throughout your educational program. Now, your awareness needs to increase.

References

- Seyal, A. H., & A Rahman, M.,Noah. (2015). Understanding learning styles, attitudes and intentions in using e-learning system: Evidence from brunei. World Journal of Education, 5(3), 61-n/a. doi:http://dx.doi.org/10.5430/wje.v5n3p61
- Samarakoon, L., Fernando, T., & Rodrigo, C. (2013). Learning styles and approaches to learning among medical undergraduates and postgraduates. BMC Medical Education, 13, 42. doi:http://dx.doi.org/10.1186/1472-6920-13-42

Learning Activity Description #2 (10:45-11:30)

Small groups (3-4): Learning styles and how to take advantage of them.

Objective	Discuss learning styles and what was learned from Power Point Presentation.
	Give examples of self-monitoring
	To be able to identify self-monitoring in themselves and in others

Learning Activity Description #3 (1:30-2:15)

Entire group (all participants): Distribute strengths/weaknesses activity sheet and how to use it.

Objective	Discuss how to use strengths/weaknesses activity sheet
	Discuss how to use it when studying for the registry exam
	Discuss how to use it in for any educational program

Learning Activity Description #4 (1:00-1:45)

Small groups (3-4): (same groups as earlier in the day). This learning activity will introduce self-reflection techniques and how self-reflection is a tool for learning

Objective	Discuss self-reflection techniques
	Discuss time management techniques and scheduling down time
	Discuss ways to accomplish to-do lists

Learning Activity Description #5 (1:45-2:30)

Entire group (all participants): Facilitator will provide handouts on how to schedule the registry exam.

Objective	To learn how to schedule the ARRT registry exam
	To determine the best time to take the exam
	To discuss obstacles to success.

If an examinee is late to the testing center, that reserved time will be lost as well as the $200 examination fee. There needs to be no obstacles once the test reservation is made.

General Tutoring Sessions (2:45-4:00)

Instructors will be available at small tables to answer any questions in any content category of the ARRT registry examination or any subject matter pertaining to the test. This is an open forum for participants to come and go at any time. Textbooks as well as other resource materials will be available from the radiography section of the general library. If an instructor does not know the answer to a participants' question, computer work stations will be available for additional support.

Reconvene (4:00-4:30)

All participants will reconvene at 4:00 to complete participant evaluations, ask any questions, and discuss the schedule for the following day. Evaluations will be done manually and collected by the instructors. Names will not be requested for the evaluations unless specific feedback is requested.

Day 1 Evaluation: Please rate your level of knowledge with the following subjects. 1-extremely unacceptable, 2-somewhat unacceptable, 3-acceptable, 4-somewhat acceptable, 5-extremely acceptable.

Learning activity	**1**	**2**	**3**	**4**	**5**
Ability to define self-monitoring					
Ability to identify strengths and weaknesses					
Ability to self-evaluate learning styles					
Ability to discuss self-reflection and how it relates to learning					
Ability to self-monitor study preparations in regards to ARRT registry exam.					

Best part of the day:_____

Worst part of the day:_____

Comments: _____

_____

_____

Workshop Director/Instructor Guidelines-Day 2

- Welcome back participants
- Review learning objectives for Day 2:
    - Define what is involved in self-motivation
    - Discuss ways to find and retrieve motivation
    - Discuss ways to refresh and rejuvenate focus while studying
    - Discuss ways self-motivation affects success with the ARRT registry
- Encourage participation, input, and engagement
- Review classroom guidelines: no cell phone use, no food or drink
- Review schedule for the day
- **Learning Activity #1:** A small panel of radiographers who have been working in the field for approximately 2-10 years will be available to answer questions and how they transitioned to the professional environment following their registry exam.
- **Power Point Presentation:** How to self-motivate. This has been occurring throughout their program. Participants needed to find motivation to graduate and now need it to take the ARRT registry exam. Techniques and tips will be discussed.
- **Learning Activity #2:** Small groups (3-4) to discuss where to find intrinsic motivation. Provide examples to share with the entire group.

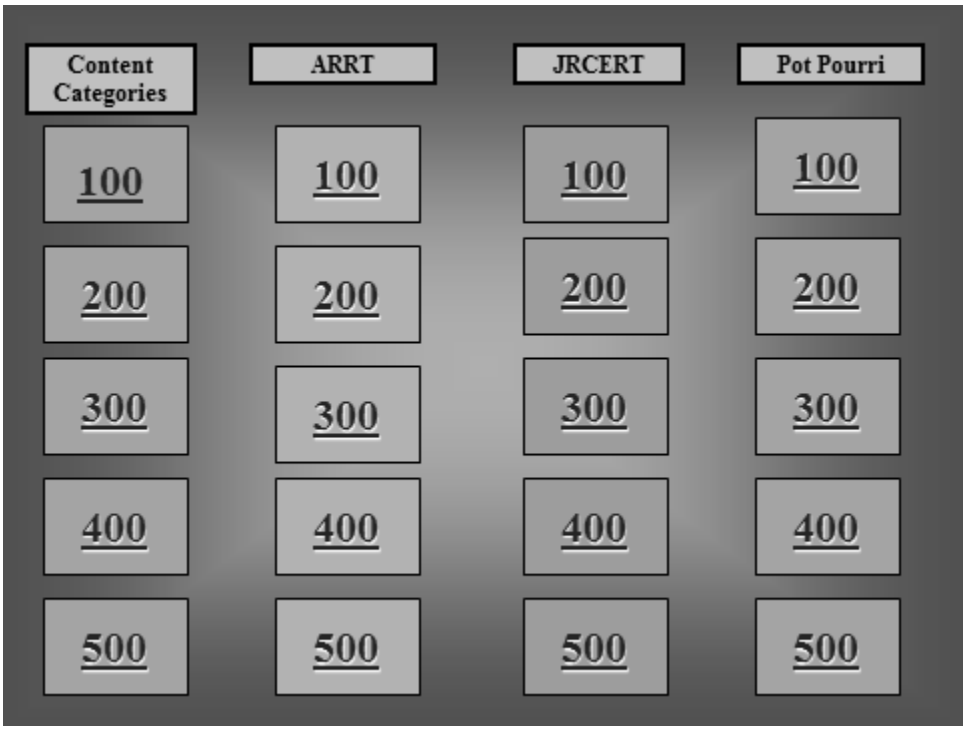
- **Learning Activity #3:** Small groups (3-4) to discuss extrinsic motivation. Provide examples to share with the entire group.
- **Learning Activity #4:** Large group activity. Making lists of intrinsic and extrinsic motivational factors. Rate them. What is most important and why? Where can more be found?
- **Learning Activity #5:** Support resources for those needing more motivation.

