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Turning Up The Sound! Senior-Level Sonographers' Perspectives On The Workforce Readiness/Competency Of Entry-Level Sonographers In The Workplace

Janice L. Glasper

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TURNING UP THE SOUND! SENIOR-LEVEL SONOGRAPHERS' PERSPECTIVES

ON THE WORKFORCE READINESS/COMPETENCY OF ENTRY-LEVEL

SONOGRAPHERS IN THE WORKPLACE

By

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ABSTRACT

There has been a longstanding preoccupation with the workforce readiness and competency of

our nation's graduates since the release of the National Commission on Excellence in

Education's, April 1983 landmark report, *A Nation at Risk*: "*The Imperative for Educational*

Reform"*,* which indicated that the educational foundations of our society were being eroded by a

rising tide of mediocrity that threatened our very future as a Nation and a people. Now, more

than 35 years since the release of *A Nation at Risk*, it appears that little has changed. Extensive

research continues to report that graduates of post-secondary institutions are unprepared for the

workplace because they are missing certain workplace skills. The purpose of this qualitative

descriptive study was to identify a specific workforce group and provide information on the

education, training, and certification requirements for that group. Additionally, based on the

perspectives/comments of more experienced/senior-level employees, this study attempts to

describe what skills/competencies are necessary for success in the workplace for that workforce

group. Finally, this study provides details on the workforce readiness of entry-level employees

as seen through the eyes of their more experienced, senior-level colleagues. A qualitative

descriptive methodology was used, and interviews were performed with 12 experienced/senior-

level sonographers from the workforce. The results of data analysis revealed that competencies

identified in the literature as necessary for success in the workplace (communication, critical

thinking, conflict resolution, teamwork, and attention to details), were important for the success

of this workforce group. Additional competencies (sympathy, empathy, compassion, and

patience) were also identified as crucial for the success of this workforce group. Participant

recommendations for Sonography educators included the need to stress the importance of these

customer service skills, through the development of specific competencies/assessments for pre-

graduates as they progress through their education and clinical training. Finally, thematic analysis of data revealed four themes related to the competency of entry-level sonographers: (a) positive contribution to the workplace, (b) fear or lacking self-confidence, (c) not taking the initiative, and (d) unrealistic self-expectations. Although participants indicated that their entry-level sonographer colleagues possessed the skills necessary for entry-level employment, they strongly recommended that sonography employers invest in and provide formal mentoring activities to support new graduate/entry-level employees, as they transition from school to work.

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LIST OF TERMS AND DEFINITIONS

For the purposes of this research and to define a collective understanding for the reader, this section contains definitions of key terms, which were used throughout the dissertation research.

Competency Model. A collection of competencies that together define successful performance in a specific workplace setting. Competency models are the foundation for important human resource functions—e.g., recruitment and hiring, training and development, and performance management (U.S. Department of Labor, Employment and Training Administration [ETA], 2015, p. 5).

Diagnostic Medical Sonographer. Also known simply as a sonographer, uses imaging equipment and soundwaves to form images of many parts of the body, known as ultrasounds. They are trained to acquire and analyze these sonographic images. These images are used to help doctors diagnose and treat many medical conditions (Diagnostic Medical Sonographer, 2020, para.1).

Diagnostic Medical Sonography. Also called sonography or diagnostic ultrasound, is an imaging method that uses high-frequency sound waves to produce images of structures within your body. The images can provide valuable information for diagnosing and treating a variety of diseases and conditions ("About Ultrasound," n.d., para. 1)

Employability Skills. Employability skills are transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes requires by the 21st century workplace. They are necessary for career success at all levels of employment and for all levels of education. These skills must be continuously developed beyond those required for a

specific job, and they enable individuals to prove their value to an organization as the key to job survival." (Overtoon 2000, p. 2).

    Entry-level Sonographer. New/recent graduate in his/her first three years of employment in the clinical setting. Also referred to as an Advanced Beginner who demonstrates marginally acceptable performance, operates on general guidelines, and therefore requires support in setting priorities and advancing their perceptions of meaningful patterns, or what is most important, in their clinical practice. (Benner, 1982)

    Expert/Senior-level Sonographer. The Expert sonographer has an intuitive grasp of each situation and zeros in on the accurate region of the problem without wasteful consideration of a large range of unfruitful solutions. The Expert operates from a deep understanding of the total situation. His/her performance becomes fluid and flexible and highly proficient. Highly skilled analytic ability is necessary for those situations with which no previous experience exists. (Benner, 1982). Furthermore, for the purposes of this research, the Expert Sonographer must be credentialed, have eight or more years of continuous employment in the clinical setting, and experience working with one or more entry-level sonographers within the last year.

    Fundamentals of Healthcare Competency Model. The Allied Healthcare Industry competency model depicts the common knowledge, skills, and abilities necessary in the healthcare industry sector and forms the foundation on which career paths in healthcare can be developed. The articulation of broad industry-wide knowledge and skill needs supports the development of a workforce that can perform successfully in a variety of cross-functional teams and make the transition from one job to another (U.S. Department of Labor, Employment and Training Administration [ETA], 2016).

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Hard Skills. Competencies that employees possess such as numeracy, literacy, fluency in a foreign language, and specific job-related technical abilities (operating a machine, creating a spreadsheet, touch-typing, driving, dressing a wound, and so forth). Typically, these skills are relatively easy to measure, and are often validated with some form of qualification. (Oxford Reference https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095920725)

Human Capital. Intangible collective resources possessed by individuals and groups within a given population. These resources include all the knowledge, talents, skills, abilities, experience, intelligence, training, judgment, and wisdom possessed individually and collectively, the cumulative total of which represents a form of wealth available to nations and organizations to accomplish their goals. Human capital is available to generate material wealth for an economy or a private firm. In a public organization, human capital is available as a resource to provide for the public welfare. How human capital is developed and managed by a nation may be one of the most important determinants of economic and organizational performance. (Huff, 2015, para. 1-2).

Professional Competence. The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served (Epstein & Hundert, 2002, p. 226).

Qualitative Descriptive Research (QDR). A widely cited research tradition and has been identified as important and appropriate for research questions focused on discovering the who, what, and where of events or experiences and gaining insights from informants regarding a poorly understood phenomenon (Kim, Sefcik, & Bradway, 2017, p. 1).

Skills Gap. ASTD defines a skills gap as a significant gap between an organization's current capabilities and the skills it needs to achieve its goals. It is the point at which an

organization can no longer grow or remain competitive because it cannot fill critical jobs with employees who have the right knowledge, skills, and abilities (American Society for Training and Development [ASTD], 2012, p. 4).

Soft Skills. Competencies and skills associated with activities such as customer service, communication critical thinking, problem-solving, and teamworking. These skills, according to various surveys, are considered by employers to be of very high importance, but sadly lacking amongst new recruits. Additional soft skills also include sympathy, empathy, loyalty, enthusiasm, punctuality, and a strong work ethic ("Soft Skills," 2021, para. 1).

Theory-to-Practice Gap. Also known as the research-practice gap, occurs when practitioners struggle to integrate knowledge learned in an academic environment with real-world clinical practice (Watkins, 2018, para. 3).

Ultrasound Transducer. A device that produces sound waves that bounce off body tissues and make echoes. The transducer also receives the echoes and sends them to a computer that uses them to create a picture called a sonogram. Transducers (probes) come in different shapes and sizes for use in making pictures of different parts of the body. The transducer may be passed over the surface of the body or inserted into an opening such as the rectum or vagina (National Cancer Institute at the National Institutes of Health [NCI], n.d., para. 1).

Workforce Readiness. A career-ready individual effectively navigates pathways that connect education and employment to achieve a fulfilling, financially-secure and successful career. A career is more than just a job. Career readiness has no defined endpoint. To be career ready in our ever-changing global economy requires adaptability and a commitment to lifelong learning, along with mastery of key knowledge, skills and dispositions that vary from one career to another and change over time as a person progresses along a developmental continuum.

Knowledge, skills and dispositions that are inter-dependent and mutually reinforcing (Career

Readiness Partner Council 2012, p. 2).

CHAPTER ONE

Introduction

The sustained success of American business enterprises depends on acquiring and retaining "talent and skilled" employees at all levels of the organization…and yet, business leaders insist that finding qualified applicants for vacant positions continues to be a primary concern. In fact, December 2020, more than a quarter of small business owners said "finding qualified workers was their most important business problem" (Dunkelberg, Dec, 2020, para. 6-7). However, the inability of employers to find skilled labor is not new. For several years, even while the U.S. job market was booming, employers in trucking, restaurants, health care, and tech industries had the same complaint. They were either unable to find enough skilled workers or find individuals with enough know-how to do the work. (Gunn, 2019)

Additionally, according to the National Federation of Independent Business (NFIB) Chief Economist Bill Dunkelberg, "ninety-two percent of America's small business owners who were hiring reported that few or no qualified applicants were available for the positions they were trying to fill" (Dunkelberg, April, 2021, para. 4).

"Human talent is the engine of innovation, productivity, and, ultimately, national prosperity, and without the world's best workforce, all other elements of national competitiveness are hollow" ("Capable Workforce?," 2012, p. 30). No organization, regardless of its type or structure is exempt from the necessity for talented and skilled employees who can help the organization grow and prosper. Unfortunately, this hunt for talent and skilled employees appears to be a challenge for employers across all industries and workforce disciplines.

In the COVID-19 environment of 2020, with 20 million on unemployment benefits and the unemployment rate double what it was at the beginning of the year, owners cannot find qualified workers to fill open positions, and that problem appears to be worsening. (Dunkelberg, April, 2021, para. 2).

In healthcare industries and organizations, recruiting talented healthcare professionals with the appropriate knowledge, skills, and competencies has also proven to be a challenge for employers and leaders in that industry (Huron Consulting Group [Huron], 2019, p. 2). The talent shortage of healthcare professionals only exacerbates existing problems in the industry, such as burnout for the existing healthcare professionals and staff in the organization, which can in turn negatively impact patient experience, satisfaction and even outcomes. (Huron, 2019, p. 2).

Healthcare professionals are required to care for patients with chronic healthcare and other conditions, and the effectiveness of that care requires that treatment be provided by knowledgeable, skilled, and competent healthcare professionals; be continuous across all settings and providers; and must be coordinated over time with healthcare professionals at various levels of care. (Pruitt & Epping-Jordan, 2005). Unfortunately, the competency of new graduate/entry-level employees appears to fall short of employer expectations.

Entering the world of work, regardless of the discipline, especially for those unprepared to do so, can lead to turmoil, uncertainty, and disappointment. Because although most graduates appeared to be confident in their knowledge, skills, and abilities, and felt that they were prepared to enter the workforce, the reality is, the skills they possess appeared to fall short of employer expectations (Stewart, Wall, & Marciniec, 2016, p. 276).

How can graduates of a two-year or a four-year institution obtain their college degree in a specific workforce discipline and not be prepared to go to work in that discipline? To answer

that question, a review of the literature on diverse topics in education, workforce development and career readiness, was performed. Several articles were identified almost immediately, and the single commonality among all was the premise that college graduates were not prepared to go to work.

For example, an article, published in *The Chronicle of Higher Education*, titled "College Graduates Aren't Ready for the Real World*",* indicated that, "it didn't matter if college graduates focused their education in engineering, law, or medicine—or whether their college education was unbound from any stated career intentions, many were unprepared to choose an appropriate form of work and manage their first job experience" (Levine, 2005, para. 2).

A second article published in *Inside Higher Ed*, titled *"Ready or not"*, relayed the results of a Gallup survey and stated that only 14% of Americans and 11% of business leaders strongly agreed that college graduates possess the necessary skills and competencies to succeed in the workplace (Grasgreen, 2014, para. 3). Finally, a third article, "Well-Prepared in Their Own Eyes," also from *Inside Higher Ed*, outlined the results of a survey performed by the Association of American Colleges and Universities (AACU). According to the article, a survey of 613 college learners and 400 employers concluded that while college graduates consistently ranked themselves as "prepared" in several key workforce readiness areas, a large majority of the surveyed employers disagreed (Jaschik, 2015).

It was clear that something was wrong with the workforce readiness of our nation's graduates. Fortunately, the researcher did not have to look far to find the underlying problem. Yes, most new graduates/entry-level employees completed the necessary education, obtained the certificate/degree, and even possessed a credential or certification however, "simply possessing a degree and a certification/credential were not necessarily, enough of themselves to start a career"

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(Rae, 2007, p. 607). Additionally, the problem was not that new graduates lacked the right degrees or technical expertise it was their lack of soft skills that seemed to be troubling employers. Many employers reported that college grads/entry-level employees lacked some very important workforce skills which included critical and creative thinking, problem-solving, communication (reading, writing, speaking, and listening), attention to details, and teamwork/collaboration/interpersonal skills (Elliott, 2015, para. 4).

As a higher education professor, teaching in an accredited educational program, delivering a curriculum based on national education standards, which included hands-on skill development and extensive real-world exposure, the researcher found it difficult to believe that college graduates were unprepared to enter the workforce, and was also offended by the notion. It was firmly believed by the researcher that new graduates were fully prepared with the knowledge, skills, and competencies necessary to perform successfully as entry-level employees—but were they really? This research is an attempt to answer that question and others, about a particular workforce known as Diagnostic Medical Sonographers.

Background

"It's a well-publicized reality that job growth is not consistent with the increase in the number of college graduates, and the unemployment crisis has become a major concern for many countries" (Ashoka [Forbes], 2014, para. 1). And yet, employers and business leaders continue to insist that their demand for talent is not being met by the current workforce supply (Dunkelberg, Dec, 2020). Additionally, despite employers and business leaders being perfectly positioned to have their pick from the cream of the new graduates' crop, they seem to be unable to find new graduates/entry-level employees who possess the workforce skills they were searching for.

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A recent report from the Bureau of Labor Statistics (Nov 2020), indicated that the number of job openings available in various industries across the United States, remained relatively constant at 6.5 million by the close of 2020 (Bureau of Labor Statistics [BLS], 2020, para. 1), while the unemployment rate, at 6.7 percent, and the number of unemployed persons, at 10.7 million, remained relatively unchanged. Although both measures are much lower than their April highs, they are nearly twice their pre-pandemic levels in February (3.5 percent and 5.7 million, respectively) (Bureau of Labor Statistics, 2020, para. 1-2).

One reason driving the unemployment rate prior to the Pandemic was that employers and human resource professionals indicated that new graduate/entry level employees lack the necessary skills to perform adequately in the workplace (Jaschik, 2015; Elliott, 2015).

Healthcare employers appear to be experiencing the same issues with finding competent employees to fill their vacant positions. Caring for patients makes our nation's healthcare workforce somewhat different from other workforce groups, due to the need in healthcare to "get it right" the first time. Because, in healthcare, "getting it wrong" or incompetence, can lead to loss of livelihood, loss of limb and/or loss of life—for the patient. That reality is also the reason why healthcare entities and organizations are among the most regulated of all the workforce industries in the world (Garman, 2006, p. 153). Unfortunately, the quality of training and preparation of our nation's healthcare workforce also demonstrates an obvious mismatch between the most prevalent healthcare problems (that is, chronic conditions) and the preparation of our nation's healthcare workforce to deal with them (Pruitt & Epping-Jordan, 2005).

Numerous studies have led to the conclusion that the burden of harm conveyed by the collective impact of our healthcare quality problems, is staggering (Greiner & Knebel, 2003, p. 2). Additionally, according to a study performed by Institute of Medicine (IOM), medical errors

due to impairment or incompetence, led to an estimated number of 98,000 deaths annually in the United States (Greiner & Knebel, 2003, p. 29), and hundreds of thousands suffer or become sick due to nonfatal injuries resulting from pervasive underuse, overuse, misuse, or abuse of medical services (Greiner & Knebel, 2003). Finally, according to an article published on the NBC News Website, "Based on a review of 70 studies involving over 300,000 patients, it was determined that more than one in ten patients are harmed in the course of their medical care, half of those injuries are preventable, and at least 12 percent of those preventable medical errors resulted in either permanent disability or death" (Carroll, 2019)

However, even with 98,000 deaths annually attributed to employee incompetence or impairment in the healthcare industry, the projected employment growth for the healthcare sector will continue to increase through 2029 due to the need to provide healthcare services to our nation's aging baby boomers, as well as those who suffer from chronic conditions. That is, 13 of the 30 fastest growing occupations through 2029, are related to healthcare and those occupations associated with healthcare (including mental health) and are projected to add more jobs than any other occupational group (15 percent, or approximately 2.4 million new jobs to the industry), by 2029 (BLS, 2020, para. 1; BLS, 2020, p. 4).

Diagnostic Medical Sonographers represent part of our nation's healthcare workforce, and employment for these professionals is expected to increase by 12 percent, adding 15,600 additional new jobs by 2029. That is much faster than the average growth of four percent for most other employment sectors (Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook [BLS], 2020, table 1). Additional information and details about the Diagnostic Medical Sonography workforce and the individuals who make up this

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workforce (education, credentials, responsibilities) will be provided in chapter two of the literature review.

Rationale for Research

The literature, though replete with research on the lack of workforce-readiness of new graduates, regardless of their workforce discipline—is bereft of studies on the workforce readiness and employability skills necessary for specific workforce groups. Additionally, much of the research available on the workforce readiness of new graduates, utilized Human Resource Professionals, organizational managers, corporate CEOs, administrators, and business owners as respondents to surveys and questionnaires (Payscale, 2016; Strauss, 2016; Cappelli, 2015, p. 252; Wilkie, 2019).

However, there is limited research on senior-level employees' perspectives and reflections on the employability skills and competencies necessary for their specified workforce, and even less information on their perspectives of new-graduate/entry-level colleagues' competence in the workplace. Finally, the literature reviewed referred to graduates with associate and bachelor's degrees from colleges and universities, but rarely defined or discussed the actual education and training those recent college graduates had received.

For this qualitative study, individuals from the Diagnostic Medical Sonography Workforce were selected as research participants for several reasons. First, this workforce and information about them as contributors to our nation's healthcare workforce has rarely been grounded in theory. Second, although there exists a significant amount of literature and research on the benefits and use of sonography as a diagnostic imaging tool in healthcare and medicine (Orenstein, 2009, 2010, 2011; Patil & Dasgupta, 2012; Orenstein, 2013; Benacerraf et al., 2015; Albury, 2015; Zagoudis & Fornell, 2016), the workforce itself or information about the

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individuals who make up this workforce, has rarely been the focus of scholarly inquiry. Third, although the literature reviewed indicated that new graduate/entry-level employees were not prepared to enter the workplace, there was no indication whether entry-level sonographers were/were not prepared for the workplace, nor were there any references to their competence as healthcare professionals.

Finally, the sonography workforce undergoes specialized education and training prior to obtaining board certification, and graduates usually become certified either prior to, or shortly after entering the workplace. However, did the education/training received by these potential healthcare professionals sufficiently transfer to competence in the workplace? This research adds "voice" to senior-level sonographers as they reflect on (1) the specific skills/competencies necessary for success in the workplace, and (2) the workforce readiness and challenges to competency, faced by their new graduate/entry-level sonographer colleagues.

Statement of the Problem

If a new graduate has completed the necessary academic requirements, graduated with a degree in a specific workforce discipline, and obtained the necessary certification or credential, then that graduate should be prepared as an entry-level employee and ready to go to work in that discipline. Right? Unfortunately, our nation's employers disagree.

The unemployment rate in the U.S continues to hover around six percent, even with millions of people desperately seeking employment, and yet many employers claim they cannot fill their vacant positions (Cappelli, 2015, p. 251; Wilkie, 2019, para. 5). "Businesses across a variety of industries, particularly trucking, restaurants, health care, and technology, report problems finding people with enough know-how to do the work." (Gunn, 2019, para. 1). Why…. because the employers of the 21st century expect more from their employees than the traditional

"three Rs" of reading writing and arithmetic—if they are to grow their businesses, maintain global competitiveness, and keep up with technological advances (American Management Association [AMA], 2012).

Today's employees, even those at the entry-level, must be able to think critically, problem-solve, innovate, collaborate, and communicate effectively—at every level within the organization be (AMA, 2012, p. 1). In addition to the traditional Hard Skills, also known as the "three Rs" skills (reading, writing, and arithmetic), employees must also excel at the "four Cs" skills: critical thinking, communication, collaboration, and creativity. These skills, also known as soft skills, appear to be missing in today's college graduates, but are extremely important in every organization for employee development, talent management, and succession planning (AMA, 2012, p. 2). Unfortunately, according to the literature, hard skills also appear to be missing in today's college graduates (Wilkie, 2019, para. 4-5).

Purpose of Study

The intentions or preliminary focus of this qualitative study was as follows: First, to purposefully select a specific workforce group of senior level/experienced individuals as respondents to research. Second, to provide a contribution to the literature on the education, certification/credentialing, and the required skills and competencies necessary for that workforce group. And, finally, to learn, based on the "lived experiences" and professional perspectives of senior level/experienced employees from that group, if their new graduate/entry-level colleagues were prepared, upon entry into the workplace, with the knowledge, skills, actions, and attitudes necessary for success in the workplace. More importantly, were they able to successfully and appropriately apply the skills/competencies the literature indicates are missing in new graduate/entry-level employees.

Significance of the Study

In addition to bridging the gap in the literature on the sonography workforce, this research serves to inform federal government, legislators, and policy makers about the workforce readiness of new graduate sonographers and their potential need for educational and/or workplace interventions. This research also informs society/citizens/patients—the consumers of diagnostic sonographic imaging procedures, of what inputs are involved in producing a DMS Imaging Professional, and what they, as consumers of sonographic procedures, should look for and questions they should ask, to re-assure themselves of the competence of the individual/s performing their sonograms.

Finally, this research informs sonography educators, healthcare employers, accreditation organizations, credentialing and certification organizations, and the sonography workforce itself, about the workforce readiness and competence of new graduate entry-level sonographers and their potential need for additional training/mentoring before graduation occurs and/or after employment begins. By detailing the perspectives of senior-level sonographers currently employed in the clinical setting and working side-by-side with entry-level sonographers, this research may also prove to be vitally important to understanding the workforce competence of entry-level employees in other workplace settings.

Theoretical Framework/Lens

Discussions of theory in qualitative research is related to the theories that ground a methodological approach (e.g., phenomenology, ethnography, narrative) or the epistemological paradigms that guide a study, such as postpositivist, constructivist, critical paradigms (Collins & Stockton, 2018, p. 4). And, although there appears to be little disagreement on the role and significance of "theory" in quantitative research, in qualitative research that role has received

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much debate (Tavallaei & Talib, 2010, p. 571). More important, Qualitative Descriptive Research (QDR) studies, compared to other qualitative approaches to research, are the least "theoretical" and therefore, the least encumbered by a pre-existing theoretical or philosophical commitment. (Lambert & Lamber, 2012, p. 255). However, that does not imply that QDR is void of theory, or that it is a method that has been stripped entirely of its theoretical or disciplinary underpinnings. (Sandelowski, 2010, p. 79)

Theoretical frameworks serve as organizing structures for research design: sampling, data collection, analysis, and interpretation, including coding schemes, and formatting hypothesis for further testing (Sandelowski, 2010). Although QDR supports and allows for the use of any theoretical framework (Sandelowski, 2010), it is probably the least theoretical of the qualitative approaches (Neergaard, Olesen, Andersen, & Sondergaard, 2009, p. 2). Additionally, as proposed by Lambert & Lambert (2012), "some qualitative studies do not employ any explicit theory or theoretical orientation because the inquirers using certain qualitative research methodologies attempt to build the essence of experience from the research participants (p. 255).

Additionally, Collins & Stockton (2018), in their article on the central role of theory in qualitative research posited that 'qualitative studies utilizing any methodological choice may result in theory construction" (p. 4). Therefore, rather than beginning this research with an underlying theory or specific theoretical framework—it was the intent of the researcher, through the features of QDR design, to generate or inductively develop a theory pattern of meaning, as gleaned from participants' responses to inquiry (Creswell 2014, p. 8).

QDR, rather than focusing on culture as does ethnography, the interpretation of lived experiences as in phenomenology, or the building of theory as with grounded theory, seeks to discover and understand a phenomenon or process, through the perspectives and worldviews of

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the people involved with the phenomenon under investigation (Caelli, Ray, & Mill, 2003; Merriam, 1998). Thus, in QDR studies, the researcher constructs a detailed account of respondents' experiences through what is known as "straight descriptions". That is, the data presentation in QDR involves a straight-forward descriptive summary that is organized in a logical manner and entails the presentation of the facts, as described by the research participants, in their everyday language. (Lambert & Lambert, 2012, p. 25; Sandelowski, 2000, p. 336)

To support this research, the knowledge and skills required of healthcare professionals were subdivided into terms of employability skills and competencies as outlined within the Employment and Training Administration's *Fundamentals of Healthcare Competency Model*. (Employment and Training Administration [ETA], 2018). Additional information about the model and a visual example (Figure 2.4) can be found in chapter two of this manuscript.

The model represents a compilation of competencies that can be included as a basis for preparation in the field of allied health. It was developed in 2012 through a collaborative partnership between Health Professionals Network (HPN) and subject matter experts from education, business, and industry, and further revised in 2018 to incorporate foundational workplace health and safety skills from the National Institute for Occupational Safety and Health's (NIOSH). (Careeronestop, 2018).

To assist the researcher in framing practice standards, employer expectations and workplace competencies necessary for the Diagnostic Medical Sonographer—competency standards for this workforce were further subdivided into statements of knowledge, skills, actions, and attitudes, as outlined within the Scope of Practice and Clinical Standards for the Diagnostic Medical Sonographer (Society of Diagnostic Medical Sonography [SDMS], 2015).

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The standards can be downloaded from https://www.sdms.org/docs/default-source/Resources/scope-of-practice-and-clinical-standards.pdf?sfvrsn=14).

Additionally, practice standards for the sonographer employee were also obtained from the Model Job Description: Staff Sonographer Society of Diagnostic Medical Sonography [SDMS], 2016. An outline of the staff-sonographer job description, and other sonographer employee positions can be downloaded from https://www.sdms.org/docs/default-source/Resources/sdms-model-job-description-staff-sonographer.pdf?sfvrsn=2#:~:text=POSITION%20SUMMARY,diagnosis%20and%20treatment%20of%20patients).