Review of Day 2: Review the day's goals and learning activities. Disburse evaluations and encourage participants to complete them.

Schedule Day 2-Self-Motivate

Day 2	Learning Activities	Time
Wake up and Drink coffee **8:00-8:45 am**	Review schedule for the remaining two days. Purpose of the Professional Development Plan. Icebreaker: Jeopardy game in 2 teams. Categories: Content categories, ARRT, JRCERT, Pot Pourri	45 minutes
Day 2 Objectives **8:45-9:00 am**	Large group: Present Day 2 Objectives. Questions/concerns before we begin.	15 minutes
Learning Activity #1 **9:00-9:45 am**	Large group: Panel of previous radiographers with 2-10 years of experience.	45 minutes
9:45-10:00 am	**Break**	15 minutes
10:00-10:45 am	Large group: Power Point Presentation: How to Self-Motivate. Address intrinsic and extrinsic motivation.	45 minutes
10:45-11:30 am **Learning Activity #2**	Small group (3-4). Discuss intrinsic motivation. List examples.	45 minutes
11:30am -12:15pm **Learning Activity #3**	Small group (3-4). Discuss extrinsic motivation. List examples.	45 minutes
12:15-1:00 pm	**Lunch - provided**	45 minutes
1:00-1:45 pm **Learning Activity #4**	Large group discussion of intrinsic and extrinsic examples. Rate them. What is the most important motivation?	45 minutes
1:45-2:30 pm **Learning Activity #5**	Large group: resources for more motivation. How can you go on and on and on? (Guest motivational speaker)	45 minutes
2:30-2:45 pm	**Break**	15 minutes
2:45-4:00 pm	**General Tutoring Sessions**	75 minutes
4:00-4:30 pm	**Reconvene.** Participant evaluations for Day #2	30 minutes

Wake up and Drink Coffee (8:00-8:45): The Jeopardy game can be an informal way to begin the day's activities. Two teams will form for an informal competition. Late arrivals can join either team.

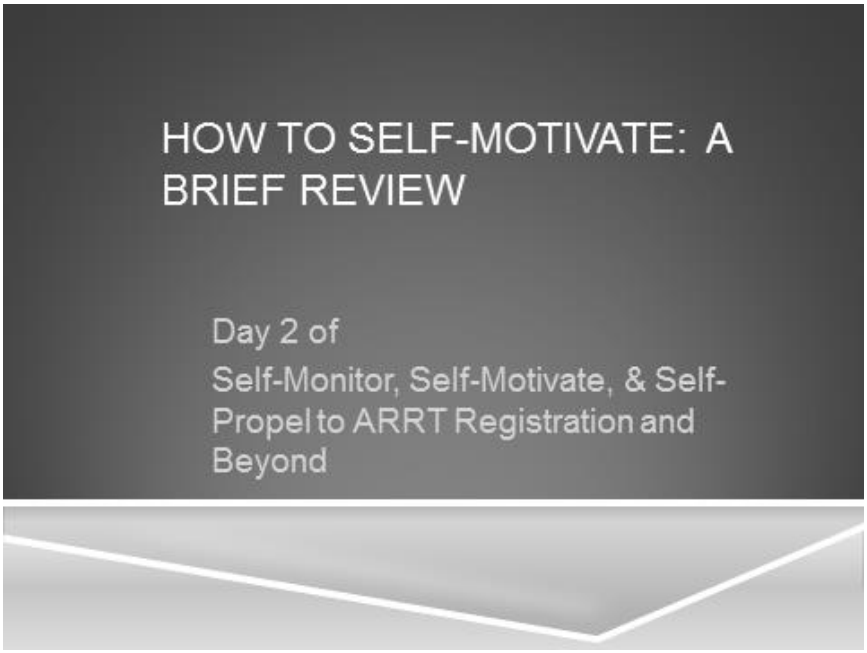


Learning Activity Description #1 (9:00-9:45)

- Entire group (all participants): Panel of radiographers who have been practicing between 2-10 years.

Objective	To gain perspectives from those who have been practicing for 2-10 years.
	To witness how others have experienced self-motivation
	To be able to ask questions regarding the profession after working in it for several years.

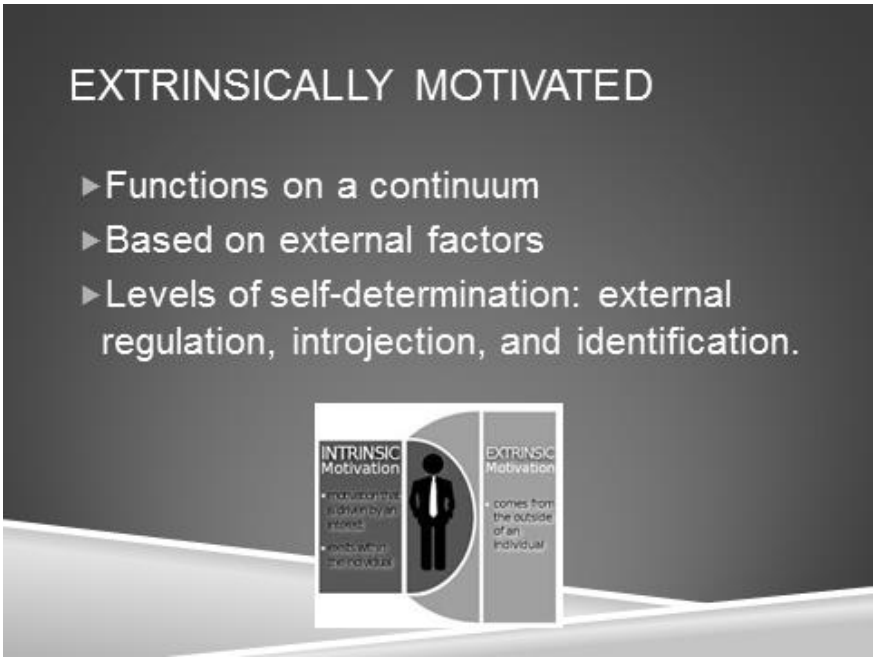
Power Point Presentation (10:00-10:45)



Encourage questions/comments throughout presentation.

There are many ways to find motivation. Think of what keeps you going towards goals you have set.

Reflect on what is your intrinsic motivation. Think of past experiences. How did you find motivation and how did you realize it was your motivation?



Can you define external factors? Discuss different levels of self-determination either from your own experiences or from what you have witnessed.

WAYS TO FIND MOTIVATION

- Physical Activity
- Stress management
- Certain conditions to motivate knowledge sharing

REFERENCES

- Liao, H., Ferdenzi, A. C., & Edlin, M. (2012). Motivation, self-regulated learning efficacy, and academic achievement among international and domestic students at an urban community college: A comparison. The Community College Enterprise, 18(2), 9-38. Retrieved from http://search.proquest.com/docview/1287963109?accountid=14872
- Pauline, J. S. (2013). PHYSICAL ACTIVITY BEHAVIORS, MOTIVATION, AND SELF-EFFICACY AMONG COLLEGE STUDENTS. College Student Journal, 47(1), 64-74. Retrieved from http://search.proquest.com/docview/1329187680?accountid=14872
- Shoemaker, N. (2014). Can universities encourage students' continued motivation for knowledge sharing and how can this help organizations? Journal of College Teaching & Learning (Online), 11(3), 99. Retrieved from http://search.proquest.com/docview/1551369027?accountid=14872

Learning Activity Description #2 (10:45--11:30)

- Small group (3-4): Discuss intrinsic motivation. List examples.

Objectives	To review power and define intrinsic motivation
	To share others' intrinsic motivation.
	Discuss how to identify and evaluate motivating factors when needed.

Learning Activity Description #3: (11:30-12:15)

- Small group (3-4): Discuss extrinsic motivation. List examples.

Objectives	To review power and define extrinsic motivation
	To share others' extrinsic motivation.
	Discuss how to identify and evaluate motivating factors when needed.

Learning Activity Description #4: (1:00-1:45)

- Large group (all participants): List and rate sources of motivation. What is the most important and how do you find more?

Objectives	List and rate sources of motivation
	List factors used for registry preparation.
	Discuss importance and how to find more motivation.

Learning Activity Description #5 (1:45-2:30)

- Large group (all members): Guest motivational speaker: A faculty member of the Mid-Atlantic university has a family member who is a professional motivational speaker. She will speak to the large group about motivation at different stages in life and how to find it where there appears to be none.

General Tutoring Sessions (2:45-4:00)

Instructors will be available at small tables to answer any questions in any content category of the ARRT registry examination or any subject matter pertaining to the test (identical to Day 1). This is an open forum for participants to come and go at any time. Textbooks as well as other resource materials will be available from the radiography section of the general library. If an instructor does not know the answer to a participants' question, computer work stations will be available for additional support.

Reconvene (4:00-4:30)

All participants will reconvene at 4:00 to complete participant evaluations, ask any questions, and discuss the schedule for the following day. Evaluations will be done manually and collected by the instructors. Names will not be requested for the evaluations unless specific feedback is requested.

Day 2 Evaluation: Please rate your level of knowledge with the following subjects. 1-extremely unacceptable, 2-somewhat unacceptable, 3-acceptable, 4-somewhat acceptable, 5-extremely acceptable.

Learning activity	**1**	**2**	**3**	**4**	**5**
Ability to define to Self-Motivate					
Ability to find and retrieve motivation					
Ability to refresh and rejuvenate focus while studying					
Ability to use self-motivation in preparation for the ARRT registry exam					

Best part of the day:_____

Worst part of the day:_____

Comments: _____

_____

_____

Workshop Director/Instructor Guidelines Day 3: Self-Propel

- Welcome participants to the final day of the program
- Review learning objectives for Day 3:
    - Define what is involved to be able to self-propel
    - Discuss ways to find support after graduation
    - Discuss more approaches to effective study habits
    - Discuss success stories from those who have passed the ARRT registry examination
    - Be able to create a study schedule from the current time until the scheduled date of the ARRT registry examination
    - Review various career paths and leadership roles
- Remind everyone to stay engaged, participate, and to adhere to classroom rules for cell phones, food, and drink.
- Review schedule for the day
- **Learning Activity #1:** This panel of radiographers have 10 years or more of experience. The clinical instructors from affiliated hospitals and clinics have also been invited to participate on this last day of the program. They will answer questions about advanced modalities and what it is like to be a seasoned radiographer.
- **Power Point Presentation:** This presentation will cover potential career pathways such as advanced modalities, Picture Archiving Communication System (PACS) , leadership, or education.

- **Learning Activity #2:** Small groups (3-4) to discuss advanced modalities. Groups should form according to interest in modalities. One table will discuss Computerized Tomography, another table will discuss Magnetic Resonance Imaging. There will be facilitators at each table who have had experience in each modality.
- **Learning Activity #3:** Large group (all members): A discussion will be held on possible educational programs for any participants who wish to work towards their baccalaureate degree. A handout (Attachment E) will be distributed with the names of several programs that offer baccalaureate degrees.
- **Learning Activity #4:** Small group (4-5): Discuss the definition of professionalism. Make a list of what makes a professional a professional. Be prepared to contribute to the large group discussion to follow.
- **Learning Activity #5:** Discuss Professionalism, workshops, continuing education credits.
- **Review of Day 3:** Review the day's goals and learning activities. Disburse evaluations and encourage participants to complete them.