Researcher Role and Philosophical Worldview

Researcher Role

Although a novice researcher, the researcher possessed a 30-year history of continuous employment as a Diagnostic Medical Sonographer, a 20-year history as a sonography educator, as well as a 16-year history as an accreditation site visitor, evaluating sonography educational programs for the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

Additionally, and at the time of this writing, the researcher was a registered Diagnostic Medical Sonographer for the past 30 years, and possessed credentials in Abdominal, Obstetrics/Gynecology, and Vascular Sonography. Although most of the researcher's career was spent as a sonographer employed in the hospital setting, she also worked in diagnostic outpatient facilities and physician offices. During employment activities, she had the pleasure of working side-by-side with some very experienced sonographers (those with more experience than her), new-graduate sonographers, and student sonographers. Prior to becoming a sonographer, the

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researcher also possessed credentials and worked as a Radiological Technologist for seven years and obtained several years of experience working as a CT (CAT Scan) Technologist.

During her 30 years of experience as a sonographer, and 20 years of experience as a sonography educator she had both pleasant and unpleasant experiences working with student-sonographers as well as new-graduate employee sonographers. In the clinical setting, the researcher also witnessed both positive and negative attitudes exhibited by both students and new-graduate sonographers, and the effect their attitude had on many of the senior-level sonographers they worked with.

The researcher's experiences working with new graduate/entry-level sonographers in the clinical setting allowed her to identify with the participants in this research and helped her to develop a trusting relationship with them. Thus, she was able to relate to the stress and demands of working side-by-side with a new-graduate sonographer, while being held responsible for providing the standard of care, as well as high-quality imaging procedures in the workplace.

However, rather than serving as an administrator or educator in this instance, the researcher wanted the participants to view her as a sonographer colleague and quality imaging professional, who was concerned and emphatic, with the same standards of patient care, knowledge-processing, skills application, and integrity that is required of all healthcare professionals.

Because of her own experience working with new-graduate sonographers in the clinical setting, the researcher may have preconceived notions and opinions about the workforce readiness of new graduate/entry-level sonographers, throughout the research process. According to Moustakas, 1994 "evidence from qualitative research, specifically phenomenology, is derived from the first-person reports of life experiences" (p. 84). Therefore, the researcher described the

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phenomenon as she understood it based on the research respondent's descriptions and points of view.

At all levels of research, the researcher made a conscious attempt to put aside her own relationships and observations from the past, to view the experiences of participants from their personal perspectives. Thereby the researcher attempted to practice what is posited by Moustakas (1994) as "intersubjectivity" or experiencing what others experience. Through intersubjectivity "each can experience and know the other, not exactly as one experiences and knows oneself, but in the sense of empathy and co-presence" (Moustakas, 1994, p. 57).

During the interview process, the researcher created an uninterrupted and uncluttered atmosphere of welcome, quiet, comfort, and mutual respect, where participants were listened to, and guided to reflect on their experiences without being judged. In so doing, the researcher attempted to discover what was "true" for each participant interviewed. Through this process, without leading the participants away from their personal perspective, the researcher was able to validate statements and descriptions.

Researcher Philosophy/Worldview

Creswell (2014) posits that the researcher should address the philosophical worldview proposed in the study; provide a definition of basic ideas of that worldview; and describe how the worldview shaped their approach to research (p. 6). Mertens (2005) posits that "a researcher's theoretical orientation has implications for every decision made in the research process, including the choice of method" (p. 3-4).

For this qualitative study, the Constructivist Philosophy or worldview, was chosen for research. The constructivist paradigm grew out of the philosophy of Edmund Husserl's

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phenomenology and Wilhelm Dilthey's and other German philosophers' study of interpretive understanding called hermeneutics (Eichelberger, 1989).

The goal of constructivism is to rely as much as possible on the respondents' views of the situation, event, activity, or phenomenon being studied and focus on the specific contexts in which participants worked to understand their historical and cultural settings (Creswell, 2014, p. 8). Additionally, the basic assumptions of the constructivist paradigm are that knowledge is constructed by the individuals involved in the research process and researchers should seek to understand the lived experience from the point of view of those who live it (Schwandt, 2000). The defining questions for the researcher utilizing the constructivist paradigm are as follows.

Researcher Axiology, or the nature of ethical behavior throughout the research process, as related to understanding the researcher-researched relationship. (Mertens, 2019, p. 11)

Constructivism adheres to the ethics found in *The Belmont Report* and in the code of ethics of their professional associations. Constructivism emphasizes the features and criteria of trustworthiness and authenticity in research (Mertens, 2019, p. 16). The features of trustworthiness as it related to this QD study will be further explained in Chapter three of this manuscript.

Researcher Ontology, or the researcher's nature of reality (Mertens, 2019, p. 11) Constructivism posits that reality is both multiple, and socially constructed between individuals, and rejects the notion that there is an objective reality that can be known. Under the constructivism paradigm the researcher's goal is to understand those multiple social constructions of meaning and knowledge from the participants. (Mertens, 2019)

Researcher Epistemology represents the nature of the knowledge relationship between the knower, and that which would be known (Mertens, 2019, p.11). Constructivism posits that

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there is an interactive link between the researcher and participant through which values are made explicit and findings are created. (Mertens, 2019)

Researcher Methodology or approach to systematic inquiry utilizing the constructivism paradigm is primarily qualitative, hermeneutical, or dialectical through which contextual factors are described (Mertens, 2019, p. 11). Multiple data collection strategies were used, such as interviews, observations, and document reviews. The researcher conducted interviews, and reviewed various documents related to the education, employment, and credentialing of a specific workforce group. (Mertens, 2019)

Therefore, the researcher's philosophy or worldview regarding the study can be formulated as follows: a) the literature indicates that new graduate/entry-level employees lack certain skills which interferes with their ability to demonstrate competence in the workplace (the phenomenon under review); b) data are contained within the perspectives and perceptions of senior-level employees who have first-hand experience with the skills necessary for competence in their workplace, as well as experience working side-by-side with new graduate/entry-level employees; c) because participants have actual experience with the phenomenon in question, they should be able to describe the importance—or not, of specific workforce skills, and the abilities of their new graduate/entry-level colleagues to grasp and apply those skills in the workplace adequately and appropriately; and d) therefore, the researcher engaged with the participants and collected the data necessary to generate a pattern of meaning or description of the phenomenon based on participant responses to inquiry (Creswell 2014, p. 8; Mertens, 2005, p. 12).

Primary Research Questions

For the purposes of research an Entry-level employee is defined according to Patricia Benner (1982) as an advanced beginner/new grad in his/her first year of employment (Benner, 1982, p. 403). The definition of a senior-level employee or the expert, was also based on Benner's (1982), definition of an expert, and was further required by the researcher to be employed continuously in the workplace for eight years or more at the time of research participation.

The purposes of research were to describe the skills/competencies necessary for success in the clinical setting for Diagnostic Medical Sonographers. In addition, based on the perspectives of senior-level sonographers, a second purpose was to describe what new graduate/entry-level sonographers know, say, and do, which could either support or interfere with their workforce readiness/professional competence in the real-world clinical setting. To obtain those descriptions in the spirit of QDR, the primary research questions consisted of the following:

(1) What skills/competencies are necessary for success in the workplace as Diagnostic Medical Sonographer?

(2) Do New graduate/entry-level sonographers possess the skills necessary to perform competently? Are they able to apply those skills appropriately in the workplace?

Limitations of research

Every research study, no matter how well conducted or constructed, has a set of limitations or "potential weaknesses" which may affect the quality of results, and the credibility of conclusions" (Leedy & Ormrod, 2016, p. 47; Creswell, 2015, p. 208; Simon & Goes, 2013, p. 272). This study may have the following limitations:

- The participants, although purposefully/naturalistically selected, were self-identified sonographers practicing in a direct-patient care facility, primarily in the state of Nevada, and therefore the results may not be generalizable to the workforce population of sonographers across the U.S.

- All participants were volunteers and could withdraw from the study at any time. The remaining participants, therefore, may not truly represent the opinions or perspectives of the actual population of sonographers in the workforce.

- Participants reflected on their own experiences and observations of working with entry-level sonographers who graduated from an accredited sonography school or program. Thus, results may not be generalizable to all new graduate/entry-level sonographers in the U.S.

- Bias in this QDR study could result because the researcher served as the only individual who both gathered and analyzed the data.

- Most participants were familiar with the researcher. Thus, despite researcher efforts to solicit personal and honest responses, participants may have ulterior motives for their participation or may not be "candid" in their responses due to personal relationship with the researcher.

- Healthcare facility organizational managers and administrators were purposely not interviewed and therefore, their opinions and input were not a part of research.

- New graduate/entry-level sonographers were purposely not included as research participants, and therefore their perspectives and opinions are not presented.

- Unknown variables falling outside the control of the researcher could impact the research negatively or positively. Et al.

Delimitations of Research

Delimitations are those characteristics of research, under the control of the researcher, that limit the scope and define the boundaries of research (Simon & Goes, 2013, p. 274; Leedy & Ormond, 2016, p. 44). For the purposes of research, the individuals (Senior-Level Sonographers/experts) who were invited to participate in this study had the following delimitations:

- Graduated from an accredited sonography program (preferred but not required)

- Possess eight or more years of continuous employment as a Sonographer in a clinical setting, working directly with patients while practicing as a sonography professional.

- Possess the credentials necessary to perform as a sonographer.

- Worked within the last year, or currently works side-by-side with one or more new graduate/entry-level sonographer(s).

- Provided personal and professional perspectives/reflections on the workforce readiness of their new graduate/entry-level sonographer colleagues.

- Provided professional perspectives on the needs of their new graduate/entry-level colleagues for additional education, training, or intervention, prior to entering the workforce.

- Provided recommendations for educators and employers that could assist new graduate/entry-level employees with their skills and transition into the workplace.

Assumptions of Research

In QDR, the researcher actively interacts with his or her participants, and uses herself/himself as an instrument granted with special privileged access to participant's real-world

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experiences (Creswell, 2014, p. 14). In conducting this research, the following assumptions were made:

- The researcher had no control over the credibility and trustworthiness of participants' responses to interview questions. However, participants were assured confidentiality and anonymity of their personal information and contributions to research. It was therefore assumed that participants would answer the interview questions in an honest and candid manner.

- Participants with less than eight years of continuous employment as a Diagnostic Medical Sonographer, and/or those with no experience working with new graduate/entry level sonographers were excluded from research. Thus, it was assumed that the inclusion criteria of the sample were appropriate and assured that the participants have all experienced the same or similar phenomenon of the study.

- Participants were not promised any personal benefits for participation in research other than to contribute to the understanding of entry-level sonographers' possession and application of necessary skills in the workplace. Thus, it was assumed that participants had no underlying motives to participate in research other than a sincere interest in the research and improving the quality and professionalism of new graduate/entry-level sonographers.

- Participants were instructed that the results of research could lead to improvements in educational curriculum, or the development of interventions to support the transition of new graduate/entry-level sonographers into the workplace. Thus, it was assumed that participants have no motives to participate other than to contribute to improving the preparation of entry-level sonographers for the workplace.

- Since participants met the criteria necessary for participation in research, it was assumed that they also possessed the knowledge and understanding of the competencies and skills necessary to perform successfully in the workplace.

- Participants had experience working side-by-side with new graduate/entry-level sonographers in the workplace. Thus, it was assumed that they also had "lived experiences/personal perspectives" with the professional competence of entry-level sonographers and could provide input into their knowledge, skills and application abilities in the clinical setting.

Chapter One Summary

The first chapter introduced the proposed research study by describing the problem and the need for research. The gap in the literature was described as well as the purpose and proposed significance of the study. Workforce readiness theories and descriptions of professional competence for healthcare professionals in general, and sonographers specifically were significant in discussing the knowledge, skills, and competencies necessary for success in the workplace. An introduction to the Diagnostic Medical Sonography Workforce was provided, along with justification for why this workforce was chosen for research.

CHAPTER 2: LITERATURE REVIEW

Introduction

The literature reviewed was divided as follows. First, the literature and scholarly research on the workforce readiness of America's youth and the skills deemed necessary for success in the workplace were organized in a historical and chronological format (Randolph, 2009, p. 4), to demonstrate the progression of workforce readiness theories from the past, through the present day. Second, an overview of scholarly inquiry on the lack of workforce readiness of new graduate/entry-level employees, as perceived by our nation's employers and human resource professionals, to include details of specific skills that appear to be missing in new graduate/entry-level employees in the workplace. The third component of the literature review represented literature on the workforce readiness of our nation's healthcare workforce, including a discussion of the Healthcare Competency Model for healthcare professionals, and the application of the model to healthcare professionals. Additional reforms and research in healthcare education and training were also presented.

The literature review concluded with an overview of the education, training, credentialing, and employment of the Diagnostic Medical Sonography workforce to include core competencies and employability skills necessary for the sonography workforce, as excerpted from the *Scope of Practice and Clinical Standards for Diagnostic Medical Sonographers*, and the *Model Job Description for Sonographers*.

Workforce Readiness Theories and Empirical Research

Over the past 35 years, a significant amount of scholarly inquiry and research, both national and international has been conducted on the workforce readiness and employability skills necessary for our nation's graduates. Several of those studies serve as foundational works

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for all subsequent research with regards to the relationship between the knowledge and skills received in higher education, and those required by corporate America for job performance (Rosenberg, Heimler, & Morote, 2012). This section provided a historical and chronological review of the literature (Randolph, 2009, p. 4), on the workforce readiness of America's youth and the skills deemed necessary for the workplace.

For America to maintain its competitive edge, today's workers must take on more responsibility and adapt quickly to the needs for corporations to introduce new products and services quickly. Thus, much more is expected of even entry-level members of the American workforce. This cry of American management for workers with greater skills who can take greater responsibility has spawned many commissions, task forces, and scholarly studies (O'Neil, Allred, & Baker, 1997, p. 2), was evident in the following workforce readiness theories and relevant research.

These workforce readiness theories and empirical research are divided into two 17-year periods and represent a historical overview of workforce readiness theories from the past through the present day (Randolph, 2009, p. 4). In addition, these theories provided details on employability skills and competencies deemed necessary for success in the workplace. An overview of these early scholarly studies was provided to better understand the evolving topic of workforce readiness/competence and the employability skills necessary in today's workplace as well as the workplaces of the future.

Although these research studies and theories, developed over the past 30+ years, have specific differences, all have a common source of concern. That is, the challenges, which are both current and ongoing, faced by American Businesses competing in the global world market,

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necessitate a rethinking of America's approaches to the utilization of people (Human capital), in organizations (O'Neil, Allred, & Baker, 1997).

Workforce Readiness Theories and Empirical Research: 1983 – 2000

A Nation at Risk: The Imperative for Education Reform (1983). One of the earliest studies on employability skills and competencies, and the landmark research for all subsequent studies on the workforce readiness of our nation's graduates, was conducted by the U.S. Department of Education's National Commission on Excellence in Education and published in April 1983. The commission's charge and mandates were to (1) investigate the declining state of the educational system in America; (2) identify specific problem areas; and (3) offer multiple recommendations for improvement (Gardner, 1983, p. 2).

The final report to the Secretary of Education, on the quality of the educational system in the United States of America, known as A Nation at Risk: The Imperative for Education Reform ("A Nation at Risk," 1983). The report concluded that America's system of higher education represented an example of rising mediocrity, which places our once unchallenged preeminence in commerce, industry, science and technological innovation at risk of being overtaken by competitors throughout the world" ("A Nation at Risk," 1983, p. 1). In addition, the report listed some very concrete reasons for why America is…a nation at risk. Some of those characteristics include:

- American students placed last, compared to other nations, on 19 academic tests.

- Some 23 million Americans adults are illiterate.

- 13 percent of all 17-year-olds in the United States can be considered functionally illiterate.

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- College Board achievement tests reveal consistent decline in such subjects as physics and English.

- SAT Test scores are steadily declining Math and science compared to past years

- Higher-order intellectual skills are missing in many 17-year-olds.

- Many of the nation's young people cannot read, write or solve mathematics problems requiring several steps.

- Our nation spends millions of dollars on costly remedial education and training programs in such basic skills as reading, writing, spelling, and computation ("A Nation at Risk," 1983, p. 115-116; Gardner, 1983, p. 16-18).

Those statistics, now more than 30 years old, might prompt one to think that the education, training, and preparation of America's youth to enter the workforce, must surely have improved over the past 30 years. Unfortunately, "much of what is said in the NAR report about the problems in America's educational system, continues to ring true today, nearly thirty years later" (Burdick, 2012, p. 1). In addition, the stark reality of these daunting statistics led to the passing of additional reform Acts such as the *Educate America Act of 1994* under President Clinton and *the No Child Left Behind Act* under President George W. Bush (Burdick, 2012, p. 2-3). Both reforms were passed by the federal government to restructure the nation's schools.

Since a NAR, there have been numerous educational reforms implemented to intensify high school graduation requirements, improve academic performance and teacher preparation, and yet the U.S. public education system continues to face problems with achievement, excellence, and equity (Hodge, 2007).

Workplace Basics: The Essential Skills Employers Want (ASTD, 1988). In 1988, the American Society for Training and Development (ASTD) published the results of its research on

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necessary workforce skills. The report, published in 1990, was titled Workplace Basics: The Essential Skills Employers Want (Carnevale, 1990). The objectives of the ASTD, was to provide an in-depth understanding of the 16 skills employers believe were the workplace basic skills necessary for every individual entering the workforce (Carnevale, Gainer, & Meltzer, 1990). Those 16 skills included the following:

- Foundational Skills: **Learning how to learn** or strategies for acquiring skills.

- Basic Competency Skills: **Reading** for the new workplace, **writing** with impact, and computation (a**rithmetic**) in a technological workplace.

- Communication Skills: **Speaking**/oral communication and **listening** effectively.

- Adaptability Skills: **Problem solving**, resourcefulness, and **creative thinking**.

- Developmental Skills: Managing **personal and professional growth**, self-esteem, motivation and **goal setting**, **career development**.

- Group Effectiveness Skills: Working with others - **interpersonal Skills**, **teamwork** and **negotiation**.

- Influencing Skills: (Making a difference) - **Understanding Organizational Culture**, and **sharing leadership** (Carnevale, Gainer, & Meltzer, 1990, p. 7-9).

Employability Skills Profile: Critical Skills Required of the Canadian Workforce (1990). The Conference Board of Canada's Corporate Council on Education worked with employers and educators from across the country and developed the Employability Skills Profile (ESP): The Critical Skills Required of the Canadian Workforce.

The Board's Employability Skills Profile (ESP) consisted of a set of characteristics and skills that 25 major employers in Canada deemed necessary for a high-quality Canadian workforce. The guiding principle of the ESP was the generic nature of the skills required for the

workforce. That is, the skills developed by the council and outlined in the ESP were basic

foundational skills as opposed to skills dedicated to any particular occupation, responsibility, or

limited to the jobs of the day. The ESP consisted of generic skills, attitudes, and behaviors that

employers look for in new recruits and that could be develop through training programs for

current employees. The ESP consisted of the following academic, personal management and

teamwork skills*:*

- Fundamental Skills which include the ability to communicate, manage
  information, use number, to think and solve problems.

- Personal Management Skills which include the ability to demonstrate positive
  attitudes and behaviors, be responsible, adaptable, learn continuously and work
  safely.

- Teamwork Skills which include the ability to work with others and participate in
  projects and tasks (McLaughlin, 1995, p. 2).

America's Choice: High Skills or Low Wages (1990). This report, released in 1990 by

the National Center on Education and the Economy's (NCEE) Commission on the Skills of the

American Workforce, concluded that the approach to work and education must fundamentally

change.

Recommendations by the commission included a new educational performance standard

for all students; states became responsible for assuring that a Certificate of Initial Mastery (CIM)

was achieved by all students; the creation of technical/professional certificates, and associate's

degrees for workers who did not pursue a baccalaureate degree; employers provided with

incentives and assistance to invest in the education and training of their workers; and the

establishment of Employment and Training Boards to organize and oversee the new school-to-

work transition programs and training systems (National Center on Education and the Economy [NCEE], 2008, p. 157).

The SCANS Reports (1990 and 1992). In September 1990, the *Secretary of Labor's Commission on Achieving Necessary Skills* (1992), SCANS Report was published. According to Richens and McClain (2000), the SCANS report defined the basic skills needed for employment by identifying three foundation skills and five workforce competencies necessary for effective work (Richens & McClain, 2000, p. 31). The results of the commission's work were presented in two separate reports that recommended fundamental changes in both education and work.

SCANS I: What Work Requires of Schools: A SCANS Report for America 2000 (1990). The Secretary's Commission on Achieving Necessary Skills (SCANS) was charged by the Secretary of Labor to (1) Define the skills needed for employment; (2) Propose acceptable levels of proficiency; (3) Suggest effective ways to assess proficiency; and (4) Develop a dissemination strategy for the nation's schools, businesses, and homes (*What Work Requires of Schools*, 1991, para. 1).

After 12 months of meeting with a variety of business owners, public employers, unions, workers and supervisors in shops, plants, and stores, in all manner of jobs from manufacturing to government employment, the commission drafted its first report to the Secretary of Labor. That report outlined the SCANS vision, described how schools and the private sector can cooperate to create a high-performance economy capable of maintaining the nation's standard of living, and offered suggestions on how to proceed. In addition, the report offered the following conclusions:

- All American high school students must develop a new set of competencies and foundation skills if they are to enjoy a productive, full, and satisfying life.

- The qualities of high performance that today characterize our most competitive companies must become the standard for most of our companies, large and small, local, and global.

- The nation's schools must be transformed into high-performance organizations. (*What Work Requires of Schools*, 1991, p. ii).

Moreover, the SCANS research verified what the commission referred to as "*workplace know-how*" which was grounded in a mix of competencies, basic skills and personal qualities, all of which were deemed necessary for solid job performance. Those competencies, basic skills requirements, and personal qualities were represented by the five competencies (resources, interpersonal skills, information literacy, understanding systems, and technology utilization skills); and three foundational skills (basic skills, thinking skills, and personal qualities). (*What Work Requires of Schools*, 1991, p. 10-14)

 SCANS II: Learning a Living: A Blueprint for High Performance: A SCANS report for America 2000 (1992). The commission's first SCANS Report (Part I) provided an outline of the commissions vision, provided descriptions of how schools and the private sector can cooperate to create a high-performance economy capable of maintaining the nation's standard of living, and offered suggestions on how to proceed. However, one of the most disturbing findings of the initial SCANS Report was "that more than half of America's young people leave school without the knowledge or foundation required to find and hold a job" (Packer, 1992, p. 27). This prompted the release of the commissions second SCANS Report in 1992, *Learning a Living: A Blueprint for High Performance. A SCANS Report for America 2000* ("U.S. Department of Labor: Learning a living, 1992," 1992).

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This report, also known as the SCANS II report, provided a more detailed roadmap for those charged with the responsibility for the Commission's major concerns: educators, employers, and the designers of certification and assessment systems. In addition, SCANS II described the economic choices facing the United States, defined the workforce issue as it was understood, and made several recommendations to set the nation on the path to a high-performance future. Those recommendations included an outline of the SCANS vision, a description of how schools and the private sector should cooperate to create a high-performance economy capable of maintaining the nation's standard of living, and finally, a recommendation was made to the Secretary of Labor to take steps to assure support for the continued development of the SCANS agenda. With this final report, the commission hoped to contribute to improving the nation's productivity and the well-being of its citizens in the next century.

SCANS II moved beyond the commission's previous description of what needed to be done to build high-performance workplaces and schools—to a description of how America's youth could be better prepared, as well as those workers already on the job, for productive work in the 21st century (U.S. Department of Labor Employment and Training Administration [DOLETA], 1992, p. 4). Moreover, SCANS II was directed to individuals and groups responsible for implementing change (educators, employers, and those individuals responsible for developing a national system of assessment) (p. 7).

Finally, the SCANS II report recommended full implementation of the following actions by the year 2000: (1) Reinventing Schools, (2) Fostering Work-Based Learning, (3) Reorganizing the Workplace, and (4) Restructuring Assessment (DOLETA, 1992). Despite some disagreement among the members of the commission over the relevance of the SCANS skills, the incoming Secretary of Labor, Lynn Martin, agreed that in today's economy, we must

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do more than educate students about reading, writing, and arithmetic. High School Diplomas must reflect the demands of a changing workplace for broader skills beyond the 3 Rs" (Whetzel, 1992, para. 9).

Following the release of the SCANS Reports and the implementation of outlined reforms, it is important to note that a scholarly review of those reports, concluded that "the appropriate prerequisite for successful employment were as varied as the type of jobs themselves." (Huitt, 1999, p. 4). Moreover, Huitt (1999) proposed that in addition to the competencies and skills outlined in the SCANS Reports, there is ample research in behavioral sciences literature to justify the inclusion of four additional workforce qualifications/employability skills: optimism, setting and using goals, self-efficacy, and self-regulation (Huitt, 1999, p. 5).

Workforce Readiness Theories and Empirical Research: 2000—2019

It has been more than 35 years since "A Nation at Risk" (1983), and the SCANS Reports are approaching their 25th birthday. Are America's youth and college graduates armed with the knowledge and skills necessary to enter the workforce? Do they possess the necessary education and employability skills to be successful in the workplaces of the new millennium?

In the global economy of today's workforce, employers require higher-order basic, academic, and technical skills, measured competencies, adaptive learning, critical thinking, and teamwork, etc. The days of dependence on a social contract with job stability, tenure and employer supported benefits and retirement plans are declining. Gone are the days of employment stability and assurance—as the expectations of the workplace have changed and continue to evolve rapidly. For example, "the U.S. Department of Education estimates that 60 percent of the new jobs that will open in the 21st century will require skills possessed by only 20 percent of the current workforce" ("Capable Workforce?," 2012, p. 30).

Employers are extremely concerned that "America's schools and job training programs are not producing a sufficient number of graduates with the qualifications necessary to fill available high demand jobs and positions. In addition, employers felt that neither high school graduates nor college graduates were prepared for entry level work or advancement in the workplace. ("Capable Workforce?," 2012)

An in-depth study conducted in 2006, by the Conference Board's, Corporate Voices for Working Families, the Partnership for 21st Century Skills and the Society for Human Resources Management, provided details related to the corporate perspective on the readiness of new entrants into the U.S. workforce based on their level of education attainment (Casner-Lotto & Barrington, 2006). Results of the study led to the groups development of what they termed a "Workforce Readiness Report Card". This report card provided an accessible, reliable, and visible picture of the basic knowledge and applied skills that are either "deficient" or "excellent" in those areas that employer respondents rated as "very important" (McLester & McIntire, 2006).

In the United Kingdom, Chris Humphries, Director General of the City Guilds of London Institute, the UK's oldest and leading awarding body for Vocational Qualifications, posited that "Change is not just restricted to the political, technological and social arenas. Work and occupations are changing also, and those changes could not be ignored" Thus, in the U.K., "we must raise our game, using advanced knowledge and innovation to add value and build a skills intensive economy." (Humphries, 2007, p. 3).

America's Perfect Storm (2007). According to research, published by the Educational Testing Service (ETS), "Our nation is in the midst of a perfect storm – comprised of three forces: divergent skill distributions, the changing economy, and demographic trends." (Kirsch, Braun, Yamamoto, & Sum, 2007, p. 3). The first set of forces resulted from numerous national and

international surveys which demonstrate that large numbers of our nation's adults do not have enough numeracy and literacy skills necessary to function effectively in the competitive world of work. The second set of forces resulted from significant changes in the labor market due to industrial and corporate restructuring, declines in unionization, technological change, and globalization. Finally, the third set of forces resulted from significant growth of our nation's population from 300 million in 2005 to more than 360 million in 2030. Additionally, due to an increase in certain minority groups and immigrants, a substantial increase in the racial/ethnic diversity of the nation's population will also be evident (Kirsch et al., 2007, p. 6).

These forces combined, according to the authors, have resulted in too many children leaving school too early, and many of those who go on to earn a high school diploma emerge with weak skills and insufficient knowledge. That is, they lack strong foundational skills (reading, writing and arithmetic), as well as strong "soft skills" (persistence, teamwork, and communication). This lack of both cognitive and noncognitive skills makes it difficult for them to obtain and retain employment. (Kirsch et al., 2007, p. 24).

Tough Choices Tough Times (2008). This report released by the National Center on Education and the Economy (NCEE), provided details and recommendations on how the educational systems in America should respond to the challenges of globalization. Specifically, the commission proposed a major overhaul of the educational system, from preschool through postsecondary education (Hodge, 2007, para. 3). In addition to its focus on pre-K-12 issues, heavy demands were also placed on institutions of higher education to ensure their alignment with the restructuring of high schools.

The major reason for restructuring was to provide our nation's employers with the most competent, creative, and innovative employees in the world. That is, employees with a high

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level of preparation in reading, writing, speaking, mathematics, science, literature, history, and the arts (National Center on Education and the Economy, 2008).

The best employers the world over would be looking for the most competent, creative and innovative employees on the face of the earth and would be willing to pay them top dollar for their services.

The commission concluded that if our nation continued on the current course, without a thorough overhaul of our educational system, and the number of nations outpacing us in the education race continues to grow at its current rate, the dynamics of the global economy will lead to a steady decline in the American standard of living and pale by comparison to those nations, rich and poor, that are doing a better job (National Center on Education and the Economy, 2008).

Preparing the Workers of Today for the Jobs of Tomorrow (2009). In 2009, a report prepared by the President's Council of Economic Advisers (CEA), titled *Preparing the workers of today for the jobs of tomorrow* (CEA, 2009), demonstrated that the economy of 2016 will resemble the economy of 2008, with several shifts that have implications for employment.

- Healthcare is forecasted to remain a large source of job growth in the labor market.

- The decades-long decline in the share of workers that are employed in manufacturing is expected to moderate.

- The construction industry is projected to eventually recover and add jobs in the coming decade.

- Well trained and highly skilled workers will be best positioned to secure high-wage jobs, thereby fueling American prosperity.

- Occupations requiring higher educational attainment are projected to grow much faster than those with lower education requirements (especially associates or post-secondary vocational degrees).

Therefore, the key attributes of a well-trained workforce necessary for the positions above included: workers who can think critically and solve problems; workers with post-secondary education and training; and post-high school education and training systems which could provide valuable skills to those who complete programs in high-growth fields. ("Preparing the workers of today," July, 2009, p. 2).

Higher Skills Development at Work (2010). This study, performed by National Business Education Association (NBEA, 2010), concluded that, the shortage of skills confronting today's dynamic workforce goes beyond academic and hands-on occupational skills. Tomorrow's workforce must have both technical and human-relation abilities. What are human-relation abilities you might ask? Soft skills! The purpose of the study was to determine the perceptions of Alabama business educators on the importance of soft skills for success in the 21st century workforce (Mitchell, Skinner, & White, 2010, p. 43, 48).

The soft skills outlined within the study included: general, written, and oral communication, ethics, diversity, teamwork, time management, problem-solving/critical thinking, customer service, leadership, and business etiquette. Sound familiar? The conclusions of the research indicated that soft skills were an important and necessary component of business/marketing education curriculum. Did you recognize the need for higher level thinking skills, social intelligence, adaptive thinking, diversity, or the ability to operate in diverse cultural settings, computational thinking, and media/computer literacy across multiple disciplines? Those qualities and competencies are nearly the same as the ones outlined in the SCANS Reports.

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Closing the Skills Gap: Companies and Colleges Collaborating for Change (2014).

This report, produced by the Economist Intelligence Unit, and sponsored by the Lumina Foundation, details the survey results of 343 senior executives, conducted in March 2014. The final summary of the report revealed widespread employer-concerns about the preparedness of the workers they needed for their industries. Although employers valued the possession of both hard and soft skills in their employees, they considered soft skills such as critical thinking, problem solving, collaboration, teamwork, and timely communication, to be the most important for their industries (Economist Intelligence Unit, 2014). Additionally, employers were also concerned about the competencies required for middle-skills jobs found in fields such as information technology, healthcare, high-skilled manufacturing, and the service industry. These jobs comprise the largest segment of the US labor force, and many experts believe that shortages of workers prepared for them are undermining US competitiveness and encouraging firms to shift operations abroad (Economist Intelligence Unit, 2014, p. 4).

Skills for a New Economy: What the Workforce of Tomorrow Needs Today (2019).

This paper, supported by the Educational Testing Services (ETS), explored the changing nature of work resulting from technological advances and global competition and how those activities are transforming the workplace. The research explored the job-requirements for next generation workplaces based on the needs for knowledge skills and abilities that employees will need for success in the evolving workplace (Tannenbaum, Robbins, & Liu, 2019). Final research conclusions indicated "that college graduates fell short, particularly on critical thinking and problem-solving, oral and written communication, professionalism and work ethic, and leadership". (Tannenbaum et al., 2019, p. 4)

Missing Employability Skills

Based on the previous research studies, today's workplace centers on a combination of necessary competencies and skills which continue to mimic those outlined in the SCANS Reports. Employers are looking for employees who possess a comparable mix of both hard and soft skills. Hard skills – those technical, tangible competencies, that can be quantified, defined, evaluated or measured. For instance, a degree from a college or university, proficiency in a foreign language, writing skills, mathematical skills, etc., are classified as hard skills. They are most often evaluated during interviews to ensure that the candidates have what they claim to in their resumes.

Soft skills, on the other hand, represents those non-technical competencies associated with personality, attitude, the ability to interact effectively with others, and sensitivity to potential individual and/or collective diversity. Soft skills are as valuable as hard skills, and to be optimally employable a potential candidate for employment must possess both competencies. Unfortunately, employers report a dearth of basic soft skills within the population of new available applicants for employment (Hart Research Associates, 2015).

Soft skills, considered to be essential for the 2021 workplace, include reading comprehension, communication skills, collaboration and teamwork skills, critical thinking and problem-solving skills, personal management skills, goal setting, self-motivation, global-minded/diversity skills, and technology skills (Share, 2016). Emphasis on these skills is reflected in classified ads all over the world and because the current workplace and job market allows employers to be more selective, they are looking for employees who have those skills. Unfortunately, as the following will demonstrate, today's new graduates appear to be missing many, if not most, of the skills employers say are necessary for success in the world of work.

Although the literature reviewed represented the most prominent research completed over the last 35 years in workforce readiness, employability skills, and workplace competency – unfortunately, year after year, the literature continued to demonstrate the worlds, not just the Unites States' preoccupation with the lack of workforce readiness and competency of new graduates in the workplace. The review also covered some of the most prominent federal initiatives released to address workforce readiness, competency in the workplace, and necessary employability skills. And yet, the literature continued to insist that entry-level employees are woefully unprepared to enter today's globally competitive world of work. That is, the knowledge and skills our nation's graduates obtained through education and training, whether from high schools, colleges, or universities, had not prepared them to enter the challenging world of work.

The Skills Gap/Mismatch Phenomenon

A survey performed by the Workforce Solutions Group at St. Louis Community College concluded that "more than 60% of employers say applicants lack "communication and interpersonal skills" and another employer survey, this one performed by the staffing company Adecco, turned up similar results. According to a statement released by Adecco, "44% of respondents cited soft skills, such as communication, critical thinking, creativity, and collaboration, as the area with the biggest gap" (White, 2013, p. 3-4). Additionally, results of several surveys referenced in the Chronicle of Higher Education, indicate that both employers and recent college graduates themselves believed graduates were not prepared for their first jobs. Employers doubted that colleges produce students with the skills that meet their needs. In fact, 54 percent of "c-suite executives" think higher education in the United States falls behind that of other countries in preparing students for the work force (Fabris, 2015, para. 7-8).

Skills mismatches occur when workers have either fewer or more skills than jobs require World economic Forum Global Agenda Council on Employment, 2014, p. 5; Economist Intelligence Unit, 2014, p.7). More importantly, the process of matching diversely skilled job seekers with available vacancies is not automatic. Imbalances exist between the supply and demand for people with different skills in all advanced economies and are sometimes inevitable. Therefore, part of the observed skills mismatch between what employers want to see in new graduates and what new graduates possess and demonstrate, is a direct consequence of initial educational and occupational choices made by graduates, and the imperfect information available about opportunities in the labor market (World Economic Forum Global Agenda Council on Employment, 2014).

Unfortunately, there is a growing mismatch between the needs of employers and the offerings of the educational systems in the US. Although colleges and universities continue to play a central role in imparting critical thinking and other soft skills to their graduates, the needs of business/industry, and the knowledge and competencies that new graduate employees possess upon graduation, have become increasingly out of alignment or disconnected. That is, higher education is not preparing it graduates with the skills and competencies most needed by workforce industries which forces employers to now spend twice as much time training new employees as in the past (Economic Intelligence Unit Limited, 2014, p. 7).

Skills mismatch affects individuals at different stages of their working lives: (1) when first leaving school and entering the workforce, (2) every time a change in jobs occurs, (3) re-entry into the labor market after long spells of unemployment or inactivity, and particularly (4) if employees fail to upgrade their skills and face skill obsolescence. Continuous adaptation of workers' skills to changing job demands depends on opportunities to learn on the job (Economist

Intelligence Unit, 2014, p. 5). The World Economic Forum also proposed that there are five major types of skill mismatches employers may experience:

1. Skills shortage in which the demand for a specific skill exceeds the supply of people with that skill at equilibrium rates of pay.

2. Qualifications mismatch in which the level of qualification and/or the field of qualification is different from that required to perform the job adequately.

3. Over-(Under-) qualification/education in which the level of qualification/education of the employee is higher or lower than required to perform the job adequately.

4. Skills gap in which the type or level of skills is different from that required to perform the job adequately.

5. Over-(Under-) skilling in which the level of skills of the employee is higher or lower than required to adequately perform the job. (World Economic Forum Global Agenda Council on Employment, 2014, p. 7).

Theory-to-Practice Gap

Like the skills gap/mismatch, the theory-to-practice gap represents the inability of a new-graduate/entry-level employee to apply or transfer the basic knowledge and skills obtained during their educational experiences…to the workplace (Watkins, 2018). The Theory-Practice Gap is also known in the healthcare workforce, specifically in the Nursing Workforce, as the Transition-to-Practice Gap (Coleman, 2016, p. 2).

The workplaces of the new millennium have changed dramatically, and these changes are expected to continue. Today's employers want graduates with a board array of knowledge and skills—not just specific content knowledge, but transferrable skills such as critical thinking, unscripted problem-solving and communication (Weathers, 2014, para. 3). Although some new

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graduate/entry-level workers have an excellent foundation of basic knowledge and applied skills, there remain significant deficiencies among entrants to the workplace, at every educational level, especially in the areas of written and oral communication and general workplace professionalism (Economist Intelligence Unit, 2014, p. 3).

Conclusions from a report published in the Economist Intelligence Unit (2014), revealed that of 343 U.S. executives surveyed, who were familiar with their company's workforce-development strategy and higher-education efforts, indicated that the overwhelming consensus among employers is that too many graduates lack critical-thinking skills and the ability to communicate effectively, solve problems creatively, work collaboratively and adapt to changing priorities. Adding to those skills deficits, employers also found that young people lacked the technical, or "hard" skills associated with specific jobs (Economist Intelligence Unit, 2014, p. 3).

Even more alarming were the results of two Gallup Polls. The first, sponsored by Inside Higher Ed, was performed in January 2014, and represented a survey of College and University Chief Academic Officers. Results of the survey revealed that most provosts think their institutions are doing a good job at preparing students for the world of work, with 56 percent saying that their institutions are "very effective" and 40 percent saying they are "somewhat effective" (Jaschik, 2015, para. 28). The second Gallup Poll, sponsored by the Lumina Foundation, was performed in February 2014. According to the results of the poll "96 percent of Chief Academic Officers believe their college graduates are ready for the workforce, however, only 11 percent of business and industry leaders strongly agreed with that assessment" (Grasgreen, 2014, para. 3).

An article from the New York Times (2013) indicated that there has always been a gap between what colleges produce and what employers want—and that gap is widening. Why?

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Because the workplace has become more complex and globalized, profit margins are slimmer, companies are leaner, and managers expect their workers to get up to speed much faster than in the past. For example, a special report distributed by the Chronical of Higher Education (2012), reported that while fresh hires with bachelor's degrees had the right technical know-how for the job, most employers surveyed, grumbled that new entrants into the workforce were not prepared in written and oral communication, decision-making, and analytical and research skills (Fisher, 2012). In addition, another report from the Chronicle, in conjunction with American Public Media's Marketplace (March 2012), found that approximately half of the 704 employers who participated in the study said they had trouble finding recent college graduates qualified to fill positions at their company. Surprisingly, it was not specific technical skills that new graduates were lacking, but the basic skills as outlined by the SCANS Report. That is, candidates for employment were lacking written and oral communication skills, adaptability and managing multiple priorities, decision making and problem-solving skills. Additionally, new entrants to the workforce also seemed to have problems with collaboration, interpersonal skills, the ability to deal with ambiguity, flexibility, and professionalism.

Recruitment of employees with the necessary skills to be successful in the workplace appears to be a problem at all industry levels, regardless of the workforce discipline. According to *Workforce Readiness and Skills Shortages*, a research report provided by the Society for Human Resource Management (SHRM), the types of basic skills that are lacking among applicants cover a broad spectrum:

- More than two out of five Human Resource professionals (42%) indicated that applicants do not possess basic computer skills.

- Thirty-one percent said applicants have insufficient skills in writing in English.

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- Twenty-six percent said applicants lack basic skills in spoken English.

HR professionals also had concerns with gaps in applied skills:

- Forty percent said applicants have gaps in critical thinking/problem-solving.

- Thirty-eight percent said there are gaps in professionalism/work ethic (38%) among applicants.

- Thirty-four percent indicated skills gaps in applicants' leadership skills. (Society for Human Resource Management [SHRM], 2016, p. 4).

The report also provided additional reasons and details for the lack of employers' ability to recruit qualified and skilled employees. Problems such as a continuous rise in the difficulty recruiting for jobs of most strategic importance—recently reaching levels not seen since before the recession of 2007-2009. Difficulty recruiting for positions in engineering a well as filling many other STEM jobs. Lack of employee technical skills, competition from other employers and lack of work experience were also key reasons (SHRM, 2016, p. 2). Moreover, three out of five HR professionals (60%) in the manufacturing industry say they are having overall recruiting difficulty for their full-time openings, and more than one-half of health care/social assistance respondents and HR professionals in the high-tech industry report the same difficulty (p. 2).

PayScale, an online benefits and compensation information company, surveyed 63,924 managers and 14,167 recent graduates. Results of the survey revealed that 87 percent of grads felt that they were ready to enter the workforce, while only 50 percent of managers felt that recent grads were prepared for a full-time job (Payscale, 2016, para. 9). The discrepancy between the two groups is known as the "skills gap". According to the survey results, 44 percent of the hiring managers surveyed listed writing proficiency as the hard skill most commonly lacking in new graduate employees. 60 percent of survey respondents listed critical

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thinking/problem solving as the soft skill most lacking in new graduates (para. 8). Moreover, attention to detail, at 56 percent, followed in second place for soft skills most lacking in college graduates. Finally, in third place for soft skills most lacking in our nation's college graduates were communication (reading, speaking and listening) at 46 percent, and interpersonal skills/teamwork at 44 percent (Payscale, 2016).

Employability Skills and Competency in the Healthcare Workforce

The way in which competency is demonstrated can vary based on the workforce and the discipline in question. For the Healthcare workplace, the concept of professional competence for the healthcare professional has been defined in this research as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" (Epstein & Hundert, 2002, p. 226).

In healthcare organizations, due to a rapid decrease in the occurrence of acute diseases and an increase in the occurrence of chronic health problems, the need for qualified and competent healthcare professionals is imperative. One issue interfering with the nation's ability to produce a qualified and competent healthcare workforce is the college education received by healthcare professionals prior to entering the workforce. That is, the education and training of the healthcare workforce, continues to rely on early 20th century models that emphasize diagnosis and treatment of acute diseases (Pruitt & Epping-Jordan, 2005).

Fortunately, educational leaders, healthcare professional organizations, and specifically, the World Health Organization (WHO), recognized that such models of education and training were inadequate for todays and future healthcare workers, who were caring for a growing population of patients with health problems that persisted across decades or lifetimes. With that

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in mind, it was recommended by WHO that education and training should be restructured to include a new set of core competencies (knowledge, skills, abilities, personal qualities, experience, or other characteristics)—new "tricks" that prepare 21st century health workers to manage today's most prevalent health problems (Pruitt & Epping-Jordan, 2005, p. 637).

The Dreyfus Model of Skill Acquisition (1980) and Benner's From Novice to Expert (1982)

Patricia Benner, in her seminal work, *From Novice to Expert*, described how nurses acquire skills and knowledge in the organizational setting (Benner, 1982). The Novice to Expert Theory adapted by Benner (1982) was first proposed by Hubert and Stuart Dreyfus (1980) as the Dreyfus Model of Skill Acquisition.

The Dreyfus Model of Skill Acquisition (1980). There are many conceptual variations of the Dreyfus Model of Skill Acquisition (1980). Figures 2.1 and 2.2 represent only two of many examples of the model. The primary purpose for developing the model was to assess the level of skill development and competency in an individual as he/she learns a new task(s). (Zeeman, 2019)

The model was initially developed to address skill development in fighter pilots and was later applied to the development of skills such as driving a car or playing chess (Carracio, Benson, Nixon, & Derstine). However, over the years, the model has been "adopted by medical educators without a consensus on interpretation of the stages as they apply to the acquisition of clinical skills" (Carraccio, Benson, Nixon, & Derstine, 2008, p. 761).

The Dreyfus Model, "a product of philosophical deliberation and phenomenological research, was initially adapted by Benner (1982) and other nursing educators to explain the development of nursing skills" (Pena, 2010, p. 1). Although the Dreyfus model explained the 'acquisition' of some skills and appears to be widely accepted across multiple educational

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disciplines, there continues to be much debate as to the model's ability to adequately explain the acquisition of clinical skills. (Pena, 2010). Patricia Benner's (1982) adaptation of the Dreyfus model was an attempt to apply the model to the acquisition of clinical skills in Nursing Practice. See Figure 2.3 for an example of Benner's adaptation of the Dreyfus Model.

Figure 2.1: Dreyfus Model of Skill Acquisition (1980)

Note: Retrieved from https://www.kaizenko.com/the-dreyfus-model-of-skills-acquisition/
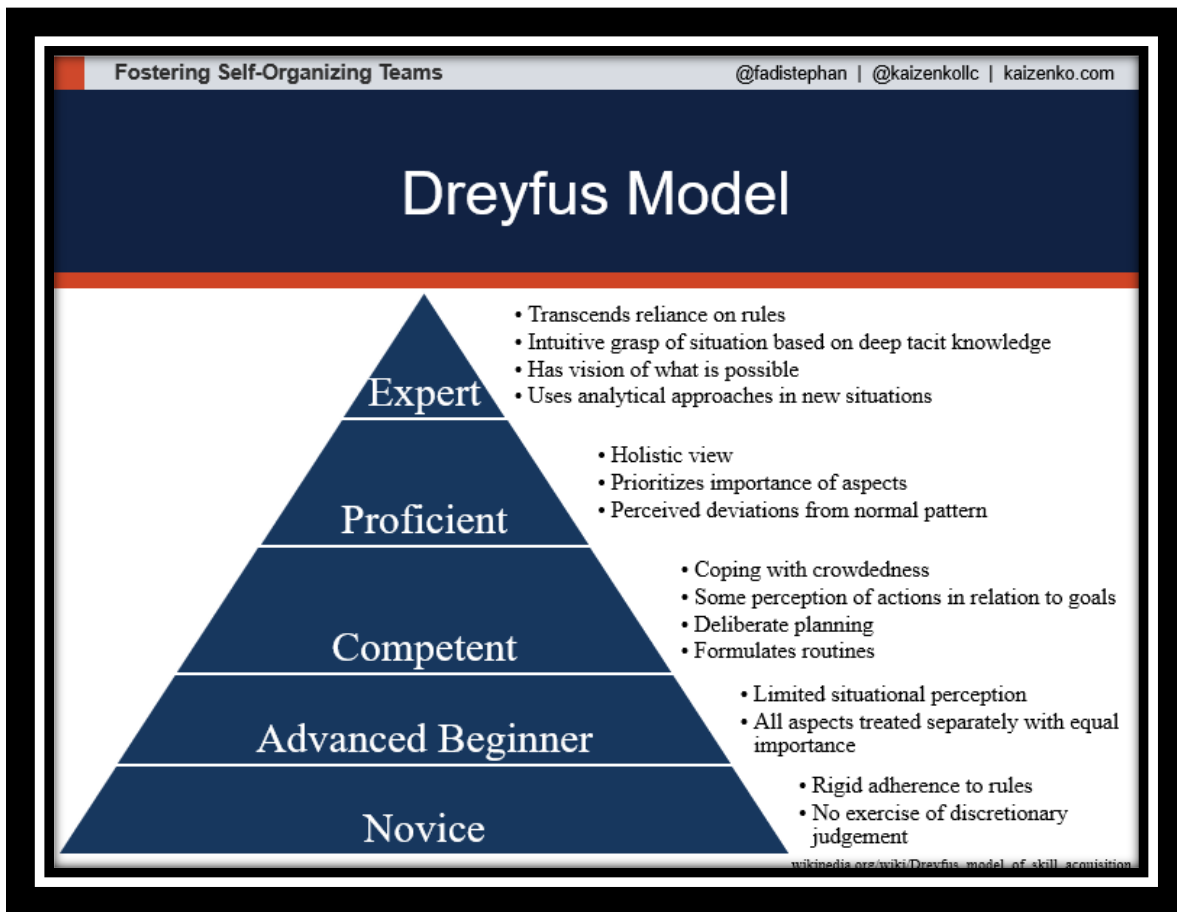
Figure 2.2: Dreyfus Model of Skill Acquisition (1980)
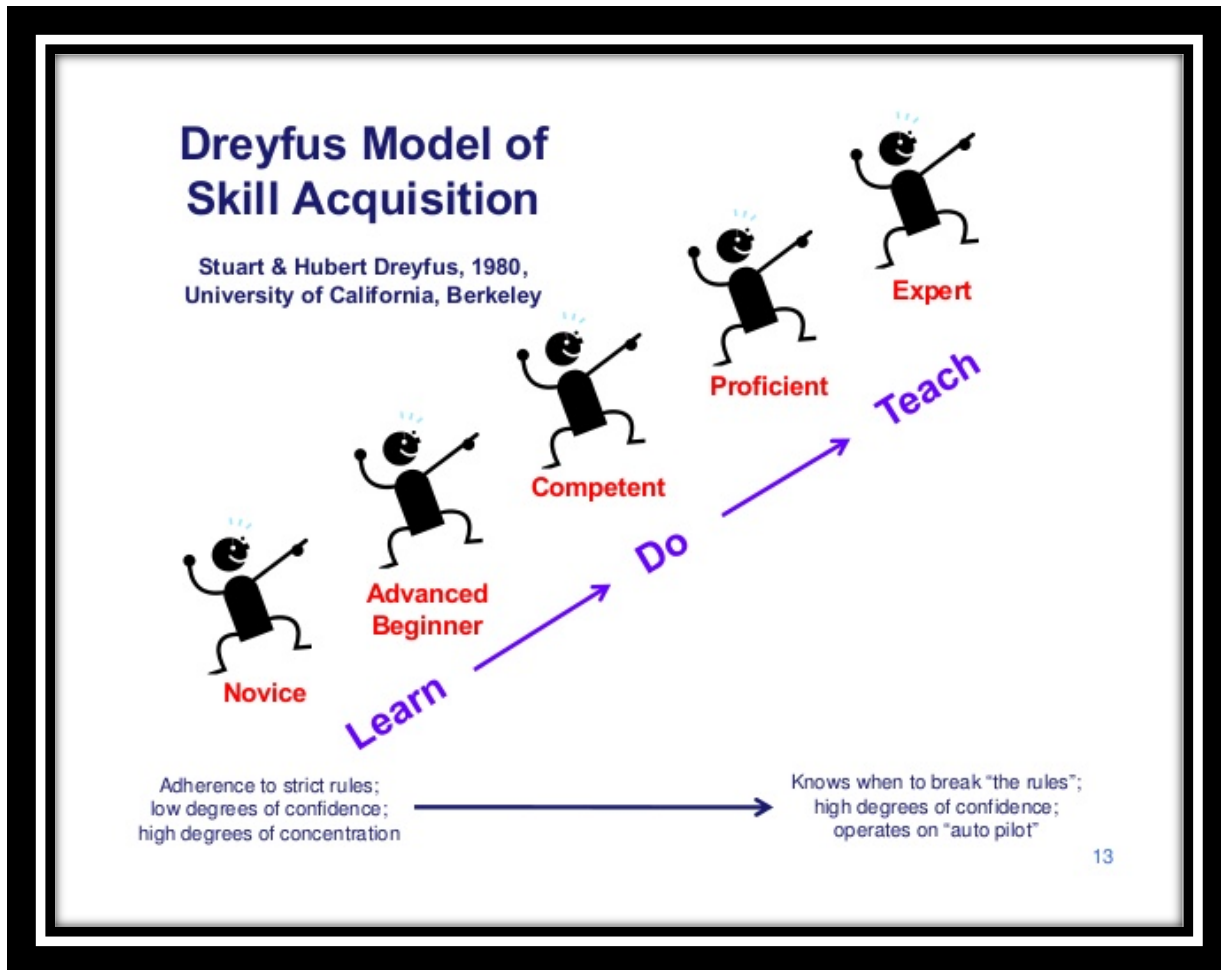
Benner (1982) From Novice to Expert. According to Benner, it takes time for new

nurses to gain knowledge. By adapting the model of skill acquisition developed by Dreyfus &

Dreyfus (1980), Benner (1982) was able to apply the model to skill development in nursing

practice. Based on her adaptation of the model, Benner described nurses as passing through five

stages of knowledge and skill development. Those five stages are novice, advanced beginner,

competent, proficient, and expert (Benner 1982). Figure 2.3 represents a visual example of

Benner's adaptation of the Dreyfus Model of Skill Acquisition.