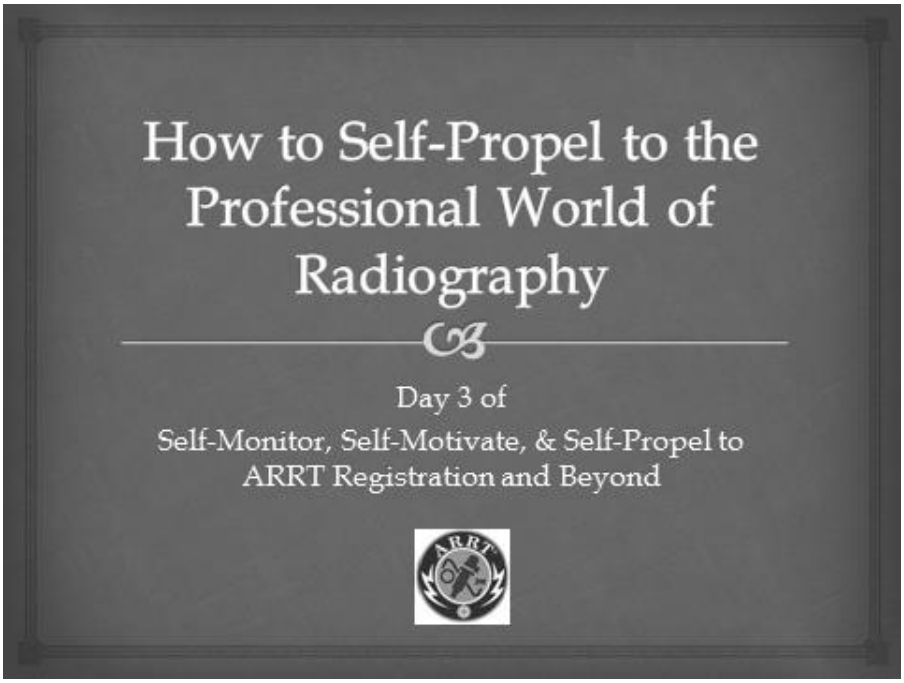
Schedule Day 3: Self-Propel

Day 3	**Learning Activities**	**Time**
Day 1 Objectives 8:30-9:00 am	Arrive and mingle. Review the day's objectives and schedule	**30 minutes**
Learning Activity #1 9:00-9:45 am	Panel of radiographers with more than 10 year experience and clinical instructors	**45 minutes**
9:45-10:00 am	**Break**	**15 minutes**
10:00-10:45 am	Large group Power Point Presentation: How to Self-Propel. Look at the professional world of radiography. What career pathways are available?	**45 minutes**
10:45-11:30 am Learning Activity #2	Small group (3-4) discussion on different modalities with different facilitators from those modalities	**45 minutes**
11:30am -12:15pm Learning Activity #3	Large group: Educational programs to increase credentials.	**45 minutes**
12:15-1:00 pm	**Lunch- pizza party**	**45 minutes**
1:00-1:45 pm Learning Activity #4	Small group (3-4): Discussion professionalism. How does one behave professionally? List and be prepared to share	**45 minutes**
1:45-2:30 pm Learning Activity #5	Large group (all members): Discuss examples of professionalism. Discuss workshops, conferences, continuing education credits.	**45 minutes**
2:30-2:45 pm	**Break**	**15 minutes**
2:45-4:00 pm	General Tutoring Sessions	**75 minutes**
4:00-4:30 pm	Reconvene. Participant evaluations for Day #3	**30 minutes**

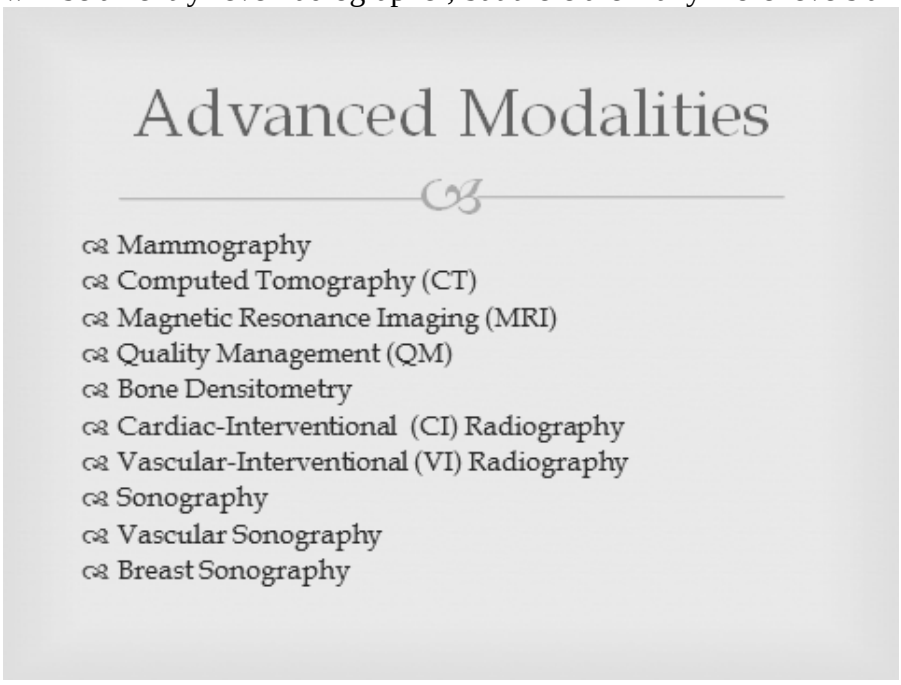
Learning Activity Description #1 (9:00-9:45) Entire group (all participants): Panel of radiographers who have been practicing over 10 years as well as Clinical Instructors

Objectives	To ask questions from seasoned professionals
	To ask questions regarding different modalities
	To identify qualities of professionalism