Figure 2.3: Patricia Benner – From Novice to Expert (1982)

From Novice to Expert – Patricia Benner

EXPERT — Has intuitive grasp of the situation and zeroes in on the accurate region of the problem

PROFICIENT — Perceives situations as wholes, rather than in terms of aspects

COMPETENT — Begins to understand actions in terms of long-range goals

BEGINNER — Can note recurrent meaningful situational, components, but not, prioritize between them

NOVICE — Has no professional experience

Benner, P. (1982). From novice to expert. *American Journal of Nursing*, 82(3), 402-407.

"Pedagogical Needs and Limitations" by Vanderbilt CC-BY-NC
https://cft.vanderbilt.edu/?s=benner
Animation by

OER (cc) BY-NC-SA S. Melrose PhD, RN and S. Swettenham MDE

Note: Retrieved from **https://oers.pressbooks.com/chapter/oer-09-from-novice-to-expert-patricia-benner/**

The five stages in the model represent changes in two general aspects of skilled performance. First, the nurse moves from reliance on abstract principles to the use of past concrete experience (Benner, 1982, p. 403). Second, as the nurse approaches competence, there is a change in the perception and understanding of a demand situation so that the situation is seen less as a compilation of equally relevant parts, and more as a complete whole in which only certain parts are relevant (p. 403). These stages of clinical competence, or movement from the novice nurse to the expert nurse were developed because of the complexity and responsibility of the nursing practice, which required long-term and ongoing career development. However, this requirement for long-term and ongoing career development is necessary for many healthcare workers and thus requires an understanding of the differences between the experienced nurse or healthcare professional and the novice worker.

As proposed by Benner (1982), the Stages of Clinical Competence that occur in moving from the novice to the expert nurse were as follows:

Stage 1 Novice. Represents a nursing student in his/her first year of clinical education; behavior in the clinical setting is limited and inflexible. Novices have a very limited ability to predict what might happen in a particular patient situation and recognize signs/symptoms after having had similar experiences with other patients.

Stage 2 Advanced Beginner. Represented by the new graduate/entry-level nurse in their first employment. They have more patient care experiences which enabled them to recognize recurrent, meaningful components of a situation. They also have the knowledge and know-how related to patient care. However, they lack sufficient in-depth experience.

Stage 3 Competent. These nurses lack the speed and flexibility of proficient nurses; they have some mastery and can rely on advance planning and organizational skills. They also

recognize patterns and the nature of clinical situations more quickly and accurately than advanced beginners.

Stage 4 Proficient. Proficient nurses can see situations as "wholes" rather than parts. They have learned from experience what events typically occur and are able to modify plans in response to those different events.

Stage 5 Expert. The expert Nurse can recognize demands and resources in situations and attain their goals. They know what needs to be done and no longer rely solely on rules to guide their actions under certain situations. They have an intuitive grasp of situations based on their deep knowledge and experience and their focus is on the most relevant problems. (Benner, 1982, p. 402-407).

The U.S. Department of Labor's Allied Health Competency Model (Figure 2.3)

In 2012, the Employment and Training Administration (ETA), in conjunction with the Health Professionals Network (HPN) and other technical/subject matter experts from education, business, and industry, convened to develop a comprehensive competency model for the allied healthcare workforce. The model represents various competencies that could provide a competency foundation for preparation in the field of allied health. In 2015, HPN and its members reconvened to update the model which was finalized in April 2016. In addition, to paint a complete picture of changes in the healthcare industry, the name of the model was changed to the Fundamentals of Health Care Competency Model. See Figure 2.4 for a visual example of the model.

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Figure 2.4: Fundamentals of Health Care Competency Model
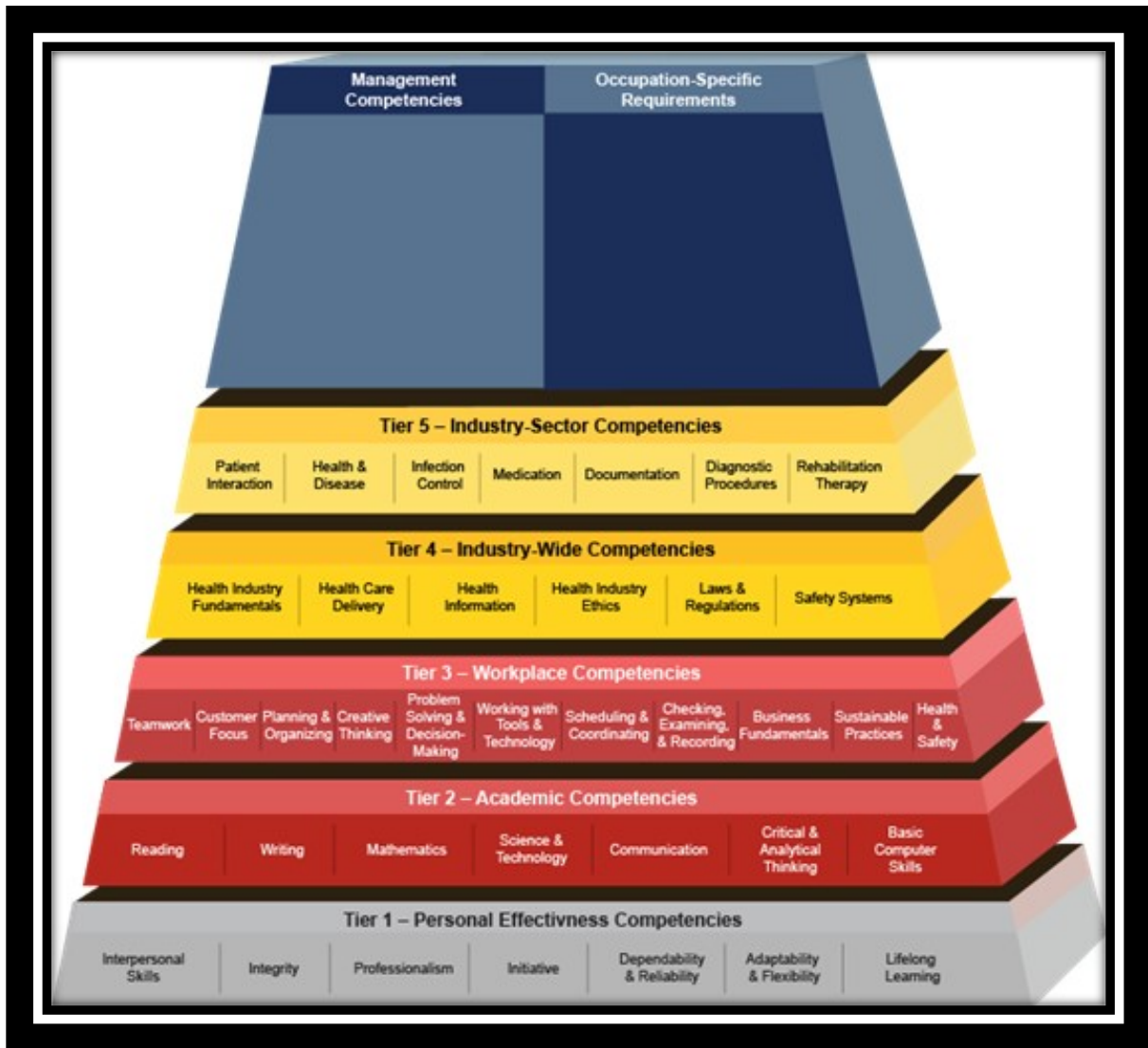
In 2018, the model was revised further to incorporate foundational workplace health and safety skills from the National Institute for Occupational Safety and Health's (NIOSH) Safe • Skilled • Ready Workforce Program, which was designed to help protect America's workforce and create safe, healthy, and productive workplaces (Careeronestop, 2018, para. 1-2).

The Fundamentals of Health Care Competency Model identifies the knowledge, skills, and abilities needed for workers to perform successfully in the Health Care field and is depicted in a graphic consisting of five tiers. The arrangement of the tiers is a pyramidal shape, representing the increasing specialization and specificity in the application of skills as one moves up the tiers. However, the model was not meant to imply that competencies at the top are at a higher level of skill than those at the bottom. The five Tiers are divided into blocks representing competency areas, or the applied skills, knowledge, abilities essential to successful performance in the increasingly specialized environment of the health industry (Department of Labor-Employment and Training Administration [DOLETA], 2011, p. 4).

What is most interesting about the Healthcare Competency Model is that the first three tiers include the competencies and skills that are most desired by today's employers and yet, appear to be those most lacking in new graduate employees. See Figure 1.

Health Science Career Cluster: Diagnostic Services Pathway 2008

The Health Science Career Cluster is one of 16 career clusters that make up career and technical education (CTE) in the United States. Career Clusters help to focus education plans towards obtaining the necessary knowledge, competencies, and training for success in a career pathway. Each cluster is associated with specific career and identified by a unique code. Within the Health Science Career Cluster there are five distinct pathways for learners interested in pursuing a career in healthcare: Diagnostic Services, Therapeutic Services, Health Informatics, Support Services, and Biotechnology Research and Development. This career cluster is also one of the most popular utilized because more than 35% of all CTE learners pursue a career in healthcare (Applied Educational Systems [AES], n.d.

Important for this research is the information for the Diagnostic Services Pathway which is made up of careers that use tests to detect, diagnose, and treat diseases, injuries, or other physical conditions. Many careers within the Diagnostic Services Pathway also require a specialized form of education or training, as well as a specific credential, certification, registration, or licensure, once the education is complete. Common careers that fall under diagnostic services pathway include EKG Technician, Phlebotomist, Radiology Technologist, Dental Laboratory Technician, and Ultrasound Technologist, (AES, n.d).

Even with advances in the education and training of healthcare professionals, job openings in the healthcare and social sector have increased approximately 44%, while job hires increased only 3% since the beginning of 2014. Meanwhile, job separations, retirements, layoffs, quits, etc. - have remained static. Additionally, by the end of July 2015, hundreds of thousands of open positions in the healthcare sector remained unfilled. Thus, it was clear that the growing gap between available healthcare positions and employers' ability to fill those positions, resulting from the rising demand for healthcare services, remains simultaneously constrained by the limited supply of qualified healthcare professionals (Newett, 2016, para. 4).

The Diagnostic Medical Sonography Workforce

The Diagnostic Medical Sonography (DMS) Workforce represents a group of rigorously educated, highly skilled, high-wage healthcare professionals who in most cases, have completed a certificate, associate, or baccalaureate degree from a program that is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) (Andrist, 2003; Society for Vascular Ultrasound [SVU], 2001, p. 4). While pursuing the educational requirements to practice as a sonographer, one will encounter a wide range of both academic and clinical training activities which are designed to prepare the novice sonographer to become

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certified and obtain employment as an entry-level sonographer (Society for Vascular Ultrasound [SVU], 2001, p. 2).

Healthcare organizations and systems differ fundamentally from other types of services in that they more directly address the actual survival of their customers. This makes "getting it right the first time" far more important than for most other service-providing organizations; it is also the reason that healthcare is among the most regulated of all the industries in the world (Garman, 2006, p. 153).

Most employers of healthcare professionals in the United States prefer to hire sonographers, who are experienced, have worked in a similar or comparable healthcare environment and already have the necessary credentials. Even so, because of the high-demand for sonographers, employers will hire new-graduate employees as unregistered sonographers, with the expectation that the sonographer will become registered/credentialed, usually within one year after employment begins (American Society of Echocardiography [ASE], n.d., p. 2). A new graduate from an accredited DMS Program may go on to complete one or more national certifications/credentialing exams to become a Registered Diagnostic Medical Sonographer (American Registry of Diagnostic Medical Sonographers [ARDMS], 2015).

Although employment as a DMS can occur after completion of formal sonography education, and sometimes prior to becoming a credentialed/registered sonographer, most employers of these professionals require new-graduate, entry-level sonographers to become registered or certified within one year of employment, in order to maintain their employment status (BLS, 2020). Thus, the employee studies profusely, takes the board exam, and hopefully completes it successfully to become a registered/credentialed sonographer, while working simultaneously—oftentimes as a full-time sonographer.

Entry-level sonographers often believe that after becoming registered or credentialed, and acquiring full-time employment as a sonographer, that they have everything they need for a successful career in sonography. Unfortunately, this could not be further from the truth. New-graduate, entry-level sonographers, laymen, expert sonographers, healthcare employers, physicians, federal governments, and policymakers must understand that becoming credentialed and gainfully employed, is just the beginning for the new, entry-level sonographer. In fact, they have barely breached the surface of what is necessary to become the expert-level sonographer.

Becoming an expert sonographer requires many years of experience, being exposed to different patients, and patient situations; being exposed to imaging different disease processes and stages of disease; being exposed to various procedures and protocols for scanning; being exposed to different sonographic procedures and equipment types; participation in countless numbers and hours of professional development activities such as traditional workshops, conferences, seminars and online webinars; and spending hundreds, even thousands of dollars in one's career, on these professional development activities.

In addition, and most important for the entry-level sonographer, there is the necessity for hours, days, months, even years of extensive mentoring from expert-level sonographers, radiologists, cardiologists, vascular surgeons, other physicians, and healthcare employees outside the realm of sonography to assist the entry-level sonographer in the transition to the expert-level sonographer and competency (Health Professions Regulatory Advisory Council [HPRAC], 2013; ARDMS, 2015).

Once employment begins, regardless of the status of the employee (entry-level, expert, certified or not); regardless of the employment arena (hospital, medical facility, diagnostic outpatient facility, or physician's office), the sonographer's training, knowledge, skill-

development, professionalism, and thus transition from novice to expert and self-efficacy, begins or continues. Through the process of professional development and mentoring, the entry-level sonographer is transformed into the expert (Health Professions Regulatory Advisory Council [HPRAC], 2013).

Professional Competency

Professional competence for the sonographer, like others in the healthcare sector, requires more than simple knowledge and skills. Competence is critical for the sonography workforce, for employers who will hire them to provide direct patient care, and especially for hospitalized patients who will utilize diagnostic sonographic services as part of their care regimen.

According to Benner (1984), a competent nurse/healthcare professional addresses relevant information in a patient scenario based on hierarchical needs with less dependence on abstract rules to identify what is important or not and increases a sense of personal responsibility for patient decisions. A competent healthcare professional is the gold standard of care for the healthcare sector workforce, overall (O'Conner, 2006).

Valloze (2009) wrote,

A competent nurse can provide excellent care, use sound judgment, understand and effectively implement evidence-based practice in an ever-changing environment, helps advance the profession, and one who stays up to date in his or her practice so that he or she can influence and advance the profession of nursing (Valloze, 2009, p. 116).

These requirements are no different than they are for a competent sonographer, or any other competent healthcare professional.

The field of sonography has evolved and continues to evolve rapidly in terms of both diagnosis and treatment due to modern advances in technology and medicine. Conventional

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ultrasound has been utilized for diagnostic imaging since the 1970s. However, over the past 10 years there have been significant technological improvements within the equipment, as well as development of new technologies, and imaging techniques which have allowed ultrasound to become more widely adopted (Zagoudis, 2016).

Overall, healthcare reform is moving toward utilizing the most cost-effective solution for diagnosis and treatment of disease. Sonography is being used repeatedly to replace costly, invasive, radiological procedures, because sonography, which does not use any ionizing radiation, is more cost-effective and safer for the patient (Nyanue, 2013, para. 10). As new uses for ultrasound procedures continue to be discovered, the demand for skilled sonographers is on the rise. In fact, the Bureau of Labor Statistics (2020), has predicted that the need for skilled diagnostic medical sonography professionals will increase 17% by 2029.

Diagnostic Medical Sonography imaging has been utilized, more often in the new millennium than it ever was in the past, to image areas of the body where it was not traditionally used before (Merton, 2011, p. 1078). These new procedures require appropriate training for entry-level sonographers to become competent. In the United Kingdom, appropriate training in a clinical setting is becoming increasingly difficult given the pressures mounting in terms of increased demand and complexity of examinations, coupled with a shortage of qualified staff and an ageing population. As a result, the demand for a knowledgeable, skilled, qualified, and competent workforce of ultrasound professionals has increased dramatically (Parker & Harrison, 2015, p. 231).

Education and Training

It is important to note that education in Sonography is not the same across all sonography programs. CAAHEP Accredited Sonography Programs often utilize the National Education

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Curriculum (NEC) for Sonography education. The objective of the NEC was to produce a curriculum outline that could assist in the achievement of educational objectives to produce an entry-level sonographer. (Joint Review Committee on Education in Diagnostic Medical Sonography [JRC-DMS], 2008).

The educational requirement for sonography varies from one to four years depending on whether a certificate, associate, or baccalaureate degree is awarded (Commission on Accreditation of Allied Health Education Programs [CAAHEP], n.d.). Although there are many avenues for education in DMS, most practicing sonographers have completed a minimum of an associate degree (Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, [BLS], 2020).

The Commission on Accreditation of Allied Health Education Programs (CAAHEP) represents the organization that grants programmatic accreditation to DMS programs. CAAHEP requires that accredited programs provide a curriculum that includes physical sciences, applied biological sciences, patient care, and clinical medicine, applications of ultrasound, instrumentation, related diagnostic procedures, and image evaluation, to all enrolled learners. In addition, CAAHEP-Accredited DMS programs must also plan for and provide a well-structured, competency-based clinical education as an essential component of the curriculum delivered (CAAHEP, para. 7).

It is important to mention that when it comes to pursuing an educational program for sonography, one should seriously consider pursuing a program that is CAAHEP Accredited. The reason for this is that to obtain credentials or certifications as a Diagnostic Medical Sonographer, most credentialing agencies require applicants to be graduates or completers of an accredited

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sonography program. ("ARDMS Certification," n.d.; "ARRT Credentialing," n.d.; "CCI Credentialing," n.d.)

Certification/Credentials

There are several areas of specialization in the field of DMS that one may be allowed to complete to achieve certification. And, there are three primary organizations offering sonograhy certification exams. The individual, who completes one or more of these specialized exams successfully, will become registered or credentialed to perform as a Diagnostic Medical Sonographer in:

- Abdomen (AB) - evaluation of all the soft tissues, blood vessels and organs of the abdominal cavities (for example, liver, spleen, urinary tract, pancreas)

- Breast (BR) - frequently used to evaluate breast abnormalities that are found with screening or diagnostic mammography.

- Cardiac (AE) - evaluation of the anatomy and hemodynamics (blood flow) of the heart,   its valves and related blood vessels, including Pediatric (PE) and Fetal (FE) Cardiac

- Musculoskeletal (MSK) - evaluation of joints and soft tissue

- Neurosonology (NE) - evaluation of the brain and spinal cord

- Obstetrics (OB)/Gynecology - evaluation of the female reproductive system

- Vascular Technology (VT) - evaluation and analysis of the hemodynamics (blood flow) of peripheral and abdominal blood vessels. (SDMS, n.d., ¶ 4).

The organizations through which certification and credentials as a general, cardiac, or vascular sonographer can be obtained include the American Registry for Diagnostic Medical Sonography (ARDMS), Cardiovascular Credentialing International (CCI), and the American

Registry of Radiologic Technologists (ARRT) (Health Professions Regulatory Advisory Council [HPRAC], 2013, Appendix A Table; https://www.medicaltechnologyschools.com/ultrasound-technician/ultrasound-certification).

Currently, the most recognized sonography credentialing organization is the ARDMS which has provided the opportunity to obtain sonography credentials since 1975. CCI has provided the opportunity for Cardiac and Vascular sonography credentials (only), since 1968, and the ARRT only began to provide the opportunity for sonography credentialing in the 1990s Each organization offers different registry exam types and the provider of the exam (ARDMS, CCI, or ARRT) may be considered by the employer for employment purposes, based on the state, region, and employer needs. ("Ultrasound Tech Certification - ARDMS, ART, CCI," n.d.)

Credential/Certification Maintenance

Once an individual becomes certified/credentialed as a Diagnostic Medical Sonographer, regardless of the credential earned or from which organization, a specific number of professional development or continuing educational units must be completed in a designated amount of time, in order to maintain that credential/certification. Maintenance of Certification (MOC) improves patient care by ensuring continuous lifelong learning and professional development throughout your sonography career. MOC provides employers, patients, and co-workers with confidence in the ongoing value of the credential held. MOC also demonstrates up-to-date knowledge and core clinical skills throughout the sonographer's career. ("Maintain Certification," n.d.)

The amount of continuing educational units or professional development activities necessary to maintain a sonography credential varies, based on the organization from which the credential was granted ("Maintain Certification," n.d.). Additionally, each accrediting organization (ARDMS, CCI, ARRT) must approve of the institute or agency from which CME

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units are obtained. Each agency also performs its own annual audit of a randomly selected group of sonographers to ensure compliance with CME requirements.

For credentials obtained through the American Registry for Diagnostic Medical Sonography (ARDMS) the amount of continuing medical education units (CMEs) varies between ten and thirty CEUs, depending on the credential. Every three years (triennium), the ARDMS requires verification from the registrant that the specific number of CMEs has been completed. If verification is not received by the end of the triennium period, then the ARDMS may place the individual on probation for a period until compliance occurs. If compliance does not occur by the end of the probationary period, the credential will be deactivated. ("Continuing Medical Education (CME) Requirement," n.d.)

For credentials obtained through the American Registry of Radiologic Technologists (ARRT), completion of 24 CME units is required every two years. Finally, for credentials obtained through Cardiovascular Credentialing International (CCI), those with "Registered" level credentials must complete 36 CME units and those with "Certified" level credentials must complete 16 CME units every three years. ("CME Requirements," 2021)

Employment

Once employment begins, regardless of the level of experience, the new employee/entry-level sonographer will be required to participate in a typical organizational orientation which simply orients the employee to the organization itself. Upon completion of orientation, the new-hire immediately becomes responsible for a host of activities and procedures related to the sonographer job description. A typical sonographer job description, according to CAAHEP includes, but is not limited to the following:

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- Obtain, review, and integrate pertinent patient history and supporting clinical data to facilitate optimum diagnostic results.

- Perform appropriate procedures and record anatomic, pathologic, and/or physiologic data for interpretation by a physician.

- Record, analyze, and process diagnostic data and other pertinent observations made during the procedure for presentation to the interpreting physician.

- Exercise discretion and judgment in the performance of sonographic and/or other diagnostic services.

- Demonstrate appropriate communication skills with patients and colleagues. Act in a professional and ethical manner. The American Labor Relations Board defines a professional as one who has advanced education, has had specialized internship, and uses their judgment to perform tasks that cannot be performed in a specified time frame. Image acquisition using ultrasound equipment is solely dependent upon the operator and relies, more than any other type of diagnostic imaging procedure, completely upon the individual competence of the sonographer performing the procedure.

- Provide patient education related to medical ultrasound and/or other diagnostic vascular techniques and promote principles of good health (Commission on Accreditation of Allied Health Education Programs [CAAHEP], n.d., p. 2).

In addition to the job responsibilities outlined by CAAHEP, employers may also utilize standardized job descriptions which have been developed for sonographers and promoted by the Society of Diagnostic Medical Sonography (SDMS). Job descriptions available for sonographers

from the SDMS website include Staff Sonographer, Lead Sonographer, Advanced Sonographer and Sonography Manager. (Society of Diagnostic Medical Sonography [SDMS], 2016)

Sonographers may become employed in a variety of healthcare settings, and although hospitals remain the primary employers of sonographers, employing more than 60 percent of this workforce (Bureau of Labor Statistics, Occupational Employment Statistics [OES], 2019, p. 2), out-patient clinics, diagnostic imaging facilities, and private physician offices, also employ many these healthcare professionals. Within the context of employment, sonographers provide patient care, along with imaging services for interpretation by the physician (Radiologists, Cardiologists, Obstetricians, Vascular Surgeons), and other healthcare entities.

What is most interesting about these healthcare professionals and what sets them apart from all other diagnostic imaging professionals (X-ray, Nuclear Medicine, Cat-Scan, MRI, and Angiography/Special Procedures Technologists), is the reliability upon the sonographer's knowledge and skills. As indicated by Dubose (2015), "Sonography is the most operator dependent, diagnostic imaging modality in modern medicine, and that difference has not received the attention that it deserves." Sonographers are *sonographic anatomists"* (Dubose, 2015, p. 4). The sonographer must be able to recognize normal sonographic anatomy first, before they will be able to recognize abnormal anatomy, and thus provide relevant, focused images which are then used for diagnosis and treatment.

According to Taylor (2004)

".... There is a very important difference between sonographers and other imaging technologists." Other technologists may reject an image because of sub-optimal technical quality, but the sonographer usually rejects over 95% of the scans because they do not provide the diagnosis. The sonographer must be able to produce sonographic images

such that a diagnosis can be made. The physician must be able to interpret those images based on the sonographer's proper documentation of any abnormalities and/or pathologies. This is the unique responsibility of the sonographer. (Taylor, 2004) Finally, the U.S. Government Accountability Office (2007) concluded that "The skill of the sonographer conducting an ultrasound is critical for its use to support a physician's correct diagnosis; poorly captured images can lead to misdiagnoses or unnecessarily repeated exams." (United States Government Accountability Office [GAO], 2007, p. 6).