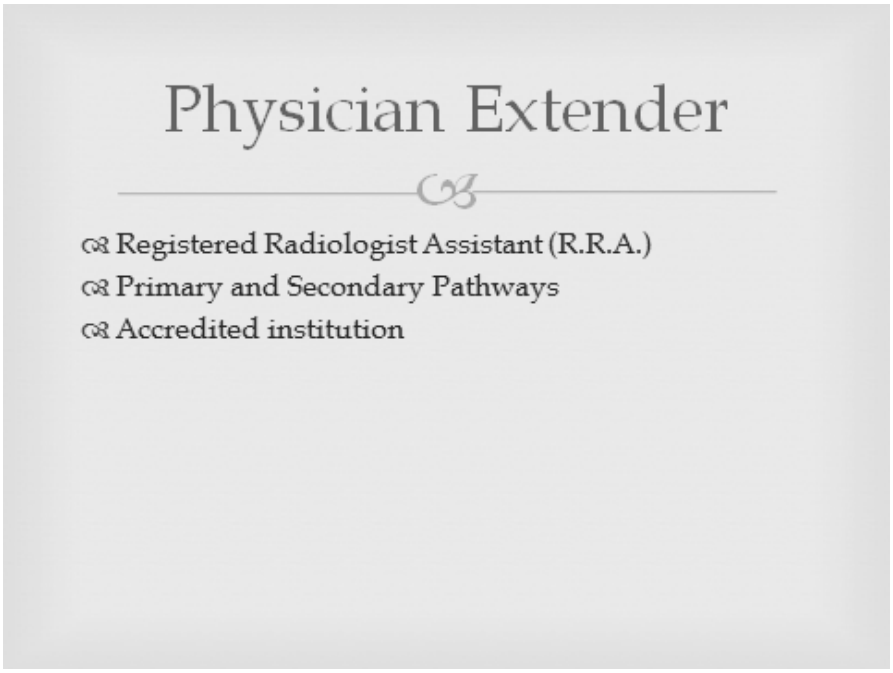
Power Point Presentation (10:00-10:45)



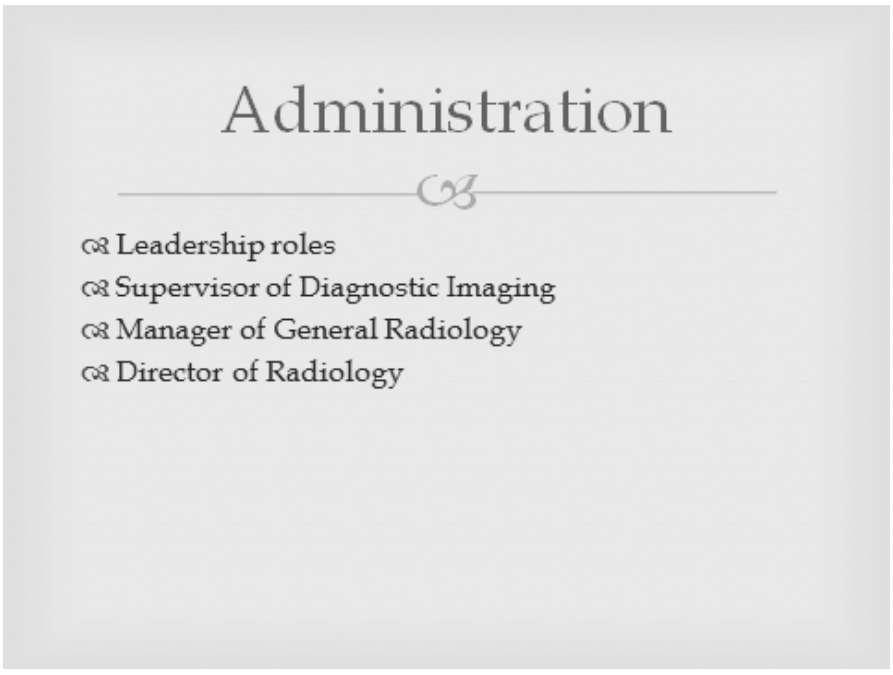
With registration, comes admittance to the world of the professional radiographer. You will be an entry-level radiographer, but there are many more levels ahead of you.



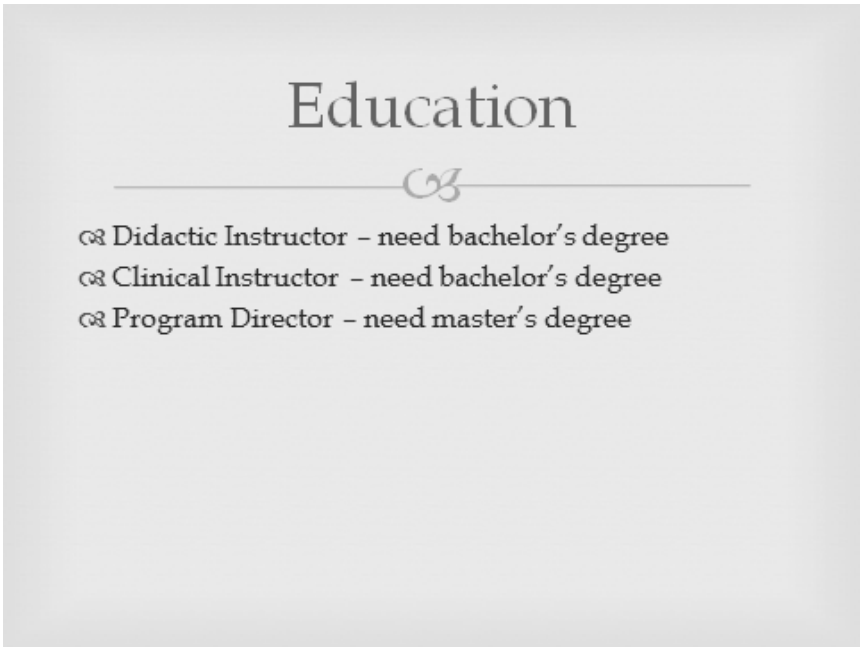
These are the various advanced modalities. What attracts you about each one?