Findings from several peer-reviewed studies, the Medicare Payment Advisory Commission, and ultrasound-related professional organizations, support requiring that sonographers either have credentials or operate in facilities that are accredited, where specific quality standards apply (U.S. Government Accountability Office [GAO], 2007). Therefore, the transition from entry-level sonographer to the expert sonographer and self-efficacy is vital to the career of the sonographer as well as the integrity of the healthcare facility in which they are employed.

Proficiency in performing diagnostic sonographic imaging, takes years of practice and exposure to develop the expertise necessary to meet these responsibilities. And, as indicated earlier in this study, it is not possible for an educational program to expose every learner to every situation she/he will encounter in the real world of healthcare.

Therefore, how does a new-graduate employee obtain the knowledge and skills development necessary to meet hefty employment responsibilities? How does an entry-level sonographer respond to being responsible for so much, so early in their career? How does she/he adapt to this stressful work environment? What challenges do these healthcare professionals face and subsequently must overcome to remain employed? How does the movement from new-

graduate/entry-level sonographer to the expert-level sonographer and mastery, occur? These questions and others will be answered in the in the following information and data obtained from research participants.

According to Finch and Wilson (2011)

> Sonography is extremely operator-dependent, requiring competent and highly skilled professionals to be a part of the integral health care system. Sonographers have extensive, direct patient contact, providing care to a variety of people from healthy to critically ill. The sonographer is responsible for obtaining pertinent patient history, performing the sonographic examination, providing for the needs and comfort of the patient during examination, and recording anatomy and pathology or other data for interpretation by the supervising physician to aid in diagnosis. Sonography is commonly used in the field of obstetrics and gynecology for purposes ranging from confirming and/or dating pregnancies to diagnosing disease processes of the female reproductive system. Sonographers must have knowledge of normal structure and functional anatomy of the human body and use independent judgment in recognizing the need to perform procedures according to sonographic findings" (p. 9).

A case study research, on the experiences of recently qualified diagnostic medical sonographers identified the following:

> Ultrasound services are now an integral part of the patient-care regimen and newly qualified sonographers emerge from a variety of educational backgrounds. Upon entry into the workplace, they are expected to "hit the ground running", to work autonomously through their own workloads and perform with high levels of accountability and responsibility (Edwards, 2006). These new graduate/entry-level professionals are also

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required to exercise critical judgement and skills to ensure the efficient, effective, and safe delivery of the ultrasound service (Baun 2004). Therefore, responsibility for the conduct, assessment, interpretation, diagnosis, and production of a final report of the ultrasound examination…lies squarely on their shoulders (Phillips, 2015, p. 3).

Challenges Facing the Sonography Workforce

The problems and challenges facing the workforce of sonographic healthcare professionals, (separate from the need for them to be knowledgeable, skilled, and competent), are inherently related to their employment responsibilities. In addition to the requirements for skills, knowledge, and competency, there are other issues facing this workforce that further exacerbates the problems of finding qualified sonographers. These problems include projected growth in the field of DMS as well as vacancies in the field due to retirement, both of which lead to increased demand for these highly skilled professionals. Changes in sonographic equipment and technological advances in sonography also results in an increased demand for competency in sonographers. Finally, an increased demand for sonographic investigation where it was not previously utilized and other issues, have had a profound effect on the need for qualified and competent sonographic professionals.

Projected Growth and Increased Demand for Sonographic Procedures. At the close of 2019, there were approximately 131,700 diagnostic medical sonographers, including cardiovascular technologists and vascular technologists, employed in the United States (BLS, 2020, table 1). The collective fields of diagnostic medical sonography, diagnostic echocardiography, and vascular sonography had a projected growth rate of 12 percent which is three times faster than the national average of 4 percent for most other U.S. occupations. That is, by the year 2029, an additional 15,600 of these healthcare professionals would be necessary to

meet the healthcare demands of the nation's aging population as well as meet the increasing demand for sonographic imaging services. Furthermore, the projected growth in this workforce has also been attributed to the increased demand for the utilization of sonographic imaging because these procedures were determined to be safer and more cost-effective compared to alternative radiological procedures (Merton, 2011, p. 1078).

Vacancies Due to Stress and Burnout. Stress and burnout are as real for the sonography workforce as they are for any other healthcare profession. Today's sonographers are overwhelmed with stress caused by several contributing factors, including:

- Staff shortages lead to increased stress and more responsibilities for those employees who are left behind. The remaining sonographers may feel abused, misused, and underappreciated. Sonographer turnover may also lead to stress and burnout because those who remain in the workplace are expected to do more with less/limited access to adequate resources.

- Compassion fatigue experienced by sonographers results from their day-to-day stressful relations with patients who were going through difficult medical situations. Symptoms of compassion fatigue may include physical fatigue, sleep disruption, headaches, body aches, and/or an increased susceptibility to infection.

- Job dissatisfaction can also lead to stress and burnout. Items such as inadequate guidance, lack of consultation, lack of communication, increased number of patient procedures, lack of supervisor support, and environmental uncertainty.

Any or all of the factors listed above can an often do lead to sonographer stress and burnout resulting in many healthcare professionals including sonographers exiting the workforce (Walvoord, 2006).

Vacancies Due to Retirement. Finally, growth and demand for these healthcare professionals occurs due to vacancies in the field resulting from retirement and vacancies resulting from professionals who vacate the field for other reasons (Bass, 2011, p. 1). Unfortunately, even with the growing demand for skilled and knowledgeable healthcare professionals, there remains a severe shortage of these healthcare professionals.

Lack of Specialized Mentoring for Entry-level Sonographers. In addition to the shortages in the available workforce, there is also a lack of procedures and processes to facilitate mentoring programs for sonographers and other healthcare professionals. That is, the importance of and formal procedures for delivering inter-professional mentoring in the field of DMS represents, to a large extent, unchartered waters. Mentoring, as a partnership in personal and professional growth and development, is central to academic medicine, but it is challenged by increased clinical, administrative, research, and other educational demands on medical faculty, that is, their everyday responsibilities. Therefore, evidence for the value of mentoring healthcare professionals, regardless of the discipline, should be evaluated (Sambunjak, Straus, & Marusic, 2006, p. 1103).

There is little known about formal mentoring in the field of sonography and even less scholarly research dedicated to its study. What is a mentor? Does formal mentoring occur in the workplace for sonography professionals, and if so, how, when, and where does it occur? More important is the question of "who" is responsible for mentoring these healthcare professionals once employment begins. Extensive research on mentoring workforce professionals has been performed in the field of business, social-work, nursing, and other healthcare industries. Unfortunately, empirical research on the importance of professional development and mentoring of sonography healthcare professionals is, for the most part, absent or not readily available

because although mentoring is perceived as an important part of academic medicine, the evidence to support this perception is not strong (Sambunjak et al., p. 1103).

Other Reasons for Shortages in the Sonography Workforce. There are at least two sides to the shortage issue—*recruitment and retention*. This includes recruitment of new appropriately educated and qualified sonographers to the profession, and retention of those who are currently practicing (Andrist, 2003). According to the Australian Sonographers Association (ASA, 2011), the number of sonographers entering the workforce is insufficient to meet the growing skills requirement. Shortages of sonographers have persisted for more than a decade, and a recent decline in local sonography student numbers will have a further negative impact on the sustainability of the sonography workforce (Australian Sonographers Association [ASA], 2011). In the U.S., as the "Baby Boom" generation, the largest composition of the nation's current workforce, ages and retires, the overall number of sonographic procedures will increase, while the number of qualified sonographers available to replace that workforce continues to decrease.

Additional Challenges Facing the Sonography Workforce. The following problems also exist and are related to the perceptions of workforce readiness in the field of sonography:

(1) According to the Bureau of Labor Statistics (BLS) "On-the-job Training, or additional training needed (postemployment) to attain competency in the skills needed in the occupation of DMS, is not necessary" (BLS, U.S. Department of Labor, OOH, 2019-2029, table. 1). Unfortunately, this statement by the BLS could not be more erroneous. Sonography is a constantly changing/ever evolving field, just like any field of medicine and therefore requires all participants to remain up to date in both knowledge and skills in order to provide the patient with the best quality of care (ARDMS, 2015).

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(2) Little information is available on how and when the transition of the entry-level to the expert, takes place. What is the process? What individuals are involved? Does the sonographer-to-sonographer inter-professional collaboration, the physician-to-sonographer collaboration, or the sonographer-to-other healthcare professional collaboration have any effect on transforming the entry-level sonographer into the expert?   An extensive amount of research is available demonstrating the importance of mentoring in the professional development of entry-level nurses and their transition to the "expert" nurse however, the transition of the sonographer from the entry-level/advanced beginner to the expert sonographer has not been previously grounded in theory.

(3) Most entry level sonographers are unaware of, or truly don't understand, despite attempts by sonography educators to reinforce the knowledge, that although they may have completed a formal sonography education program (regardless of the degree type); may have become registered as a diagnostic medical sonographer; and may have obtained gainful employment, they will not have the knowledge and skills to be considered an "expert-level sonographer" for many years after completion of their formal education.

Chapter Two Summary

Chapter two presented a detailed literature review beginning with definitions of workforce readiness, competency and employability skills. Historical perspectives on necessary workforce readiness skills and workforce readiness theories were presented in detail, followed by a review of scholarly inquiry on the lack of workforce readiness and competence of our nation's youth and specifically new graduate/entry-level employees. Additionally, the workforce readiness needs of new graduate/entry-level healthcare professionals was described, including a

detailed description of the education, training, credentialing and workforce readiness skills and competencies of the healthcare professionals known as Diagnostic Medical Sonographers.

Finally, chapter two concludes with a view into what a competent sonographer should look like, as well as the education and training that goes into producing professional competence for the Diagnostic Medical Sonography workforce.

It was the hope of the researcher that through this chapter, readers would begin the journey of understanding the literature that described the workforce employability skills and competencies necessary for success in the workplace—from the past to the present day. And, more importantly, understand that with all that has been written, described, mandated, and idealized in educating and training to prepare America's youth, and new college graduates for entry into the workforce—America's youth and college graduates, as the research consistently suggested, continue to be unprepared to enter the workplaces of the new millennium.

Chapter three will provide an in-depth discussion and outline of the research methodology, design approach, participant selection, data collection, and analysis procedures for this qualitative descriptive research.

CHAPTER 3: METHODOLOGY

Introduction

In this chapter, the researcher provided background on the philosophy and method of Qualitative Descriptive Research (QDR) and reviewed relevant empirical research utilizing that methodology. The steps that were taken to conduct research and practices utilized to eliminate or reduce the flaws in methodology, which could lead to weak, invalid, unreliable, and unusable results, were also described (Heppner & Heppner, 2004, p. 108).

This chapter allowed the researcher to reiterate the primary research questions in a concise manner based on the literature review; provided an overview of the primary research perspective and design approach, which should guide the reader in contextualizing the methodology; described the population and selection process and the researcher role; reiterated the primary research questions; addressed participant informed consent, interview method, and confidentiality; as well as the potential ethical issues associated with data collection and analysis procedures.

The qualitative approach to research data analysis, discussed in detail later in this chapter, offered a way for the researcher to reflect on the "quality measures" or trustworthiness of the study, through the four inter-related components of: Credibility, Transferability, Dependability, and Confirmability (Devault, 2019).

Qualitative Research Methodology

During the latter half of the 20th century, there was an increased interest in qualitative research which has its origins in anthropology, sociology, the humanities, and evaluation, because of the value it added in addressing matters of equity and social justice (Creswell, 2014, p. 13). Additionally, for the qualitative researcher, meanings and interpretations are negotiated

with participant (the data sources) because it is the participants' perspectives and perceptions that the researcher attempts to reconstruct. Qualitative studies are appropriate and often derive information when there is a lack of literature available on a topic – while quantitative studies traditionally revolve around a problem for which there is an abundance of literature available (Simon & Goes, 2013, p. 95).

The dimensions of qualitative research include a) understanding context, or how economic, political, social, cultural, environmental, and organizational factors influence the workforce readiness of new graduate/entry-level employees; b) understanding people and how they make sense of their experiences in the workplace; c) understanding interaction and how the various actors involved in the workplace interact with each other (Nigatu, 2009, p. 6). "Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem" (Creswell, 2014, p. 4).

Qualitative research is most often conducted to understand the contexts in which research participants address a problem or situation; to minimize the power relationships that exist between researcher and participants; or to follow up on quantitative research and help explain the mechanisms or linkages in causal theories (Creswell, 2007). However, rather than using quantitative methods which measure and predict—the qualitative researcher uses contextually thick descriptions and rich data to describe and interpret findings (Rossman & Rallis, 2003).

Qualitative Descriptive Research (QDR) Methodology, Features and Examples

Qualitative Descriptive Research is a label used in qualitative research for studies which are descriptive in nature, particularly for examining health care and nursing-related phenomena (Polit & Beck, 2014). This research method is widely cited and has been identified as important and appropriate for research questions focused on discovering the who, what, and where of

events or experiences and gaining insights from informants regarding a poorly understood phenomenon (Kim et al., 2017, p. 1-2). Qualitative descriptive designs tend to be eclectic methodologically and are based on the general premises of constructivist inquiry. These studies produce findings closer to the data ("data-near") than studies within such traditions as phenomenology or grounded theory. Nonetheless, good qualitative descriptions still have some interpretive obligations (Polit & Beck, 2014, para. 3).

Performing qualitative research, such as QD and phenomenology, are methodologies commonly used in the healthcare sector, and researchers often rely on these and similar qualitative methodologies as a way of understanding the "nature or essence" of the lived experiences of healthcare research participants (Rodriguez & Smith, 2018). Moreover, "similar to other types of qualitative research, inquiries utilizing QDR typically represent efforts to understand poorly understood phenomena that do not lend themselves readily to quantification" (Polit & Beck, 2011, para. 2).

A QDR design approach is particularly relevant where information is required directly from those experiencing the phenomenon under investigation, those directly involved in the activities or events in question, and where time and resources are limited (Bradshaw, Atkinson, & Doody, 2017, p. 1). Additionally, the inquiries in QDR are based on direct descriptions from (or observations of) the individuals who have experienced the phenomenon. Samples are typically small. Data are most often derived from loosely structured interviews with study participants, including both individual interviews and/or group interviews.

QDR could effectively capture the perspectives and experiences of the participants in this study and was therefore chosen as the research methodology. This research represents a qualitative study of the "voice" of senior-level sonographers' as they provide their perspectives

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on (1) the skills and competencies necessary for their workforce group, (2) the workforce readiness and competence of their new graduate/entry-level colleagues, and (3) the ability of new graduate sonographers to apply necessary workforce readiness skills to a real-world clinical setting.

QDR Features

Qualitative Descriptive design is one that is philosophic in tradition, influenced or informed by one or more of the major qualitative designs (ethnography, phenomenology, narrative theory, grounded theory, and others), yet is limited in scope (e.g., research question, sample size, data generation and analysis methods, and interpretation) to allow a clear description of a specific phenomenon or experience from the perspective of the individual doing the experiencing (Magilvy & Thomas, 2009, p. 299).

Another feature of the QDR design is that research can be conducted within a naturalistic or organic setting to seek out some facet within the social world (Sandelowski, 2000). Additionally, as explained by Rossman & Rallis (2003), "the researcher is the means through which the study is conducted" (p. 5). Thus, the researcher must use a well thought out but flexible approach to research through which knowledge about the phenomenon or subject of research emerges, without the use of a formal hypothesis. That is, the researcher uses the reasoning processes of induction, deduction, reflection, and inspiration to describe, analyze, or interpret qualitative data (Rossman & Rallis, 2003).

QDR differs from other qualitative methods in that the terms of analysis, the aim of QDR is neither thick description (ethnography), theory development (grounded theory), nor interpretative meaning of an experience (phenomenology), but a rich, straight description of an

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experience or event based on the perspectives of the individual who experienced that event (Neergaard et al., 2009, p. 2).

Other features of the QDR approach include:

(a) a broad range of choices for theoretical or philosophical orientations, (b) the use of virtually any purposive sampling technique (e.g., maximum variation, homogenous, typical case, criterion), (c) the use of observations, document review, or minimally to moderately structured interview or focus group questions, (d) content analysis and descriptive statistical analysis as data analysis techniques, and (e) the provision of a descriptive summary of the informational contents of the data organized in a way that best fits the data (Colorafi & Evans, 2016, p. 17).

Finally, as mentioned earlier, QDR is the least "theoretical" of the qualitative approaches to research because researchers performing these studies are rarely confined to a particular theory or committed to a particular philosophy (Sandelowski, 2000, p. 337). However, the reader must note that although the researcher may not have commitment to a particular theory, it does not imply that theory had no influence on the research at all. According to Sandelowski (2010), every word is a theory; the very way researchers talk about their subject matter reflects their leaning, regardless of whether they present these inclinations as theory or philosophy, or even recognize them as such (p. 79).

Examples of Relevant Empirical QDR

As mentioned earlier, qualitative description design has been used often in healthcare related research. This design type is particularly relevant where information is obtained directly from those experiencing the phenomenon under investigation, where time and resources are

limited, and where researchers seek to discover and understand a phenomenon or the perspectives and worldviews of the people involved (Bradshaw et al., 2017, p. 1).

QDR design was utilized by Mackintosh (2007) in her research with registered nurse participants. The aim of her research was to explore and describe, based on the perspectives of her participants, how qualified nurses working with in, in-patient surgical areas cope with the daily experiences they are exposed to (Mackintosh, 2007, p. 982). Mackintosh's research involved semi-structured interviews using open-ended questions with 16 registered nurses as research participants.

Based on research findings, which indicated that students may leave higher education without mastering independence or academic literacy skills effectively, (Borglin & Fagerstrom, 2012), utilized QDR to explore the nursing student's view of crucial academic literacy skills, such as critical thinking and appraisal and academic writing. Data collection for research consisted of focused interviews with eight nursing students. The interviews were transcribed and analyzed using content analysis to identify two emerging themes.

Additionally, due to ongoing concerns regarding the quality of education in communication skills for nurses and other healthcare professionals, (Shorey, Siew & Ang, 2018) also used QDR design to explore first year nursing students' experiences of the blended learning design adopted in a communication module. Data collection for this research consisted of collecting the reflections submitted by 74 students. Data analysis was performed through thematic analysis to reveal six overarching themes.

Similarly, QDR was utilized by Lillibridge (2007), in her attempt to explore and determine the satisfaction level of commitment to the preceptor role, and to highlight positive and negative aspects involved when placing students in the clinical setting with nurse preceptors

instead of faculty as clinical instructors (Lillibridge, 2007, p. 46). Her research data was obtained from five participant nurse preceptors who were interviewed utilizing a semi-structured interview process.

Another QDR study, and one most resembling the research presented in this study, was performed by Baumberger-Henry (2012). In her study Baumberger-Henry utilized the data obtained from the perspectives of experienced nurses on what it was like to work with new graduate/entry-level nurses in the emergency room or critical care areas. Through data obtained using a semi-structured interview process with focus-group participants, she was able to identify two emerging themes that encompassed the participants' experience (Baumberger-Henry, 2012, p. 301).

Features of this QDR Study

Selection of Research Participants – Purposeful Sampling

According to Magilvy & Thomas (2009),

The sample for a qualitative descriptive study is often smaller than in other qualitative designs and is conveniently and purposively selected. The participants in this type of research must have several qualifications: They have experienced the phenomenon identified for the study; they must be able to communicate with the researcher; and they are willing to tell their stories (usually audio recorded) to a researcher interested in learning about their experiences. A typical sample size for a qualitative descriptive study may be as few as three to five persons, ranging up to about 20 participants. (p. 299)

Sample sizes in qualitative research are typically small because the researcher controls who is selected for the interview by making sure the sample is both appropriate and adequate,

based on the phenomenon being studied. Often, a sample of eight to ten participants may be all that is necessary for saturation to occur in qualitative research (Simon & Goes, 2013).

In purposeful or purposive sampling, a sample group is selected that is believed to be representative of a given population (Simon & Goes, 2013). Moreover, Hycer (1985) posits that, "the phenomenon dictates the method of sampling, including the type of participants" (p. 156). The researcher used purposeful and maximum variation sampling for selecting research participants. That is, participants were selected because of their ascendency from entry-level sonographers to senior-level sonographers and thus, had "living through it" experiences associated with the phenomenon under investigation. Moreover, participants were also selected because of their experience working side-by-side with new graduate/entry-level sonographers in the workplace.

Through the process of purposeful sampling, the researcher selected 12 senior-level/expert sonographers to participate in research because they "could purposefully inform an understanding of the research problem and central phenomenon of the study" (Creswell, 2007, p. 125). In addition, purposive sampling was used based on the rationale for inclusion of specific participants, events, or processes (Rossman & Rallis, 2003). The appropriateness of the sample was more important than quantity or randomness and included participants who best articulated the needs of the study by being "good" informants.

To identify additional participants or potential respondents to research, Snowball Sampling, also known as Chain Referral Sampling, technique was also used. Snowball sampling represents a method of expanding the participant sample by asking one participant to recommend others who possess those characteristics that were of research interest (Groenewald, 2004).

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Demographic data was collected from all participants which was used to describe each participant individually and assisted the researcher in deriving meaning from the participants' perspective. The demographic data collection included the following information: age, gender, number of years of experience as a sonographer, educational background and training for sonography, employment facility type, the number and type of certifications held, and experience working with new graduate/entry-level sonographers.

Primary Research Questions

According to Creswell (2007), "drafting a central research question or questions often takes considerable work because of its breadth and the tendency of some to form specific questions based on traditional training" (p. 27). Qualitative researchers should state the broadest, open-ended question(s) possible about the research problem and which will help to guide the study. Creswell (2003).

Typically, open-ended questions garner responses from participants in their own words and captures their ideas about how things work. In QDR the researcher collects narratives from participants by asking quality, open-ended questions and probing to solicit responses. The following primary research questions guided this study:

1. What skills/competencies are necessary for success in the workplace as a Diagnostic Medical Sonographer?

2. What are the perceptions/perspectives of senior-level sonographers on the competency/workforce readiness of their new graduate, sonographer colleagues in the clinical setting?

Procedures for Informed Consent to Participate in Research

Approval to conduct the study was granted by an internal review board from my institution. Permission to record the interviews was obtained from the participants, and an informed consent form was discussed and signed before the interviews began. Additionally, the participants were informed that they could withdraw from the study at any time, and that fictitious names were used in the transcripts to protect each participant's identity. The interviews were conducted over a specified length of time.

Seidman (1986) recommended that the consent form should inform participants of what they will be asked to do, for what purposes, and of any risks they might be taking by participating in the research. Glesne (2006) states that through informed consent, potential study participants are made aware:

1. That participation is voluntary.

2. Of any aspects of the research that might affect their well-being; and

3. That they may freely choose to stop participation at any point in the study (p. 132). The consent form developed for this study followed these recommendations and included information on the research purpose, the procedural steps to be followed by each participant, the benefits and risks of research; and measures taken to protect the participants' confidentiality. In addition, the consent form included a clause that informed participants that they could withdraw or refuse to participate at any time during the research process.

Approval for this study was sought and granted by the university's Institutional Review Board (IRB). The IRB protocol was meticulously adhered to in obtaining approval for the Primary Research Questions (Appendix A), the Invitation to Participate in the Research Study (Appendix B), the Consent Form (Appendix C), and the Interview Questionnaire/Survey with guiding questions (Appendix D). Another form developed by the researcher was a notification to

those participants who were not selected to participate in research (Appendix E). This form
served to inform participants that their consent to participate in research was sincerely
appreciated, however, they did not meet one or more of the requirements necessary to participate
in research.

An additional form utilized for research during follow-up conversations with participants
was the researcher's Field Notes Form (Appendix F). This from was used to clarify any
questions the researcher may have had from her review of the participant's initial survey and to
ask any additional questions.

Participant Interview Protocol and Data Collection Procedures

In qualitative descriptive research the primary source of data collection is most often
semi-structured in-depth interviews however, other methods are not discounted. In addition to
semi-structured interviews, qualitative researchers have obtained data through collection tools
such as document reviews, field notes, classroom observation, questionnaires, and focus groups,
etc. (Bradshaw et al., 2017). According to Taylor & Francis (2013),

> The underlying epistemological assumption in seeking participants' lived accounts from
> semi-structured interviews is that the information gathered constitutes valid and valuable
> knowledge, relative to participants' unique contexts of time, place, and personal
> experiences described the qualitative in-depth interview as being more like conversations,
> than formal events with predetermined response categories (p. 207).

Both telephone and face-to-face, semi-structured interview processes were used to gather data
and to uncover the truth as revealed through participants' perspectives and experiences
(Sandelowski, 2000). Participants were also given the option to complete the interview
questionnaire on their own and return it to the researcher upon completion. When it appeared that

the respondent had no further data to report, the researcher asked, "Is there anything else you can think of, or would like to add regarding your experience? Each interview was terminated after a negative response to that question (Wengraf, 2001, p. 136)

The research Questionnaire/Survey with guiding questions (Appendix C) were used to bracket the research topic and acted as a deterrent from collecting data that might have been useless in describing the phenomenon under review (Moustakas, 1994).

During each interview, the researcher was careful to consciously set aside her own experiences and observations from the past and attempt to view the experience fresh and anew, through the perspectives and experiences of participants.

According to Heppner & Heppner (2004), descriptions of the interview protocol help respondents and readers to understand the contents of the interviews as well as the rationale for having specific questions in the interviews (p. 162-163). Thus, the interview protocol for this research was explained to each participant in advance of beginning the interview, as follows:

- Participants were informed that the entire interview would be audio recorded and that all information gathered was strictly confidential.

- Participants were informed that they could op-out of being audio-recorded.

- Participants were informed that they could opt to complete the survey questions on their own and return to the researcher.

- Participants were informed that they could withdraw from the research process at any time and choose not to answer any question or questions.

- The purpose of research and the purpose of the interview were re-stated.

- A list of "warm-up" (demographic) questions were provided along with a discussion and explanation of why these questions were being asked.

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- Respondents were referred to a copy of the full interview protocol and the researcher discussed examples of questions that would be asked.