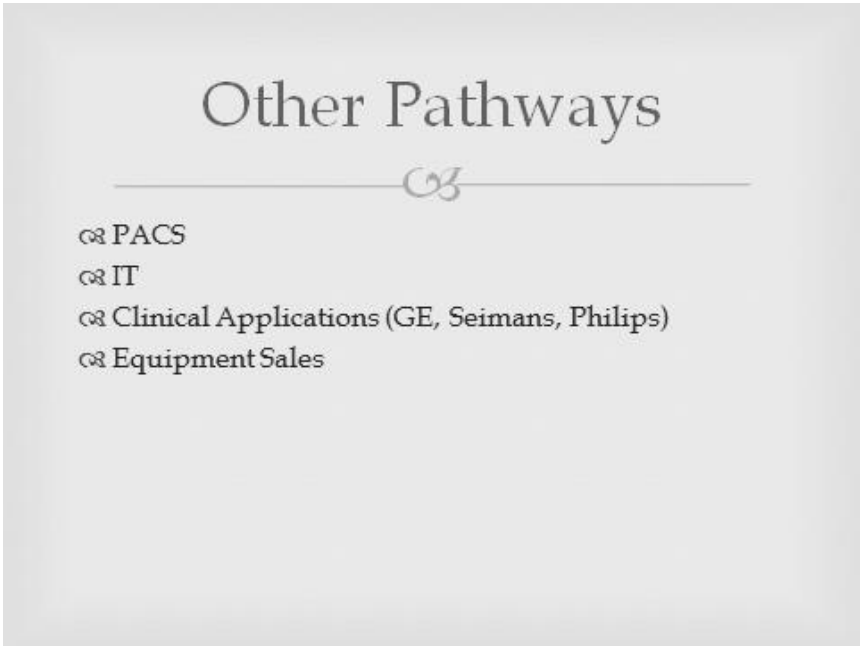
This is a relatively new field. The RRA generally performs fluoroscopy cases.



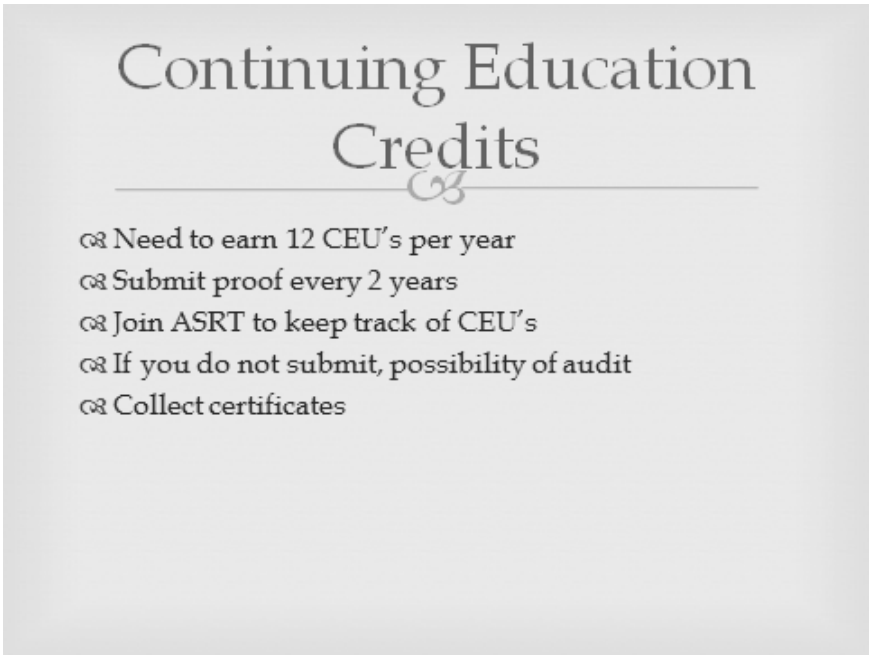
Administration can be very rewarding. This role generally requires more education.



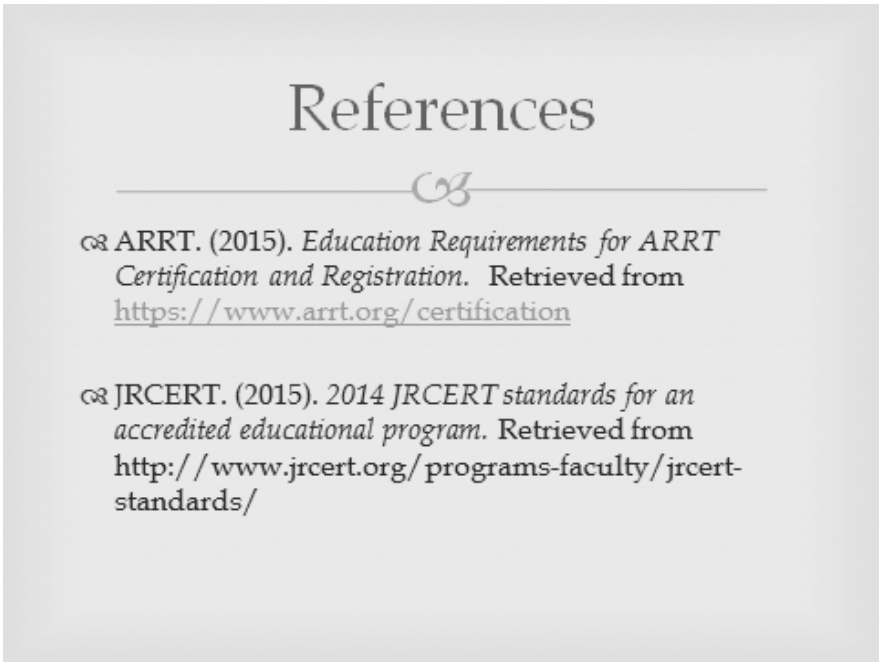
Here are the different positions in the world of education and the degrees each position requires for a JRCERT accredited program.



These roles do not necessarily require more education, but they will require more training.



You will need to earn CEU's every year as a registered radiographer. If you do not comply with this rule, you may face suspension and be required to retake your ARRT registry exam.



Learning Activity Description #2 (10:45-11:30)

- Small groups (3-4): Discussion on different modalities with different facilitators from those modalities

Objectives	To see how other radiographers entered an advanced modality
	To see how a radiographer evolves in the profession
	To see if different modalities are a fit with individual's goals

Learning Activity Description #3 (11:30-12:15)

- Large group (all members): Discussion/presentation on educational programs to add credentials.

Objectives	To learn about baccalaureate programs (handout- Attachment E)
	To discuss if the profession will soon require a baccalaureate degree
	To discuss advantages/disadvantages to furthering a radiographer's education.

Learning Activity Description #4 (1:00-1:45)

- Small group (4-5): Discussion professionalism. List traits/qualities of a professional. Be prepared to contribute examples.

Objectives	To share ideas about professionalism
	To determine a definition. Does the profession dictate the definition?
	To discuss if participants are professionals and why or why not?

Learning Activity Description #5 (1:45-2:30)

- Large group (all members): Discussion examples of professionalism. Discuss workshops, conferences, continuing education credits.

Objectives	To learn about continuing education credits
	To discuss the life-long leaner aspect of the radiography profession
	To realize the role of a professional radiographer

General Tutoring Sessions (2:45-4:00)

Instructors will be available at small tables to answer any questions in any content category of the ARRT registry examination or any subject matter pertaining to the test (identical to Day 1). This is an open forum for participants to come and go at any time. Textbooks as well as other resource materials will be available from the radiography section of the general library. If an instructor does not know the answer to a participants' question, computer work stations will be available for additional support.

Reconvene (4:00-4:30)

All participants will reconvene at 4:00 to complete participant evaluations, ask any questions, and discuss the schedule for the following day's program. Evaluations will be done manually and collected by the instructors. Names will not be requested for the evaluations unless specific feedback is requested.

Day 3 Final Evaluation: Please rate your level of knowledge with the following subjects. 1-extremely unacceptable, 2-somewhat unacceptable, 3-acceptable, 4-somewhat acceptable, 5-extremely acceptable.

Learning activity	**1**	**2**	**3**	**4**	**5**
Ability to define to self-propel					
Ability to find support after graduation					
Ability to find different approaches to effective study habits.					
Ability to create a study schedule from the current time until the scheduled date of the ARRT registry examination					
Understands various career pathways and leadership roles					

Best part of the day:_____

Worst part of the day:_____

Comments: _____

_____

_____

What do you recommend we can improve to make this program better for you?

_____

_____

Would you recommend this program? Why or why not? _____

_____

_____

Budget

Materials - pens, paper, notepads	100.00
Use of Mid-Atlantic university's classrooms	0.00
*Coffee, donuts each morning	90.00
*Lunch, Day 1(for approximately 40 people)	400.00
*Lunch, Day 2	400.00
*Lunch, Day 3	400.00
*Drinks, cookies for breaks	100.00
Sub-Total	**$1490.00**
*Will be paid for by sponsors	-1390.00
Total cost for Mid-Atlantic university	**$100.00**

References

ARRT. (2015). *Education Requirements for ARRT Certification and Registration.* Retrieved from https://www.arrt.org/certification

JRCERT. (2015). *2014 JRCERT standards for an accredited educational program.* Retrieved from http://www.jrcert.org/programs-faculty/jrcert-standards/

Liao, H., Ferdenzi, A. C., & Edlin, M. (2012). Motivation, self-regulated learning efficacy, and academic achievement among international and domestic students at an urban community college: A comparison. *The Community College Enterprise, 18*(2), 9-38.

Pauline, J. S. (2013). Physical activity behaviors, motivation, and self-efficacy among college students. *College Student Journal, 47*(1), 64-74.

Samarakoon, L., Fernando, T., & Rodrigo, C. (2013). Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC Medical Education, 13,* 42. http://dx.doi.org/10.1186/1472-6920-13-42

Seyal, A. H., & A Rahman, M., Noah. (2015). Understanding learning styles, attitudes and intentions in using e-learning system: Evidence from Brunei. *World Journal of Education, 5*(3), 61-n/a. http://dx.doi.org/10.5430/wje.v5n3p61

Shoemaker, N. (2014). Can universities encourage students' continued motivation for knowledge sharing and how can this help organizations? *Journal of College Teaching & Learning (Online), 11*(3), 99.

Attachment A: Flyer

(To be distributed in hallways at the Mid-Atlantic university and neighboring radiography programs.)

Self-Monitor, Self-Motivate & Self-Propel to ARRT Registration and Beyond

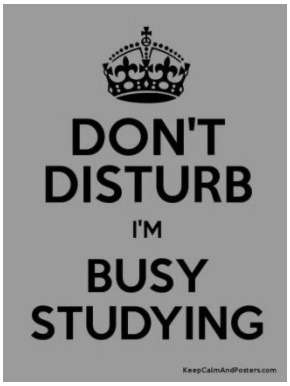
A 3-Day Program for Registry Review

Date: November 3-5, 2016

Time: 8:00a-4:30pm

Mid-Atlantic university, Room 121

Free parking, lunch, and snacks provided



Topics covered: Study Skills, Time Management, How to review, Motivational factors, Advanced modality preparation, individual tutoring sessions

Discussion panels with experienced radiographers and modality specialists

Please RSVP by DATE

echamberlain@mail.com, 888-556-5566

Sponsored by our friends at Philips Medical, X-ray Visions, and Rad-Aid

Attachment B: Electronic Invitation to Other Programs

Dear Neighboring Radiography program,

Please share this information with your recent radiography graduates:

Mid-Atlantic university will be sponsoring a 3-day Registry Review:

Self-Monitor, Self-Motivate, and Self-Propel to ARRT Registration and Beyond.

DATE, 8:00-4:30 at the Mid-Atlantic university, Room 121

All meals and snacks are provided. Cost of the program is free due to our friends at Philips Medical, X-ray Visions and Rad-Aid.

Any questions? Please e-mail echamberlain@mail.com, 888-5565566

Attachment C: Electronic Invitation to recent graduates

Dear recent radiography graduate:

Are you busy preparing for your ARRT registry exam? Are you having trouble staying organized and reviewing all of the subjects? Please attend our free 3-day program:

Self-Monitor, Self-Motivate, and Self-Propel to ARRT Registration and Beyond.

DATE, 8:00-4:30 at the Mid-Atlantic university, Room 121

All meals and snacks are provided. Cost of the program is free due to our friends at

Philips Medical, X-ray Visions and Rad-Aid.

Any questions? Please e-mail echamberlain@mail.com, 888-5565566

Attachment D: E-mail to experienced radiographers and clinical instructors

Hello (registered radiographer or clinical instructor),

We invite you to participate in a discussion panel as part of a learning activity for the

Mid-Atlantic university's 3-day program:

Self-Monitor, Self-Motivate, and Self-Propel to ARRT Registration and Beyond.