- The flow of the interview questions, from beginning to end, was discussed, and the dimensions of the phenomenon/events/activities of interest was clearly defined.

- Open ended questions were utilized to help facilitate participants' recall of the phenomenon/events in question.

- The researcher's intent to understand the participants experiences/perspectives on the investigated phenomenon were re-stated.

- Audio recordings, if utilized, were transcribed verbatim immediately after conclusion of the interview.

- Finally, participants were given a copy of their transcribed interview, and one week to review for correctness, and to validate that the content correctly captured the intent of their responses.

- Research participants were not involved in the data analysis process.

Audio recordings were made of each interview (where participant consent was given to record) and transcribed verbatim after each interview and prior to conducting any subsequent interviews. However, many participants opted to complete the questionnaire on their own and return it to the researcher within one week of receiving the questionnaire. The process of personally transcribing all audio recordings assisted the researcher with becoming familiar with the data collected. That is, dialogue on the audio recordings and researcher-reflection helped to identify the participant sonographers' lived experiences with, or perspectives on, the phenomenon (Moustakas, 1994). During the follow-up questions, the researcher utilized phone-

interviews, which were also recorded with participant approval, and the researcher's Field-Notes Form (Appendix F) to record responses. Participant interviews lasted anywhere from 45 minutes to 1.5 hours, and the follow-up phone conversations lasted a minimum of 45 minutes to a maximum of 1hour.

It is important to note that after a comprehensive review of the participants' responses to the survey questions, the researcher added two questions to the Field Notes Form for participants to respond to (Appendix F). Participants were again informed that they were under no obligation to answer any of these questions either. The two additional questions presented to the participants during the follow-up conversations consisted of the following:

1. Other than communication, critical thinking, conflict resolution/problem solving, teamwork/collaboration, and attention to details, are there any other skills necessary for success in the workplace as a diagnostic medical sonographer?

2. In your opinion, is the practice of sonography a low, medium, or high stress workforce discipline?   a. Why?   b. Do any of the things mentioned in part a contribute to the struggle's new graduate/entry-level employees may face?

Once the transcripts were complete, each participant received a copy of their verbatim transcript in an email attachment, for additional review and validation of their responses. Participants were given one week to review their transcript and provide additional information, clarification, or make revisions before forwarding the transcript back to the researcher. In addition, the researcher participated in a continuous dialogue with research participants via phone and email to ensure that participants' concerns were addressed, and any research-related issues resolved.

Procedures for Maintaining Participant Confidentiality

The protection of human subjects and the confidentiality of the participants remained the utmost importance throughout this research study (Rossman & Rallis, 2017). The researcher explained in detail the purpose of the research and informed the participants that if they become uncomfortable, they could stop participation at any time. In addition, all participants were informed that participation in research was voluntary and that they could terminate their participation at any time before, during or after the research process.

The data from research was stored in a locked cabinet. Access to the data was limited to the researcher only, until the completion of the data collection and research study, to protect the confidentiality of the participants. Data was destroyed 7 years after publication per UNLV Policy. Any hard copies of the coded participant's data the researcher needed was kept in the researcher's private/personal folder, also under lock and key.

All participants were requested to submit a formal address or email address where the transcripts could be sent for participant debriefing. Each participant and all the data obtained for that participant (interview transcript, field notes form, audio-recordings, consent form, etc.) received a fictitious name/unique code or identified, which was used in the transcripts to protect the participant's identity. Protection of anonymity and confidentiality was explained in the informed consent. After informed consent was obtained, the audio recorder was turned on and the researcher began asking the guiding questions.

Procedures for Ensuring Trustworthiness/Rigor in Research

Trustworthiness in research refers to the degree of confidence in the data, interpretation, and methods used to ensure the quality of a study. The various aspects or criteria of trustworthiness, also known as "Rigor", in qualitative research have been described by the concepts: *credibility, dependability, transferability* and *confirmability* (Bradshaw et al., 2017, p.

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5-6; Connelly, 2016). These principles were first introduced and developed in the 1980s by Lincoln & Guba (1985) to facilitate the description of rigor within qualitative research.

Credibility. Simon & Goes (2013) defined credibility as "the 'truth,' value, or 'believability' of the findings that have been established by the researcher" (p. 105). Credibility in research can be achieved "through an extended, trusting, and confidential relationship between researcher and participants, rather than through the establishment of the psychometric properties of research instruments" (Greneheim & Lundman, 2004, p. 286). Moreover, the researcher must consider four objectives related to credibility:

> (a) defining the target population; (b) how these individuals will be selected for inclusion in the study and the procedures to be used to sample from the source; (c) how many participants the researcher ultimately wants to include in the study; and (d) strategies to maximize the researcher's ability to gain access to and cooperation from the people of interest (Roller & Lavrakas, 2015, p. 22).

Thus, to contribute to a richer variation of the phenomenon being studied for this research and to enhance credibility, participants were identified through their membership on a Sonography Program Advisory Board Committee. These committee members were employed in the local community as Sonographers, represented employers of entry-level sonographers, and has experience working with entry-level sonographers in the clinical setting.

Each Advisory Board Committee member was sent an initial introductory request (Appendix B) via email to participate in research. The request identified the purpose of research, the specific requirements for participation, and information on how to contact the researcher. Although there were 18 individuals who were interested in participating in research, 12 were

selected based on their length of employment as a sonographer and their experience working side-by-side with entry-level sonographers in the clinical setting.

The remaining six individuals were not selected to participate in research because they were either missing the number of years of employment/experience necessary to be defined as a senior level/expert sonographer, and/or they had little/no experience working with a new graduate/entry-level sonographer in a clinical setting. Those individuals not selected to participate in research were sent another email notification which thanked them for their willingness to participate in research and explained why they were not selected to participate in research (Appendix E). The communication also advised that although they were not selected to participate in research, they were welcome to request a copy of the final research manuscript from the researcher.

Every participant who was selected for research was contacted by the researcher for an initial discussion about the research purpose and were then provided with a consent to participate along with interview details. The twelve sonographers selected for interview, represented various genders, ages, credentials, workplace types (hospital, out-patient facility, physician's office, mobile office, or entrepreneur). Each participant verified their experience and length of continuous employment as a Diagnostic Medical Sonographer, as well as their experience working with entry-level sonographers.

 Finally, upon completion of the interview transcript, each participant received a copy of his/her transcript and one week for review and revision to ensure that their comments and experiences were captured appropriately. More importantly, the researcher was familiar with all participants through either a previous working relationship or previous instructor (researcher)-

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student relationship. Thus, a rapport between the researcher and the participants had already been established.

Dependability. According to Lincoln and Guba (1985), dependability seeks the means for addressing the factors of instability and of phenomenal or design induced changes." (p.299). To address this concern, open dialogue between the researcher and participants, as well as between the researcher and experts on the dissertation committee were maintained for input and direction. This was done to ensure that the data captured from participants represented their experiences, as they intended.

Procedures utilized by the researcher to foster dependability included maintenance of an audit trail of process logs and peer-debriefings with a colleague. The researcher utilized process logs/notes taken of all activities that occurred during the research process from start to finish, to include decisions made about any aspect of the study, such as whom to interview, how the interview should be facilitated, what items to have on hand during the interview, any observations made by the researcher before, during, or after conclusion of research, thoughts during the transcription of interview data, etc. (Connelly, 2016, p. 435).

Confirmability. The strategy needed to ensure confirmability in research is known as an audit trail. The audit trail represents detailed notes on all decisions made about the research and data analysis progresses. Qualitative researchers are responsible for providing a complete set of notes on decisions made during the research process, research team meetings, reflective thoughts, sampling, research materials adopted, emergence of the findings and information about the data management (Connelly, 2016; Korstjens & Moser, 2018).

Thus, to enhance confirmability and transparency in research, the research maintained a very specific audit trail. Notes maintained by the researcher include all documents utilized in

research (initial letter, consent, questionnaire, field-notes forms, and audio-recordings), notes taken during both in-person and phone interviews; researcher thoughts/ideas/personal biases during research, and detailed notes on any changes made at any level of the research process. In addition, the researcher also included notes in the audit trail about her own conceptual lens, explicit and implicit assumptions, preconceptions/biases, and values, and how these may affect research decisions in all phases of the study (Korstjens & Moser, 2018, p. 121).

Transferability. The extent to which the findings can be transferred to other settings or groups, represents its transferability. It is the researcher's responsibility to provide a 'thick description' of the participants and the research process, to enable the reader to assess whether findings are transferable to their own setting (Korstjens & Moser, 2018, p. 122).

The author of research can provide suggestions about transferability, but it is the reader's decision about whether the findings are transferable to another context (Polit & Beck, 2014). However, to address this concern and facilitate transferability, the researcher provided a clear and distinct description of culture and context, selection and characteristics of participants, data collection and thematic analysis procedures. The research process and findings were also presented in rich and vigorous (straight…not thick) descriptions together with appropriate quotations to enhance transferability.

It is important for the reader to note that according to Neergard et al (2009), QDR differs from other qualitative methods in that,

> During analysis, the aim of QD is neither thick description (ethnography), theory
> development (grounded theory) nor interpretative meaning of an experience
> (phenomenology), but a rich, straight description of an experience or an event. This
> means that in the analytical process and presentation of data, researchers using QD stay

closer to the data, and the final product is a description of informants' experiences in a language similar to the informants' own language. (Neergaard et al., 2009, para. 11)

Data Analysis Procedures for QDR

According to Baptiste (2001), "Regardless of the field of practice, disciplinary allegiance, research purposes or designs, there are four phases to all qualitative data analysis (QDA): (1) defining the analysis, (2) classifying data, (3) making connections between and among categories of data, (4) and conveying the message/write-up" (para. 4).

Moreover, because data analysis involves so much decision making—so many judgments—it can be especially vulnerable to a researcher's predispositions, expectations, biases, and values, such that true objectivity may not be possible in qualitative research (Leedy & Ormond, 2016, p. 301). Therefore, as recommended by Leedy & Ormond (2016), the following strategies were utilized to enhance the trustworthiness and rigor of research findings:

1. Strive for balance, fairness, and completeness in data analysis and interpretation.

2. Analysis procedures were carefully documented.

3. In your final report, be upfront about your personal biases. (p. 301)

For this research, two methods, *Content Analysis* **vs** *Thematic Analysis* of QDA were reviewed for data analysis to determine the one most appropriate for the study (Vaismoradi, Turunen, & Bondas, 2013). Selection of the method for data analysis was based on research methodology, the constructivist philosophical assumptions of the researcher, researcher experience, the nature of the research problem and the types of data for which the problem called (Leedy & Ormond, 2016, p. 292), as well as the ultimate goals and objectives of research.

Thematic Data Analysis

Although either Content or Thematic procedures could have been used to perform data organization and analysis, and both methods shared commonalities across several procedural steps, *Thematic Analysis*, as outlined by Ian Baptiste (2001), and further expounded upon by Braun & Clarke (2006), was chosen as the method for data organization and analysis.

According to Baptiste (2001), "Regardless of the field of practice, disciplinary allegiance, research purposes or designs, there are four phases to all QDA: defining the analysis, classifying data, making connections between and among categories of data, and conveying the message/write-up" (Baptiste, 2001, p. 3). And, as expanded by Braun and Clarke (2006), Thematic Data Analysis includes the following six phases: familiarizing yourself with the data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes, and producing the report. (Braun & Clarke, 2006, p. 87).

Phases of Thematic Data Analysis

Phase 1: Becoming Familiar with the Data. To accomplish this step, the researcher immersed herself in the data to become familiar with the depth and breadth of the data content. Immersion in the data involved 'repeated reading' of the data in an active way, while simultaneously searching for meanings, patterns and so on. Notes and ideas for coding were noted in the researcher's reflective journal. For those participants who consented to be audio recorded, a verbatim and rigorous transcript of the interview data was completed. Verbatim transcription of the data helped the researcher develop a more thorough understanding of the data, and further facilitated the interpretative skills necessary for data analysis (Braun & Clarke, 2006, p. 87-88).

Phase 2: Generating Initial Codes. It is important to note that coding and recoding during thematic analysis of qualitative data is an ongoing process. After becoming familiar with

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the data and identifying, through comments in the reflexive journal, what stood out or was interesting about the data, initial codes were developed. Coding was performed manually although there were software options available for coding qualitative data. As initial codes were identified, data extracted from participant responses was added to a particular code. All data extracts were coded, and similar data extracts were correlated together and placed under a particular code. If a data extract did not match an existing code, then a new code was developed, so that by the end of the coding process there were more than 50 initial codes developed (Braun & Clarke, 2006, p. 88-89).

Phase 3: Searching for Themes. The 50 initial codes were reviewed repeatedly, and codes with similar characteristics and similar data extracts were grouped together to form categories which served as the foundation for developing the initial data themes. That is, different codes were combined together, and their data extracts reviewed to identify overarching themes. It is important to note that some codes were utilized to form main themes, others formed sub-themes, and still others were discarded. Additionally, some codes did not appear to fit into any theme and were therefore placed in a "miscellaneous" category or theme (Braun & Clarke, 2006, p. 89-90).

Phase 4: Reviewing the Themes. This phase of thematic analysis involved two levels of reviewing and refining the initial themes. Level one involved reviewing all the coded data extracts by re-reading them for cohesiveness and formation of a coherent pattern that validated the individual theme. Level two of this phase involved coding of any additional data within the themes that may have been missed during the earlier coding stages.

Both Level 1 and Level 2 of Phase 4, were performed to determine if the initial themes were an accurate reflection of the meanings in the data extractions aligned with that theme and

the data set – overall. That is, based on review of the data extractions, codes, and themes, it was determined if the initial themes were an adequate reflection of how everything fit together, and told the overall story about the data. By the end of this review and re-review of the initial themes and data, the initial themes were either revised and finalized, or finalized as they were (Braun & Clarke, 2006, p. 91-92).

Phase 5: Defining and Naming Themes. During this phase of the thematic analysis the researcher finalized the themes that would be presented in research for analysis and analyzed the data within each theme to identify the 'essence' of what each theme was about. This phase also included a determination of what aspect of the data each theme captured.

Additionally, during this phase, the researcher considered each theme individually, as well as each theme in relation to the others. The researcher noted in her reflexive journal, the story told by each theme and how that story fit into the broader overall story being told about the data, in relation to the primary research questions (Braun & Clarke, 2006, p. 92).

Phase 6: Producing the Report. The final phase of thematic analysis, "the Write-up" outlined specifically in Chapter four of this qualitative study, contained enough data extracts to demonstrate the prevalence of the themes involved. Chapter Four of this qualitative study details the finalized themes gleaned from the data review/re-review processes and "provides a concise, coherent, logical, non-repetitive and hopefully interesting account of the story being told by the data, both within and across themes" (Braun & Clarke, 2006, p. 93).

Procedures for Addressing Ethical Dilemmas in Research

Ethical issues in research must be addressed and handled with care at every stage of the dissertation process especially when human subjects are involved. Therefore, in keeping with the objectives outlined within the Belmont Report, and although complete freedom from harm

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could not be guaranteed, extensive measures were taken to decrease the potential for harm to participants of the study.

Approval to perform research was approved/granted by the university Institutional Review Board (IRB) Human Subjects Committee prior to beginning research or the collection of any data. In addition, there were no unusual or sensitive ethical issues noted during the data collection process. Finally, all participants were provided with specific information on who to contact should they have any concerns related to the research or data collection processes.

Researcher honesty was tantamount with the participants who were informed of the risks for participating in the study and the measures taken to protect their anonymity and confidentiality. Participants were made aware of the protection efforts made to prevent public access to audio tapes, transcripts, researcher's journal, and reflection notes.

Participants were not coerced or forced to participate in any way. The statement of informed consent was read by the researcher verbatim, prior to turning it over to the participants for their review and signature. Participants were afforded ample opportunity and time to read the consent and ask any questions, nor were they rushed through the process.

In addition, to address the ethical dilemmas related to having taped interviews (i.e., copyright law violations, libel, and invasion of privacy), all interviews, whether in-person or over the phone, occurred while the researcher/interviewer was in a private location and without the possibility of interruptions. Interviews ranged from 45 minutes to one hour. the recorder was not turned on until the participant felt comfortable and gave consent to have his or her responses recorded. The participants provided verbal permission to record their responses and that permission was also recorded and included at the beginning of each interview recording, as suggested by (Wengraf, 2001).

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Finally, each interview was assigned a unique code or identifier to protect the participants' identities. Each interview was recorded on a separate cassette, and each cassette was labeled with the assigned interview code (Groenewald, 2004, p. 48). Violations of anonymity during transcribing the tape or in writing the results were avoided by carefully describing the participant in a way that could not uncover their identity. Additionally, researcher reviews of audio files occurred behind closed and locked doors.

Wengraf (2001) asserted,

Participant should be warned about making assertions about others on tape that could result in a lawsuit from publishing or repeating information from a taped interview" and to "be aware of the possibility of defamation, or false statements that harms someone's reputation" (p. 185).

Participants were therefore cautioned, in advance of the interview, that describing others and their actions can prove to be incriminating or embarrassing, and thus were asked to refrain from using specific names of people, places and facilities or "personal identifiers", during the interview. More important, publishing personal information and/or intimate details of an individual's life should not be done unless necessary. This practice is well understood by healthcare professionals, due to the Health Insurance Portability and Accountability Act of 1996 (HIPPA).

HIPAA compliance policies represent United States legislation that provides data privacy and security provisions for safeguarding medical information. Prior to beginning the interview, the researcher discussed how participants' names could be changed to disguise their identity and informed all participants that they could discontinue the interview at any time and were not required to answer any question(s) they chose not to.

Only behaviors and experiences that were verbally relayed and relevant were researched; the researcher maintained an open, respectful, and collegial relationship with participants that was free from coercion or manipulation. The researcher took the ethical stance of personal accountability, through caring, valuing individual expressiveness, empathizing, and sharing of emotions" (Denzin & Lincoln, 1994, p. 22). In addition, the researcher utilized bracketing of her personal assumptions before data were collected to ensure accuracy and eliminate bias (Lincoln & Guba, 1985)

Chapter Three Summary

Chapter three provided brief details on the difference between quantitative and qualitative research methods. An introduction to the methodology utilized for research and the rationale for choosing a qualitative research method for the study were discussed. The chapter addressed the core tenets of the Qualitative Descriptive Research Methodology, the design of the study, the approach to participant selection, the research instrument, data collection and data analysis procedures.

This chapter also outlined the strategies utilized to improve trustworthiness/rigor of research through researcher actions that aligned with adding credibility, confirmability, dependability, and transferability to the research data and results, as well as protection of research participants' confidentiality. Finally, this chapter provided specific steps for how data were analyzed and addressed how ethical issues, that can be associated with qualitative research, were handled.

It was hoped that through this research and the quality measures put into place at the data collection, analysis, and reporting phases of the research design, that worthwhile, actionable

conclusions and recommendations for the users of research, could be achieved (Research Design

Review: A Discussion of Qualitative and Quantitative Research Design Issues, 2017, para. 1).

CHAPTER 4: RESULTS OF DATA ANALYSIS AND THEMES

Introduction

Chapter Four represented the findings and results of data analysis to include participant demographic data, details on primary themes, data extracts, from participant comments, and additional data findings.

The intent in conducting research was twofold. First, to identify the necessity of specific skills/competencies for the success as a Diagnostic Medical Sonographer, and second, to obtain a deeper understanding of the workforce readiness, or lack thereof, of entry-level sonographers in the workplace. The skills identified by the literature as missing in new graduate/entry level employees, and those most important for research were communication (reading, writing, speaking, and listening skills), critical thinking, problem-solving, interpersonal/teamwork, and attention to details skills.

Chapter four provides basic demographic details about the participants, data obtained from the research instrument (questionnaire/survey), and the prevalent themes gleaned through the process of thematic data analysis. Four primary themes (positive contributions to the workplace; fear or lacking self-confidence; not taking the initiative; and unrealistic self-expectations) were identified through data analysis. Various data extracts from participant comments are included in this chapter to support the final themes and demonstrate how they support the overall research and address the primary research questions.

Finally, this chapter provides additional data extracts (specific comments) made by participants on recommendations for how both educators and employers can help to better prepare new graduate sonographers for success in the workplace, through activities that would assist them with the school-to-work transition and promote success in the workplace.

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About the Survey Instrument/Questionnaire Utilized for Research

The survey instrument/questionnaire utilized for research (Appendix D) was divided into three sections. Section One represented questions about participants' demographics (age and gender), experience (both as a sonographer and working with new graduate/entry-level sonographers), credentials, and employment/clinical setting type (hospital, diagnostic imaging facility, out-patient facility, physician's office, entrepreneur, etc.).

Section Two of the questionnaire was composed of two sections, 2a and 2b. Part 2a was a Likert scale and represented a list of competencies for participants to identify as important or not for the sonography workforce. Part 2b consisted of five open-ended questions related to the participants' own personal experiences as a sonography professional.

Section Three of the questionnaire also consisted of two parts, 3a and 3b. Part 3a was a Likert Scale for participants to rate the ability of new graduate/entry-level sonographers to demonstrate competency—or not, in various workforce skills, and part 3b consisted of six open-ended questions which guided participants to discuss their perspectives on the competency of the new graduates/entry-level sonographers they either work with currently, or previously worked with in the clinical setting.

Data Analysis Findings - Section One of the Research Survey Instrument

About the Research Participants

Because the researcher was an instructor in an accredited sonography program, a member of the Advisory Committee for the program, an accreditation site visitor for sonography programs, and possessed more than 30 years of experience working as a sonographer in the clinical setting, there were numerous contacts available to choose from for research participation. However, to be representative, the sampling procedure sought participant variation in terms of

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age, gender, education level, years of clinical experience and clinical practice/area of employment.

Demographic data collected from participants included age, gender, educational background, credentials, clinical setting/employment type, length of time employed as a sonographer, and experience working with entry-level sonographers. In addition, for the purposes of this study, a senior level/expert employee was defined as a lead or staff sonographer who graduated from an accredited sonography program, who was credentialed/board certified in at least one sonographic specialty and possessed eight or more years of continuous employment as a sonographer in the clinical setting.

Research participants were also selected based on having experience/s working with new graduate/entry-level sonographer(s). Although new graduate/entry-level sonographers did not serve as respondents to research, they were defined, for the purposes of research, as a graduate of an accredited sonography program, who possessed at least one sonography credential or was certification eligible, with ≤ 3 years of experience working in the clinical setting as an entry-level sonographer.

Finally, "recent" experience working with new graduate/entry-level of sonographers was defined as having at least one experience (lasting six months or more) working side-by-side with one or more new graduate/entry-level sonographers in a clinical setting, either currently, or within the last year.

Participant Demographics, Experience, Credentials, and Employment/Clinical Setting

As suggested by Sandelowski (2000), the researcher utilized a semi-structured and open-ended interview guide to avoid limiting responses and to encourage participants to express themselves freely.

The researcher received 18 inquiries from potential research participants however, there were 12 sonographers selected from those who volunteered to participate in research. Eight of the participants were women (66.67%) and four were men (33.33%). Although participants primarily represented women, it is important to note that according to demographic data from Zippia.com, pertaining to these healthcare professionals in the U.S, "among diagnostic medical sonographers, 79.9% of them are women, while 15.9% are men. And, among cardiac/vascular sonographers, 62.9% of them are women while 30.0% are men" ("Diagnostic Medical Sonographer: Demographics in the US," 2021, para. 2; Cardiac/Vascular Sonographer: Demographics in the US," 2021, para. 2). Therefore, it appears that the gender disparity in the research participants closely resembles the gender disparity in the sonography workforce overall.

All participants were older than 21, with ages ranging from 38 to 58 and averaging between 35- to 45-year-old range.

Ten participants were former graduates of an accredited Sonography Program and two were cross trained from a related discipline in Radiology. The total number of years of experience working as a sonographer for all participants combined was 220, with an average of 18.33 years. All participants possessed a minimum of eight years of experience and continuous employment as a Sonographer in a clinical setting and therefore had attained the level of expert-sonographer as defined in the research.

Every participant possessed one or more credentials or certifications in Sonography, to include Abdominal, Ob-Gyn, Vascular, Adult Echo, Pediatric Echo, Neuro, Breast, and Fetal Sonography. Most participants (75%) possessed a minimum of three credentials in diagnostic, cardiac, or vascular sonography, or a combination thereof.

Employment/clinical setting type for participants varied between physician offices, diagnostic imagining facilities, hospitals, out-patient facility, entrepreneur, or educational facility, and all participants had extensive experience working side-by-side with entry-level sonographers in the clinical setting. Ten participants (83%) indicated that they were currently working with one or more new graduate/entry-level sonographers in their employment setting, while the remaining two participants (17%) indicated having worked, within the last six months, with one or more new graduate sonographers in a clinical setting.

Data Analysis Findings - Section Two of the Research Survey Instrument

Prior to discussing the resulting themes that were identified through data analysis, the researcher thought it relevant to discuss the two Likert Scales utilized for Section Two and Section Three of the survey instrument and the related responses to questions 2a and 3a.

Although the use of Likert Scales is not typical in qualitative research and is more aligned with quantitative studies, the use of the Likert Scales in this qualitative study provided the researcher with additional thoughts and questions which were addressed during the follow-up conversations with participants.

Participant ratings represented by Section Two (question 2a), and Section Three (question 3a), are separately depicted for each question, respectively, in the form of two individual Likert Scales which are demonstrated in Figures 4.1 and 4.2 below.

About Section Two (Question 2a) of the Research Survey Instrument

Section Two (Question 2a) of the survey asked participants to rate certain competencies/skills related to their importance in becoming a competent and successful Diagnostic Medical Sonography professional. The scale ratings included the following (1) Not

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Important, (2) Somewhat Important, (3) Very Important, and (4) Crucial. Table 4.1 represents

participant ratings/responses related to Question 2a of the survey instrument.