DATE, 8:00-4:30 at the Mid-Atlantic university, Room 121

Your years of experience will determine which day you will participate in the program. If you are a recent graduate and have less than two years of experience, we invite you to participate on **Day 1.** If you have 2-10 years of experience, we invite you to participate on **Day 2.** If you have more than 10 years of experience, or are one of our clinical instructors, we invite you to participate on **Day 3.** The panel will meet from 9:00-9:45 am on each day. It will be an informal question and answer session. We invite you to come early for coffee and donuts and to stay afterwards for drinks and snacks.

Please RSVP by DATE). We know our participants would greatly benefit from the knowledge and experience you can share with them.

Any questions? Please e-mail echamberlain@mail.com, 888-556-5566

Attachment E: Handout on Baccalaureate Degree Programs

Name of Institution: Pima Medical Institute
Management Track or Education Track available
100% online
Degree: Bachelor of Science in Radiologic Sciences

Length of time to complete: 15 months

http://pmi.edu/Programs/Bachelors/Bachelor-of-Science-in-Radiologic-Sciences

Name of Institution: Midwestern State University
Offers bachelors and master's programs
Bachelor's-100% distance education
Master's offers Radiologic Administration, Radiologic Education, and Radiologist Assistant

http://mwsu.edu/academics/hs2/radsci/index

Name of Institution: University of North Carolina at Chapel Hill

Degree: Bachelor of Science in Radiologic Science
Also offers Masters of Radiologic Science Program (Radiologic Assistant)

https://www.med.unc.edu/ahs/radisci/ed-programs/medical-imaging

Name of Institution: Northwestern State University

Degrees: Bachelor of Science in Radiologic Sciences (BSRS)
Bachelor of Applied Science in Allied Health (BASAH)
Master of Science in Radiologic Sciences (MSRS)

https://radiologicsciences.nsula.edu/bsrs/

All information was obtained from the school's website. For more information, please contact the school directly.

Appendix B: E-mail to Prospective Participants

Dear Recent Graduate of Mid-Atlantic University,

I am e-mailing you to ask for your participation in a research study I am conducting as part of the requirement of my doctoral degree at Walden University. This research study is entitled "A Case Study on the Process of Passing a Radiography Registry Examination" and will focus on how to successfully prepare and pass the ARRT registry exam.

Although there will be no benefit to you personally, this will benefit the radiography profession in that the study data will assist other graduates who are preparing for their registry in hopes of passing on the initial attempt and beginning their professional practice. Your confidentiality will be maintained. There is no risk to you. Your participation will involve an interview conducted by me for a length of approximately 30 minutes. These interviews will be recorded for documentation and analysis. All data collected will be kept secure and confidential.

Please contact me within two weeks of receipt of this e-mail to let me know if you are interested in participating or have any questions or concerns regarding this research study. I will schedule the interview at your convenience. Feel free to respond to this e-mail or you may call me at 623-203-3082. I very much hope you will consider participating in hopes of impacting the experiences of other graduates preparing for the registry examination.

Respectfully,

Toni Chamberlain, MSL, RT (R) (M),

Doctoral Candidate for Walden University's EdD Program in Adult Education

Appendix C: Follow-up E-mail to Prospective Participants

Dear Recent Graduate of Mid-Atlantic University,

Two weeks ago I sent the e-mail below to ask you to participate in a research study:

I am e-mailing you to ask for your participation in a research study I am conducting as part of the requirement of my doctoral degree at Walden University. This research study is entitled "A Case Study on the Process of Passing a Radiography Registry Examination" and will focus on how to successfully prepare and pass the ARRT registry exam.

Although there will be no benefit to you personally, this will benefit the radiography profession in that the study data will assist other graduates who are preparing for their registry in hopes of passing on the initial attempt and beginning their professional practice. Your confidentiality will be maintained. There is no risk to you. Your participation will involve an interview conducted by me for a length of approximately 30-60 minutes. These interviews will be recorded for documentation and analysis. All data collected will be kept secure and confidential.

Since you have not yet responded, I am again asking for your participation. This study may help other radiography graduates as they prepare to pass their ARRT registry examination. If you would allow me the time, I would greatly appreciate your help with this research.

Please contact me as soon as possible by either responding to this e-mail or by phone at (623) 203-3082.

Respectfully,

Toni Chamberlain, MSL, RT (R) (M)

Doctoral Candidate for Walden University's EdD Program in Adult Education

Appendix D: Interview Protocol & Questions

Research Topic: Perceptions of what a graduate can do to successfully pass the ARRT registry examination.

Date/Time of Interview_____

Interviewer_____

Interviewee_____

Thank you for participating in the interview. Your feedback will have the potential to help others studying for their ARRT registry examination.

These questions will be regarding the first research question: What study skills/study aids do radiography graduates perceive as the most helpful in successfully passing their national registry exam?

1. How did you prepare for the registry?
2. Did you use any software programs to help you study?
3. Were the software programs purchased by you and, if so, what was the price?
4. Was there any software program that you felt was not helpful?
5. How many hours per week did you spend on studying when you were in your radiography program?
6. How long did you wait to take your registry and why?
7. How many hours per week did you spend studying for the registry exam after graduation?
8. What would you do differently to prepare to take the registry?

These questions are regarding the second research question:

What factors in their student experiences do radiography graduates perceive as most important in successfully passing their national registry examination?

1. Concerning your text taking history, have you been in previous college programs where you did well on multiple-choice exams?
2. Did you feel that your educational program adequately prepared you for the registry exam?
3. What was the subject matter you felt was most difficult?
4. What was the subject matter you felt was the easiest?
5. What are words of wisdom you would give to those who are studying to pass the ARRT registry exam?
6. What motivated you the most to pass your registry exam?
7. Was there anything you did that you feel was not helpful in passing the registry exam?
8. Why do you feel you were successful?
9. What else would you like to add?

Thank you for your participation in the interview. You will be receiving findings of this interview to check for accuracy. Your contributions were insightful and will assist with the completion of this research study.

You have my contact information should you have any questions or additional comments.