Table 4.1: **Survey Section Two (Question 2a): How Important are the Following Skills for the DMS Professional?**

	Attention to Details	Interpersonal (Teamwork)	Conflict Resolution	Problem Solving	Critical Thinking	Communication Skills			
						Reading	Writing	Listening	Speaking
P1	4	2	4	4	4	4	4	4	4
P2	4	4	3	4	4	4	4	4	4
P3	4	3	4	4	4	4	4	4	4
P4	4	3	4	4	4	4	4	4	4
P5	4	3	4	4	4	4	4	4	4
P6	4	3	4	4	4	4	4	4	4
P7	4	3	4	4	4	4	4	4	4
P8	4	3	4	4	4	4	4	4	4
P9	4	4	4	4	4	4	4	4	4
P10	4	3	4	4	4	4	4	4	4
P11	4	3	3	3	4	4	4	4	4
P12	4	3	4	4	4	4	4	4	4
Total Score	48	37	46	47	48	48	48	48	48
Average Score	4.00	3.08	3.83	3.92	4.00	4.00	4.00	4.00	4.00

Note.
(P) = Participant
(1) = Unimportant
(2) – Somewhat Important
(3) = Very Important
(4) = Crucial

Although multiple competencies were listed on the questionnaire for participants to consider, details provided here only pertain to the skills/competencies identified in the literature review as missing in new graduate/entry-level employees. The objective in asking this question was to verify that the skills and competencies identified by the literature as missing in new graduate/entry-level employees were still relevant or necessary for these healthcare professionals.

Participant ratings on the importance of various skills and competencies, as gleaned from the Likert Scale for question 2a, revealed that the skills and competencies identified by the literature as missing in new graduate/entry-level employees, were rated by participants as either very important (3) or crucial (4) and were therefore considered to be necessary for the competency and success of these healthcare professionals in the workplace. The maximum number of points any skill could receive was 48 points. (See Table 4.1)

Findings Associated with Question 2a of the Survey Instrument (Table 4.1)

Based on responses from participants, it appears that the interpersonal skill "teamwork skills" although important, did not rate as high as other skills and competencies, for the success of the sonographer in the workplace.

Interpersonal/Teamwork Skills. Based on Question 2a and the participant ratings identified in Table 4.1, most of the skills received a rating of three or four as related to its importance to the success of sonography healthcare professionals. And, as mentioned above, the maximum number of points any skill could receive was 48 points. However, interpersonal/teamwork skills, although rated as very important with an average rating of 3.08, also received the lowest number of total points (37), and the lowest average rating (3.08). Participant comments related to the importance of interpersonal/teamwork skills were as follows:

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Teamwork is important, but Sonographers are required to work independently. We must know what is required for every exam and often we use our own judgment to change/modify an exam based on the patient or other limitations.

Portable ultrasounds are usually performed by one person. I use my knowledge, skills and experience to make sure that the correct images are taken, and pathology identified appropriately.

Performing an ultrasound adequately is primarily dependent on my knowledge and skills as a sonographer. My colleagues are great when I have a question about something, but when it come to my exams, its all about how well I can demonstrate that the anatomy is normal or not.

Sonography is extremely operator dependent. We must be able to use the knowledge, skills and experience we have to perform adequately and appropriately. There is not always someone around to ask or assist. You are quite often, on your own.

Therefore, based on participant comments, the interpersonal skill "teamwork" although important, it is not as important for success as a Diagnostic Medical Sonographer as other skills and competencies were deemed to be.

Additional Findings Associated with Section 2a of the Survey Instrument

As the researcher reviewed participant survey data, she wondered if there were additional skills necessary for competency as a Diagnostic Medical Sonographer, that had not been discussed or mentioned in Section 2a of the survey instrument. Therefore, an additional question was added to the Researcher Field Notes Form (Appendix F), for participant responses.

During the follow-up conversations participants were asked the following: "Are there any additional skills/competencies, not listed on the initial survey instrument which are necessary for success as a Diagnostic Medical Sonographer in the workplace?" In response to this question, participants identified additional skills, not mentioned by the literature as missing in new graduate/entry-level employees but which were considered, nonetheless, to be very important for success in the workplace for these healthcare professionals. The additional skills mentioned by participants were related to Customer Service Skills.

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Healthcare, like many other industries, is a customer service industry. The industry and the customers served can live or be unduly harmed based on the quality of services provided, and the interactions between the employees and patients/customers. Thus, the first step toward improving customer service in a healthcare organization is to first see the patient as more than just a paying customer, but as a person/human being with wants, needs, and feelings, that the healthcare organization/professional are designed to help.

Every employee in a healthcare entity should approach his/her job with a customer-service mind-set, be focused on providing the best care possible to support not just the patient, but the healthcare entity overall ("Customer Service," n.d.). The Customer Service Skills mentioned by participants as important for this workforce included (Sympathy, Empathy, Compassion, and Patience).

Customer Service Skill – Sympathy. Dictionary.com defined sympathy as "harmony of or agreement in feeling, as between persons or on the part of one person with respect to another; the fact or power of sharing the feelings of another, especially in sorrow or trouble; fellow feeling, compassion, or commiseration. That is, sympathy is the ability to feel bad for another person without experiencing what it is like to walk in that person's shoes. ("Sympathy," n.d.). Participant comments related to demonstrating "sympathy" in the workplace, were as follows:

> Entry-level employees should be able to identify with how the patient feels and understand why the patient may not be cooperative and then…not hold it against the patient.

> Sometimes they (entry-level) employees concentrate too much on trying to get the exam done and they forget that the patient is a person too.

> Another skill that entry-level employees should have is sympathy. Every healthcare worker should be able to sympathize with the patient's situation, pain, feelings, or emotions.

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Customer Service Skill – Empathy. Dictionary.com defined empathy as "the psychological identification with or vicarious experiencing of the feelings, thoughts, or attitudes of another. That is, empathy is the ability to imagine oneself in the situation of another and experience the emotions, ideas, or opinions of that person ("Empathy," n.d.). Participant comments related to demonstrating "empathy" in the workplace, were as follows:

> New graduates should be able to take their time and feel what the patient feels. Once you can feel what the patient feels, or how the patient feels, then you become more sensitive to the patient needs.

> Patients are here because they are in pain or because they have an underlying physical or pathological issue. Entry-level employees do not always know how to put themselves in the patient's shoes and feel what the patient feels.

> A good bedside manner is crucial! Our exams are very personal and at times invasive. We are very close to the patient as we examine their anatomy. Treat them like your own family members or imagine how you would want a Sonographer, or any healthcare professional to treat you or one of your loved ones.

Customer Service Skill – Compassion. Merriam-Webster Online Dictionary defined compassion as "a feeling of deep sympathy and sorrow for another who is stricken by misfortune, accompanied by a strong desire to alleviate the suffering. That is, compassion is the ability to demonstrate kindness, concern, toward those who may be in pain or experiencing great difficulty. ("Compassion," n.d.). Participant comments related to "compassion" were as follows:

> All healthcare professionals should be compassionate and willing to help the patient whenever possible. Sometimes a kind word or a hand placed on a shoulder, or even a smile can go a long way in making a patient feel better. Entry-level employees don't always understand that.

> New graduates need to be able to imagine that the patient is one of their family members and treat the patient like they would if they were family. Offer to assist the patient before leaving the room. Fluff the pillow, lower the bed, raise the bed so that the patient can sit up, or offer an encouraging word. It only takes a minute to offer comfort to someone in pain or who doesn't feel well.

Sometimes, if you just encourage the patient, let them know that you really care about them and how they feel; that you hope they feel better soon. Those things go a long way in improving the patient's attitude.

Taking the time to listen can make the patient feel comfortable and improve the quality of care. There will be times we see abnormalities/pathologies that can change the course of a patient's life and their family. Kindness and compassion can go a long way—the patient will never forget it or you.

Customer Service Skill – Patience. Dictionary.com defined patience as "the quality of being patient, as the bearing of provocation, annoyance, misfortune, or pain, without complaint, loss of temper, irritation, or the like; an ability or willingness to suppress restlessness or annoyance when confronted with delays; quiet, steady perseverance; even-tempered care; diligence" ("Patience," n.d.).

Frustration occurs, and in healthcare, frustration often abounds! That is, healthcare professionals often deal with individuals (patients) who are in pain, stressed or who are physically, emotionally, or mentally struggling. Patients experiencing such symptoms don't often act their best, and the patient's family members can also behave inappropriately because they are stressed and worried about a sick loved one. Participant comments related to demonstrating "patience" in the workplace, were as follows:

I tell all the new graduates that I have worked with that the greatest skill they can master, in addition to quality scanning skills is patience. They must be patient with others, with physicians, family members, non-physician healthcare professionals, and themselves.

Becoming frustrated or upset because you can't get the unborn baby in position to take the correct image won't help. Be patient and wait for the baby to move. New graduates need to know that they can't control every situation and to obtain the best images they can within that situation. They still have the opportunity to explain all challenges in their sonographer impressions.

I watched one entry-level employee get upset because the patient was combative, struggling, or resistant, and wouldn't hold still. I told the new graduate to be patient, do the best you can, get the best images you can. Often the patient has no control over their behavior, especially if suffering from a mental illness.

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They just graduated! They often have no idea that they still have so much more to learn. Sometimes new graduates become frustrated because they don't know something. They just need to understand that it might take them several more years, after graduation, before they become comfortable with Sonography. They need to relax, be persistent, and patient. It will come!

I worked with one new graduate who became frustrated trying to perform an ultrasound on a toddler. The toddler was all over the place…doing what toddlers do. Sometimes you have to kick the parents out of the room or bring the parents into the room (depending on the toddler… and the parents). Either way, becoming frustrated never makes a difficult situation better. Be patient!

About Section 2b (Question 4) of the Research Survey Instrument

Section 2b of the survey instrument consisted of five open-ended questions. Question 4 asked participants "In your opinion how long (in years) of continuous employment, beginning with the initial entry into the workplace, does it take to become a competent Sonographer?" The reason for asking this question was for the researcher to obtain a better idea or understanding of the length of time it may take for competency to occur once a new graduate/entry-level sonographer begins employment.

Findings Associated with Section 2b (Question 4) of the Research Survey Instrument

Participants' responses in Section 2b, to Question 4 were quite varied and consisted of the following comments:

At least two years of full-time continuous employment. But competency in sonography is continuous. Competency requires the willingness to learn constantly and apply that knowledge to scanning skills.

2 years. However, the field of sonography is a very individuals experience. Some entry-level sonographers excel in their first year, while others never achieve competence, remaining uncertain, unable to complete exams in a timely manner, and having no motivation to continue their own professional development. Thoe individuals don't remain in the field very long.

3 to 5 years before the entry-level sonographer has been exposed to the most common procedures and sonographic pathologies. However, no matter how many years have elapsed, when a sonographer changes jobs and moves to a different workplace, training begins all over again. No two facilities are alike. Competency as a sonographer is based

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on the willingness to adapt, learn new protocols and technologies, and regular participation in professional development activities…not the number of years of employment.

4 years minimum, but there is always the need to learn something new, especially learning how to perform procedures using sonographer where it was never utilized before.

5 years. After five years of continuous employment, you should be able to hold your own in Sonography. However, I learn something new every day.

At least three to five solid years of scanning, continuing education, follow-up with patients' official records and laboratory results, becoming competent in viewing other diagnostic imaging modalities that correlate with ultrasound.

It depends on the number of exams the sonographer is exposed to. A sonographer employed in a busy facility, exposed to approx. 8 exams/day, five 5 days/week can become competent in six months to 2 years. However, in a poorly populated area where the sonographer may only perform 4 to 5 exams/day, 2 to 3 days/week, it make take 1 to 2 years minimum to become competent.

I'm not sure how many years it takes to feel competent in Sonography. After 14 years in the field, I am still learning. There is not a day that goes by that I don't learn something new.

5 to 10 years, but that only applies to sonographers who continue their education and professional development.

Hard to say! Varies by individual. Depends on the determination of the sonographer. Typically, 3 to 5 years after employment begins. However, the length of time varies depending on the determination to learn through professional development and adapt to new technologies and techniques. It could take more or less time. Unfortunately, even after being in the field more than 5 years, there is always something new to learn. Sonography is an ever-changing modality.

Although participant responses to this question were quite varied, one common denominate across all participants responses was the need for professional development and training for all sonographers, regardless of the number of years they had practiced in the field.

About Section 2b (Question 5) of the Research Survey Instrument

An interesting fact regarding the Sonography workforce, identified during research for this study, was information published by the Bureau of Labor Statistics-Occupational Outlook

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Handbook (Summary Table) regarding Diagnostic Medical Sonographers and Cardiovascular Technologists and Technicians, including Vascular Technologists. If you visit the website and within the Quick Facts Summary Table, click on the question mark next to "On the Job Training" a note will be displayed. According to the note displayed, "there is no additional training needed (post-employment) to attain competency in the skills needed in this occupation" (BLS, 2020, table 1). Figures 4.1 and 4.2 represent visual screenshots of the table from the Handbook.

Figure 4.1: BLS Quick Facts: Diagnostic Medical Sonographers, and Cardiovascular Technologists and Technicians, Including Vascular Technologists
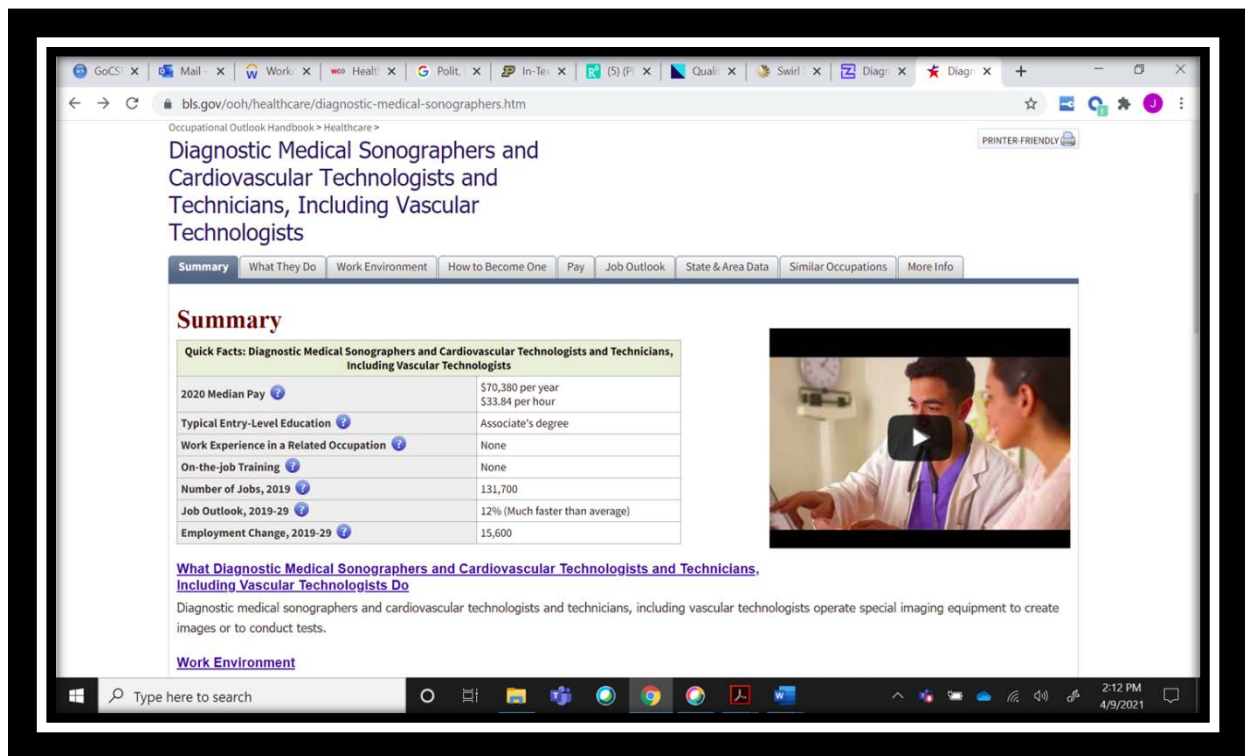
Note: Retrieved from https://www.bls.gov/ooh/healthcare/diagnostic-medical-sonographers.htm

Figure 4.2: BLS Quick Facts: On-the-Job Training for Sonographers
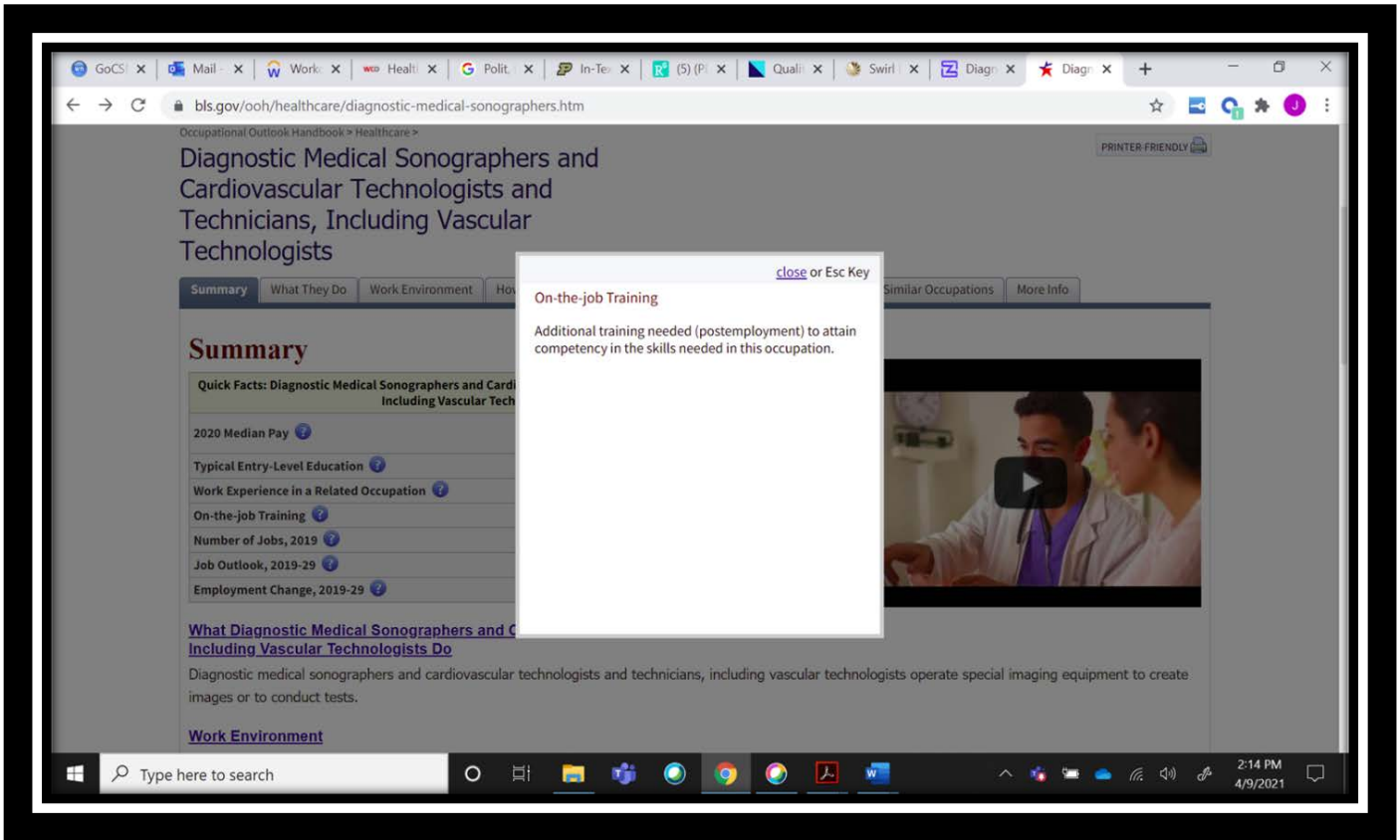
Note: Retrieved from https"//www.bls.gov/ooh/healthcare/diagnosic-medica-sonographers.htm

Findings Associated with Section 2b (Question 5) of the Research Survey Instrument

In Section 2b, Question 5, research participants were asked the respond to the following statement: "There is no additional training needed, once employment begins, to attain competency in the skills needed to perform as a Diagnostic Medical/Cardiovascular/Vascular Sonographer." Responses to the statement revealed that all 12 participants (100%), disagreed. Participant comments regarding the statement were as follows:

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The day you feel like there is nothing more to learn as a sonographer, no matter how many years of experience you have, is the day you have decided to stop progressing toward becoming a great sonographer.

The ARDMS (American Registry for Diagnostic Medical Sonography) continues to implement new registry/credentialing exams. Additional skills and training may be necessary to obtain those credentials. The day a sonographer stops learning or achieving new skills or competencies—is the day they become closed-minded and possibly unprepared for newer technology, improved scanning protocols and pathological diagnosis.

What??? Whoever said that has never practiced as a Sonographer. The statement is both false and misleading. The field of sonography is ever-changing due to technological advances, new protocols, and the use of sonography where it had never been used before. And don't even think about changing employment from one facility to another. That's like becoming a new graduate all over again. Sonographers ae always learning and should never stop!

Sonographers are required to participate in professional development activities to maintain their credentials. This is necessary because the field changes rapidly and we must be sure that our knowledge and skills are in-step with those changes. Otherwise, we become stagnate and not of much use to the employment facility or our patients.

Because sonography is relatively non-invasive and inexpensive compared to other diagnostic imagining modalities, it is being used more and more to diagnose disease processes and pathologies. Often sonographers are being required to perform ultrasounds on areas of the body where ultrasound was never used before, like musculoskeletal ultrasound and intrauterine fetal echo. You never know what you will be required to do as a sonographer until you have to do it. Training and attempted competency never ends…nor should it.

I possess credentials in Abdominal, Obstetrics/Gynecology, and Vascular Sonography. To maintain those credentials, I am required to obtain a specific number of continuing medical educational units in the form of professional development activities every year. These completed continuing educational units must be submitted to the credentialing agency (ARDMS). If I don't maintain my credentials this way, then the ARDMS can deactivate my credentials. If no additional training was necessary, then there would be no need for me to remain current in best practices for performing ultrasound procedures.

Data Analysis Findings - Section Three of the Research Survey Instrument

About Section Three (Question 3a) of the Research Survey Instrument

This portion of the questionnaire/survey instrument asked participants to rate new

graduate/entry-level sonographers' ability to demonstrate these competencies upon entry into the

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workplace. Although multiple competencies were listed on the questionnaire for participants to consider, details provided here only pertain to the skills/competencies identified in the literature review as missing in new graduate/entry-level employees. The objective in asking this question was to provide an overall picture of the perceptions/perspectives of senior-level/expert sonographers, on the abilities of their new graduate colleagues to apply certain skills adequately and appropriately in the clinical setting.

Findings Associated with Question 3a of the Survey Instrument (Table 4.2)

Based on Question 3a and the participant ratings identified in Table 4.2, each skill listed could receive a maximum rating of four for a total of 48 points. However, the reader will note that very few participants provided a rating of four for their new graduate colleagues. The researcher did not consider this to be unusual since the participants were rating the competency of new graduate/entry-level employees who were new to the workplace.

Most participants rated their new graduate colleagues as " competent" in many of the skills listed, except for "attention to details", "conflict resolution", and "critical thinking" skills, which received the lowest overall ratings of 2.2, 2.3, and 2.2, respectively, and the lowest overall scores of 26, 28, and 26, respectively. In addition, the communication skill "writing" received the lowest average rating (2.7) and score (32 points), as compared to the other skills listed under communication. Participant comments related to new graduate sonographers "writing" skills were as follows:

> New graduates don't know how to structure their written "Sonographer Impressions". They struggle with how to tell the patient's story…in summary. That is the summary of the ultrasound performed.

> Sonographer impressions become a part of the patient's medical/legal record. New graduates struggle with what words to use, how to implement ultrasound-specific terminology, measurements, pathology, overall findings/results. Writing Sonographer Impressions takes time and practice.

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Sonographer Impressions are important. The Radiologist uses them to get an overall picture of the exam performed. New graduates don't always know how to write their impressions of the ultrasound performed to include patient history, measurements of normal anatomy, descriptions (size, shape, location) of any anomalies or pathologies, or details of the results of the exam.

Most new graduate sonographers struggle with writing that final summary of findings, once the ultrasound exam is complete. They don' know how to tell the patient's "Story" or concisely summarize the entire exam. The summary should include the patient's history (prior medical and surgical history and current symptoms), the results of the ultrasound performed to include (normal anatomy, abnormal anatomy, location, size, shape, and sonographic appearance of any pathology/anomalies). Every patient story is different, and the patient story is different for every ultrasound performed. The story can certainly be different from one patient to the next, but it can also change between different ultrasounds performed on the same patient.

The reasons for the low ratings and overall point values for "attention to details",

"conflict resolution", and "critical thinking" skills, should become clear in the next section of

data analysis under the identified themes.

Table 4.2: Survey Section Three (Question 3a): Rate New Graduate/Entry-level Sonographers Abilities to Demonstrate these Skills/Competencies Appropriately in the Clinical Setting.

| | Attention to Details | Interpersonal (Teamwork) | Conflict Resolution | Problem Solving | Critical Thinking | Communication Skills | | | |
						Reading	Writing	Listening	Speaking
P1	2	2	2	3	1	3	3	3	3
P2	2	3	2	3	2	3	2	3	3
P3	2	3	3	3	2	4	2	3	3
P4	3	3	2	3	3	3	3	3	3
P5	2	3	2	3	2	3	2	2	3
P6	2	3	3	3	3	3	3	3	3
P7	3	3	2	3	3	4	3	3	3
P8	3	3	3	3	3	3	3	3	3
P9	2	3	2	3	2	4	3	3	3
P10	2	3	3	3	2	3	3	3	3
P11	2	3	2	3	2	3	2	3	3
P12	1	3	2	3	1	4	3	3	4
Total Score	26	35	28	36	26	39	32	38	37
Average Score	2.12	2.92	2.33	3.00	2.17	3.25	2.67	3.17	3.08

Note:
(P) Participant
(1) Needs Improvement – Not yet demonstrating the skill/competency required. Additional training necessary.
(2) Inconsistent – Needs occasional reminding, mentoring, or instruction.
(3) Competent – Demonstrates the skill with few exceptions/mistakes; willingness/eagerness to improve when mistakes are made.
(4) Advanced – Consistently demonstrates competency; exceeds expectations; emerged as leader improving the team, overall.

Thematic Data Analysis and Resulting Themes

Data obtained from participants' responses to the survey instrument were analyzed through the process and steps of Thematic Data Analysis, as described in Chapter three of this manuscript.

Responses and content were extracted from participant recordings, questionnaires, and fieldnotes forms for consistency and similar meanings, which led to the identification of various data patterns and major themes. Data saturation was achieved in that once no new information was identified, or when redundancy began to appear during the data analysis process, data collection ceased (Saunders et al., 2017, p. 1896).

Four primary themes were extracted from the data related to the competency of new graduate/entry-level sonographers in the workplace. The final four themes were: (1) positive contributions to the workplace, (2) fear or lacking self-confidence, (3) not taking the initiative, and (4) unrealistic self-expectations.

Theme 1: Positive Contribution to the Workplace

Every participant mentioned positive contributions that new graduate/entry-level sonographers brought to the workplace. Positive comments about new graduate/entry-level sonographers included new protocols and techniques for scanning, additional knowledge about various anomalies and pathologies, new ideas for using technology to modify a particular scan or image, and a fresh, new, and invigorating perspective to the workplace. Participant comments related to this theme were as follows:

New graduate/entry-level sonographers often bring fresh knowledge of new ways to perform exams and measurements.

New graduates bring a fresh new look and feel to the department. They are really "go getters" and have high energy. And they are eager to learn and often malleable.

New graduates bring current skills cutting edge information. This new blood stimulates questions and dialog within the department.

New graduates bring An eagerness and willingness to learn which is refreshing. They are truly happy to be out of school and contributing to field. Their positive attitude in the workplace benefits patients and co-workers.

New graduates have the most updated technology skills. They really know how to use the ultrasound machines very well. They know how to use the equipment to adjust their images for the best image quality.

New graduates are usually very motivated to work and are willing to go above and beyond for their employer. They have great attitudes and positive career outlook.

Theme 2: Fear or Lacking Self-Confidence

This theme was identified due to participant comments such as, inability to make the transition from school to work, they don't know what they don't know yet, fear of working independently without the protection or guidance of the instructor, fear that they will miss an anomaly or pathology, not knowing how to handle difficult physicians, or non-constructive criticism, the inability to tailor the exam based on patient limitations, not knowing when the images they have, are the best they're going to get, or just simply trying to fit into a new work environment. Participant comments related to this theme were as follows:

New graduates struggle with their inexperience performing certain procedures; express anxiety or nervousness with being on their own, keeping pace with the more experienced sonographers; and communicating with Radiologists, Cardiologists, etc., about the exam, findings.

Some new graduates struggle with the school to work transition. Once employment begins, they may not have anyone to look over their shoulder or coax them through an exam. They are no longer students, but employees and must be able to work independently without assistance, which is uncomfortable at first for most new graduates.

New graduates have a genuine fear of missing any pathologies or not providing quality images, because someone is not always available to check their work like when they were students. They don't always know that it's not them, or the equipment, or their ability. Sometimes it's the patient!

Sometimes physicians are not always the most comforting or encouraging in their communication. They can appear to be extremely abrupt and unfeeling. New graduates don't often take non-constructive criticism very well and can become stagnate after such an interaction. However, instead of being frustrated by it, they should not take it personally, but learn from it. Even if they learn what not to do next time. Even non-constructive criticism can become a positive learning opportunity.

New graduates sometimes struggle with identifying certain pathologies. They don't realize that their scanning is only as good as the experience they have scanning. That is, the more you scan, the more procedures you do and pathologies you identify, the easier it gets to identify pathologies down the road.

Theme 3: Not Taking the Initiative (Reluctance to Perform Certain Procedures)

This theme was identified due to comments such as, new graduates often shy away from difficult procedures like 3rd trimester obstetrical exams, indirect arterial exams, some vascular exams, neonatal neuro-sonography (baby brains), or just difficult procedures in general. They sometimes disappear when a difficult procedure become available. Participant comments related to this theme were as follows:

The Sonography Program cannot expose every student to every scenario that could occur in the real-world. But rather than shy away from an unfamiliar procedure, new graduates should dive in and put their best foot forward attempting to perform that ultrasound to the best of their ability.

You can look at a book or search the internet and find all kinds of sonographic images of pathology. However, that won't show you how to skillfully obtain those images via technique and proper equipment utilization. As a sonographer you are only as good as your last scan. Practice makes experience!

Sometimes new graduate employees will leave the more difficult ultrasounds for the experienced sonographers. No! No! No! If you never perform that exam type, what happens when you're the only person available? Just do it!

Some new graduates have had leave the more difficult ultrasounds for the experienced sonographers. But running away won't help. Especially now that they are employed.

And, while performing that difficult or unfamiliar exam, new graduates need to remember what is at stake…for the patient, for their reputation. They need to be accountable and responsible; always setting their standards high to improve the quality and consistency of their imaging.

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New graduates need to take pride in their work and doing the best that they can. They can't become competent if they run away from the difficult patients and exams. Running away only increases incompetence!

One of the greatest challenges facing new graduate sonographers is the fear of making a mistake, which sometime paralyzes or prevents them from taking on more responsibility. Sometimes they need help and won't ask for it because they think it makes them seem weak or incompetent.

Theme 4: Unrealistic Self-Expectations

New graduates sometimes begin their first employment not realizing how much they have

yet to learn, or sometimes they feel that their education has prepared them for the workplace.

Unfortunately, they are often in a new/unfamiliar employment environment, working with

individuals they don't know, or they have to learn new/different protocols for certain procedures.

They don't understand that after spending all that time completing their education and even

becoming credentialed, that the learning doesn't just end there. In fact, it is just beginning.

Participant comments related to this theme were as follows:

New graduates are often slow in completing their exams, which causes anxiety. They want to be as fast as their more experienced colleagues. But it takes time to become fast. First, they need to concentrate on quality. With exposure to multiple exams, perseverance, and determination…speed will come!

Most ultrasound departments have a hectic schedule and there is little time to train. New graduates are often slow in completing their exams, which causes anxiety. They are working with other professionals they don't know, and have to become familiar with company policy, procedures, mission, sonography protocols, and culture, in addition to attempting to increase speed and accuracy. It's a challenge!

It takes time and lots of practice to become a truly competent sonographer. After 14 years in the field, I still learn something new every day. New grads should not become discouraged if they are slow or have difficulty scanning certain patients. Even if you are uncomfortable with the exam, the patient, or the pathology, always maintain a professional attitude! Dig in! Don't sweat the small stuff! Grow thicker skin and develop your "poker face".

New graduates don't realize that in the beginning, the time it takes to complete exams can be lengthy. There will be no one to guide your hand to an anatomical window or give you quick tips on probe position or angling, or a reminder to change annotations. Ultrasound

can be puzzle you have to solve and/or a story you must tell with your imaging. It takes time to learn how to do that. It doesn't happen overnight.

Making the transition from student to sonographer is challenging and often stressful for new graduates. They don't realize that they will be solely responsible/accountable for the patient, for keeping up with strict time limitations to stay on schedule and expected to work solo without feedback or supervision.

New graduates don't realize that mastering sonography is a continuous process that never ends. Competency is an ongoing process from the first year of employment as a sonographer, to the 30th year as a sonographer, and beyond. However, the more years in the field, the easier it gets…until you scan that one patient with a pathology or anomaly you've never seen before. Then everything you thought you knew or learned, even after 30 years…goes right out the window!

New graduates always want "textbook" images. Unfortunately, the average patient is far from "textbook" image quality. There are many things that could decrease image quality, like the patient's body habitus, too much gas/air in the abdomen, inability to take in a deep breath, surgical incisions, scars, bandages, tubes, etc. New graduates need to be more patient with themselves.

Most new graduates don't realize that once hired, they will be expected to fulfill their employment responsibilities without any assistance and regardless of their new graduate status.

Some new graduates expect to work 9 to 5 Pm, no weekends, evenings, on-call, or holidays, and have three weeks of vacation after their first year of employment. They don't realize that in some workplaces they are starting low on the totem pole and will probably get the shifts no one else wants and receive last consideration for vacation or holidays.

Additional Data Analysis Results

Many of the comments mentioned by participants were not surprising. According to Benner (1984) the advanced beginner may be distracted by new, different, or strange situations and may have difficulty focusing or concentrating on the situation at hand. (Benner, 1984). Although new graduate/entry-level sonographers appeared to be efficient and skillful in parts of the practice area, most still required occasional supportive cues from their more experienced sonographer colleagues. (Benner, 1984)

New graduate/entry-level sonographers were able to demonstrate acceptable performance in the clinical setting due to their prior exposure to actual situations during their clinical experiences while in school. However, based on participant comments, their performance collectively, was not standard across the group, and inconsistencies appeared to exist individually. This perceived lack of confidence in new graduates' own abilities is likely because most new graduate/entry-level sonographers had limited experience with many real-world patient situations, procedural types, and knowing who and when to ask for assistance. (Baumberger-Henry, 2012)

Worry, anxiety, and excessive fatigue are frequent experiences for new graduates because they have limited experience with a range of clinical situations, and the anxiety of learning to perform new tasks is ever present (Benner, 2004). In addition, feelings of not knowing how to respond in certain situations or having to request assistance (often perceived as a weakness that contrasts with the need to feel independent) frequently keeps the new graduate/advanced beginner from asking questions, which creates a catch 22 situation (Baumberger-Henry, 2012, p. 302).

The reality of moving from being a student or novice sonographer prior to graduation, to an employee, is a stark, often shocking change for the new graduate (regardless of the healthcare discipline) who now has full legal and professional responsibility for his/her patients and for performing independently, often without any assistance. These new graduates no longer feel that they can always look to their more experienced colleagues to tell them what to do or to bear their responsibilities. However, this new level of individual responsibility can heighten the new graduate's sense of engagement with the patient, and often leads to increased clinical competence (Benner, 2004, p. 192; Baumberger-Henry, 2012).

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More important, for competency to occur, the new graduate/entry-level sonographer must move beyond focusing on newly learned skills and progress toward critical reflection on the clinical event or situation in its entirety. Possessing the skills necessary to perform sonographic imaging is insufficient—by itself. The competent healthcare professional, more than the ability to follow rules and regulations, must also possess a mix of patient care skills, experience, and intuition to be successful. And, with increased confidence and skills, the new graduate/advanced beginner begins to think beyond the performance of specific tasks to grasp the entire clinical situation, which helps to formulate the patterns needed for accurate decision making and critical thinking (Benner, 1984).

Although they felt that their new graduate sonographer colleagues were "competent", related to the knowledge and skills necessary for entry-level employment, and contributed positively to the workplace, participants also indicated that there was still a learning curve that all new graduates experienced. That learning curve was often associated with new graduate fear, anxiety, lack of self-confidence, reluctance to perform certain procedures, inexperience with certain clinical/patient situations, and various sonography protocols, and unrealistic self-expectations.

Participant Recommendations for Sonography Educators and Employers

In addition, through details of senior-level sonographers' "experiences and perspectives", on working side-by-side with new graduate sonographers in the workplace, the researcher sought to identify the need for implementing curriculum changes and interventions, or onboarding activities after employment began, which could assist future new graduate sonographers, by

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improving their workforce readiness and competence as they transition from new-graduates to entry-level sonographers in the workplace.

During the data collection process many participants commented on what they thought educators could do to assist pre-graduate sonographers with overcoming the school-to-work transition. Participants also offered recommendations for what employers could do to assist new graduate/entry-level employees with onboarding and increased competency through mentoring activities in the workplace, once employment began. Participant comments related to recommendations for Sonography educators and employers and were as follows:

Participant Recommendations for Sonography Program Educators

> Instill a sense of importance of the field to students. Stress to students that they will be expected to provide quality exams in a specific time frame, provide excellent patient care, and need to become confident recognizing pathology vs normal anatomy, and have the ability to communicate findings in both verbal and written forms.

> Sonography educators should be mindful of different learning styles of students and adapt instructional methods accordingly. Educators need to keep an open mind about student learning and incorporate their real-world experience in the classroom or lab to reinforce knowledge, skills, and professionalism.

> Educators can build confidence in their students; provide constructive criticism without being condescending. Remember that how you conduct yourself as an educator can have both positive or negative effect on a student and how they reflect themselves in the future. Remember that you were also a student at one time in your life.

> Learning/graduating from an accredited program ensures that the students will receive an education based on quality standards and guidelines for which the program is held accountable for instruction and curriculum based on those standards and guidelines. Educators should provide a curriculum that is as close to real-world as possible and a curriculum based on best practices for the field of Sonography.

> Provide exposure to more advanced procedures, like advanced obstetrical, vascular, and pediatric procedures. Provide access to a job referral network or service to assist new graduates with employment placement.

Participant Recommendations for Employers of a New Graduate Sonographers

Possibly adjust the schedule for a length of time or provide smaller workloads to accommodate the slowness of a new graduate and partner that new graduate with a mentor who is an experienced sonographer.

Rather than just throwing a new graduate in to sink or swim, employers could allow new graduate sonographers to observe the workflow and get a better picture of how things work at that site; what protocols and procedures are used, etc. These things could go a long way in preparing a new graduate for success in their new role.

Assist new graduates with the transition from school to work through mentoring, orientation to the facility, introduction to key personnel, consider a web-based course or workshop in conflict management and negotiation (for handling/de-escalating conflicts with patients or other employees.

Be available for questions, provide insight on expectations in advance, provide training for difficult or rarely performed procedures/exams, understand that the new graduate does not have the experience of your senior-level sonographers and could make mistakes. Be patient with them. Provide teambuilding meetings for the Sonography Department; provide workshops, conferences, in-service, or case-study activities to foster improved knowledge, skills, advances in technology, or changes in sonographic protocols.

Provide close and consistent guidance via a mentor to new graduates for the first year, or until they become more acclimated to the facility, the employees, and the process, procedures, and protocols.

Experienced/Senior-level sonographers should become mentors. Remembering what it was like for them when they were a new graduate employee. Healthcare is about helping people, not just patients. It is not a "me-me-me" profession. A little time and patience with new graduates can cultivate a really great addition to the workforce.

Employers could have a 30-day review every month, for the first six months so that both parties (employer and new graduate employee) can discuss the progress of the new graduate and adjust as needed to enhance the learning process and accelerate the new graduate's competency and success. As the new graduate becomes more adjusted, then extend the reviews to every three months, then every six months for the first one to two years.

Chapter Four Summary

Chapter Four provided the reader with details on the number of participants selected for research and demographic details about those participants. Through the process of Thematic Data Analysis, four themes were identified: (1) positive contributions to the field, (2) fear or lacking self-confidence, (3) not taking the initiative, and (4) unrealistic self-expectations. These

four themes were further supported by the inclusion in the research of data extractions from participant comments.

Additional results of data analysis included the identification of other skills/competencies that were not mentioned by the literature as missing in new graduate employees and the brief analysis of qualitative data extracted from the survey instrument/questionnaire. Chapter Four concludes with data extractions from participant comments on recommendations for both educators and employers that could assist new graduate sonographers with the transition from school to work and enhance their success in the workplace.

CHAPTER 5: RESEARCH SUMMARY/CONCLUSIONS

Introduction

According to the Literature Review graduates of two- and four-year institutions were not prepared for entry into the workplace because they were missing certain necessary workplace skills. Those missing skills included new graduates' inability to attend to details, to problem solve, to resolve conflict, and their lack of communication skills such as reading, writing, speaking, and listening.

However, the literature did not identify specific workforce groups, or the education and training received by a workforce group prior to graduation. Nor did the literature utilize input from senior-level employees as respondents to questionnaires about the workforce readiness of new graduate/entry-level employees. This qualitative descriptive study attempted to address those gaps in the literature as well as answer questions about the relevance and importance of the skills the literature indicates are missing in new graduate employees.

This study looks at the workforce known as Diagnostic Medical Sonographers and 12 individuals from that workforce were selected to participate in research. Each participant represented a senior-level sonographer with eight or more years of experience and continued employment in the field of Diagnostic Medical Sonography. Additionally, each participant had either very recent or current experience working side-by-side with one or more new graduate/entry-level sonographers in the workplace.

Because the participants represented senior-level, experienced employees, they had knowledge about and experiences with the skills necessary for success and competency in the workplace. All participants were credentialed/certified in one or more sonography specialties, and ten of the participants were former graduates of an accredited sonography program.

During the interview process and subsequent phone conversations, participants seemed to be open and honest in their discussions with the researcher about what it means to be a competent sonographer and the knowledge and skill necessary to do so. Additionally, participants appeared to have a genuine willingness to discuss their experiences and perspectives on the competency of new graduate sonographers and thereby contribute to what is known about the Diagnostic Medical Sonography Workforce.

Addressing the Primary Research Questions

There were two primary research questions to be addressed by this qualitative study. (1) What skills/competencies are necessary for success in the workplace as a Diagnostic Medical Sonographer? (2) Do New graduate/entry-level sonographers possess the skills necessary to perform competently? Are they able to apply those skills appropriately in the workplace?

Regarding the importance of certain workforce skills, participants indicated that the skills identified by the literature as missing in new graduates {Critical Thinking, Conflict Resolution/Problem Solving, Attention to Details, Interpersonal/Team Work, Communication (Reading, Writing, Listening, Speaking)}, were indeed alive and well and being utilized by sonographers…continuously. This was not surprising to the researcher since she is also a sonographer. Soft skills such as attention to details, communication, critical thinking, interpersonal/teamwork, problem solving, and conflict resolution were utilized in the sonographer's daily work while either performing ultrasound procedures, or interacting with patients, colleagues, physicians, and other healthcare professionals.

Regarding the ability of new graduate/entry-level sonographers to demonstrate competency upon entry into the workplace…participants had much to say in contributing to research. Four themes were identified through the data analysis process: (1) positive

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contributions to the workplace, (2) fear or lacking self-confidence, (3) not taking the initiative, and (4) unrealistic self-expectations. That is, participants indicated that new graduates contributed positively to the field of sonography with their new knowledge, experience with advances in technology, positive career outlook, and willingness/eagerness to help. New graduates brought a breath of fresh air to the field which participants appreciated.

Participants also had much to say about the challenges and struggles that new graduate sonographers seemed to face. New graduates were slow and struggled with keeping up with the daily routine. They often had limited experience/exposure to certain ultrasound procedures and therefore shied away those procedures instead of attempting to do the best job they could. New graduates were often challenged by patients who were not "walkie-talkie" such as infants, children, or those patients with physical, mental, or surgical limitations. They were also challenged by patients who did not present "text-book" anatomy and required problem-solving, thinking it though, a change in transducer angle, patient position, or an adjustment in technique to get the exam done.

New graduate/entry-level employees were often too hard on themselves, if they were unable to finish an ultrasound procedure in a certain amount of time, or if they required assistance to complete the procedure. They were sometimes afraid to ask questions or for assistance with a difficult procedure/patient, and their sonographer impressions were not always written thoroughly.

However, even with the challenges that new graduate sonographers seemed to face in the workplace, research participants considered them to be competent for employment as entry-level sonographers. And, although participants rated new graduates low on the scale for attention to details, conflict resolution and problem-solving skills, it is important to note that new graduates

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did possess these skills, they just didn't always know how/when to use them. That is because new graduates often found themselves dealing with individuals, situations, patients, and/or procedures they had not encountered before, they struggled with knowing how to address issue, resolve the problem, or approach the situation. These challenges were not seen by participants as incompetence on the part of the new graduate, rather they were viewed as opportunities for the new graduate to learn through determination, perseverance, mentoring activities and/or additional training.

Fortunately, and in contrast to what the literature indicated, participants thought their new graduate sonographer colleagues were prepared for the workplace. What they lacked is what the researcher calls " the knowledge of experience" or they don't know what they don't know yet.

Competency for a new graduate/entry-level employee does not occur over night. It takes time. And the length of time it takes depends on several factors, including the quality of education received and exposure to various procedures while still in school; the workforce discipline in question; the amount of mentoring provided by the employer or by senior-level, more experienced colleagues in the workplace; and new graduate's willingness to persevere, and determination to become competent; to keep an open mind and learn new protocols, to ask questions of and listen to their more experienced sonographer colleagues, to not be afraid to attempt new procedures or revise a protocol based on the patient's ability to tolerate the procedure.

Most important of all, new graduates need to relax! Competency will come! Speed with come! As long as new graduates are open to learning, accepting of constructive criticism, improving their skills, and adding to their experiences, they will persevere to become long-term, senior-level, expert sonographers and valuable member so the sonography workforce.

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Additional Activities to Support the Transition of New Graduates into the Workplace

Providing case studies or workshops for new graduates to discuss interesting cases or pathologies. Providing case studies or workshops for new graduates to discuss interesting cases or pathologies, could assist new graduates with recognizing pathologies they had not seen before, as well as the sonographic appearance and demonstration of that pathology.

Finally, among other things, employers could provide 30-day reviews, every 30 days, for the first six months. This review, as it was understood by the research, was not about attempting to discontinue the employment of the new graduate or separation, but about both parties coming together (employer and employee) to discuss progress and the need for assistance or further training of the new graduate to improve their skills and competency. As the new graduate improves their performance and skills, the reviews could be extended to once every three months, and then once every six months for the first year or two of employment.

According to participant comments, in addition to having the knowledge, skills, and competency necessary for entry-level employment as a sonographer, new graduates were also eager to work, excited to have finally graduated and entered the workforce; demonstrated good patient care skills, had positive career outlooks, were eager to learn and fit into their new job, and were helpful, courteous, and respectful. However, assisting new graduates with their success in the workplace, to increase their competency, and improve their skills, new graduates require patience, support, encouragement, additional training (for unfamiliar procedures/protocols), and mentoring from their employer and senior-level sonographer colleagues in the workplace.

Implications for Sonography Practice

Among the important contributions/comments made by participants to this research, their recommendations for how educators and employers could better prepare new graduates for success in the workplace, either before or after employment begins, were very significant.

Participants felt that their new graduate sonographer colleagues possessed the education, knowledge, and entry-level skills necessary to be successful in the workplace. However, they recommended that educators have very candid conversations with pre-graduates about the workplace so that new graduates are not surprised or discouraged in their first employment. They also recommended that educational programs provide employment/career services for graduates to assist them with finding employment opportunities.

Sonography educators can explain to new graduates that they will be expected to hit the ground running when employment begins, that few concessions will be made for them, and they will be expected to keep up with the departmental workflow and quotas, while providing the same or similar quality service, procedures, and patient care, as their more experienced sonographer colleagues.

To prepare sonography learners for the demands of the health care workplace, educators must continue to focus on the development of critical thinking and clinical reasoning skills. Additionally, sonography learners should have a better understanding of how to demonstrate "customer service" skills such as sympathy, empathy, compassion and patience. By including/embedding competencies and assessments for those customer service skills, as well as skills such as critical thinking, conflict resolution, and communication, in the curriculum or as part of clinical competency.

Customer service skills such as sympathy, empathy, compassion, and patience are difficult skills to teach. Additionally, skills such as critical thinking, problem solving, conflict

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resolution, communication, and attention to details are also difficult skills to teach. However, educators should find a way to make assessment of these skills an objective of the sonography or any other healthcare program. By ensuring that graduates of healthcare programs are competent in more than just the knowledge and hard skills of the discipline, educators can be certain that they are developing competent and safe healthcare professionals.

Participant recommendations for employers included onboarding process such as adjusting the department schedule so that new graduates have the time they need to acclimate to the department and performing procedures without feeling rushed; orientation and tours of the department/facility so that new graduates know where to find people, places, equipment, supplies, etc.

New Graduate Entry-level Employees' Needs for Workplace Mentoring

There is little known about formal mentoring in the field of sonography and even less scholarly research dedicated to its study. What is a sonography mentor? Does formal mentoring occur in the workplace for sonography professionals, and if so, how, when, and where does it occur? More important is the question of "who" is responsible for mentoring these healthcare professionals once employment begins. Extensive research on mentoring workforce professionals has been performed in the field of business, social-work, nursing, and other healthcare industries. Unfortunately, empirical research on the importance of professional development and mentoring of sonography healthcare professionals is, for the most part, absent or not readily available. And, although mentoring is perceived as an important part of academic medicine, the evidence to support this perception is not strong (Sambunjak et al., p. 1103)

The participants in this study also mentioned the need for new graduate/entry-level sonographers to be assigned a mentored in the workplace. Unfortunately, mentoring in the field

of sonography is not typical. Most new graduates just begin their work upon entry into the workplace and obtain assistance with difficult procedures as needed. Having a mentor—an experienced sonographer from whom the new graduate can regularly obtain input, guidance for difficult patients or difficult procedures; for adjusting protocols or techniques, to improve image quality; or to discuss sonographic anatomy/pathology, could go a long way in helping a new graduate feel more comfortable in the workplace and assist with increasing their speed and building their confidence.

Participants continued to mention, throughout the interview process and during phone conversations, the need for new graduate/entry-level sonographers to be mentored. That is, a new graduate employee, or any new employee should be oriented to not just the organization or healthcare entity, but to the department specifically, which should include an orientation to the department workflow; introductions to co-workers to include sonographers, physicians, and front-desk employees; exposure to procedural protocols and equipment use; location of supplies and other medically related equipment; review of how sonographer impressions should be written, and procedures for patient care and flow, etc.

As mentioned before, mentoring of new employees in Sonography is not typical. Yes, they receive the standard Human Resource orientation, maybe a tour of the facility/department, and introductions to key personnel. However, in most facilities, that is as far as mentoring goes, if one can call that mentoring. In my opinion and that of many of the participants interviewed, the typical onboarding process for new graduate/entry-level sonographers, in most facilities, is woefully insufficient.

As the basis for mentoring new graduate/entry-level employees in the workplace, I return to another adaptation of the Dreyfus Model of Skill Acquisition (2008). A visual example of the

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revised model is represented by Figure 5.1. This model differs from both the initial Dreyfus

Model (1980), as pictured in Figure 2.1 & 2.2, and the revised model as proposed by Patricia

Benner (1982) and pictured in Figure 2.3.   The visual example of the revised Dreyfus Model

featured in Figure 5.1 was excerpted from an article written by Raman Attri (2017), titled *7*

Phases of Skill Acquisition: A Novice's Journey to Expertise and Beyond.

   The new model still contains the original five phases of skill development (Novice,

Advanced Beginner (Entry-level), Competent, Proficient, and Expert), however, two additional

phases have been added to the model (Mastery and Practical Wisdom), which were not included

in the initial Dreyfus Model (1980) or Benner's (1982) adaptation of the model. Based on the

new model, mentoring new graduates who are entering sonography or any workforce entity, and

offering them a trusting learning environment helps with retention and the demands of the

profession, regardless of the profession.

Figure 5.1: 7 Phases of Skill Acquisition: A Novice's Journey to Expertise and Beyond
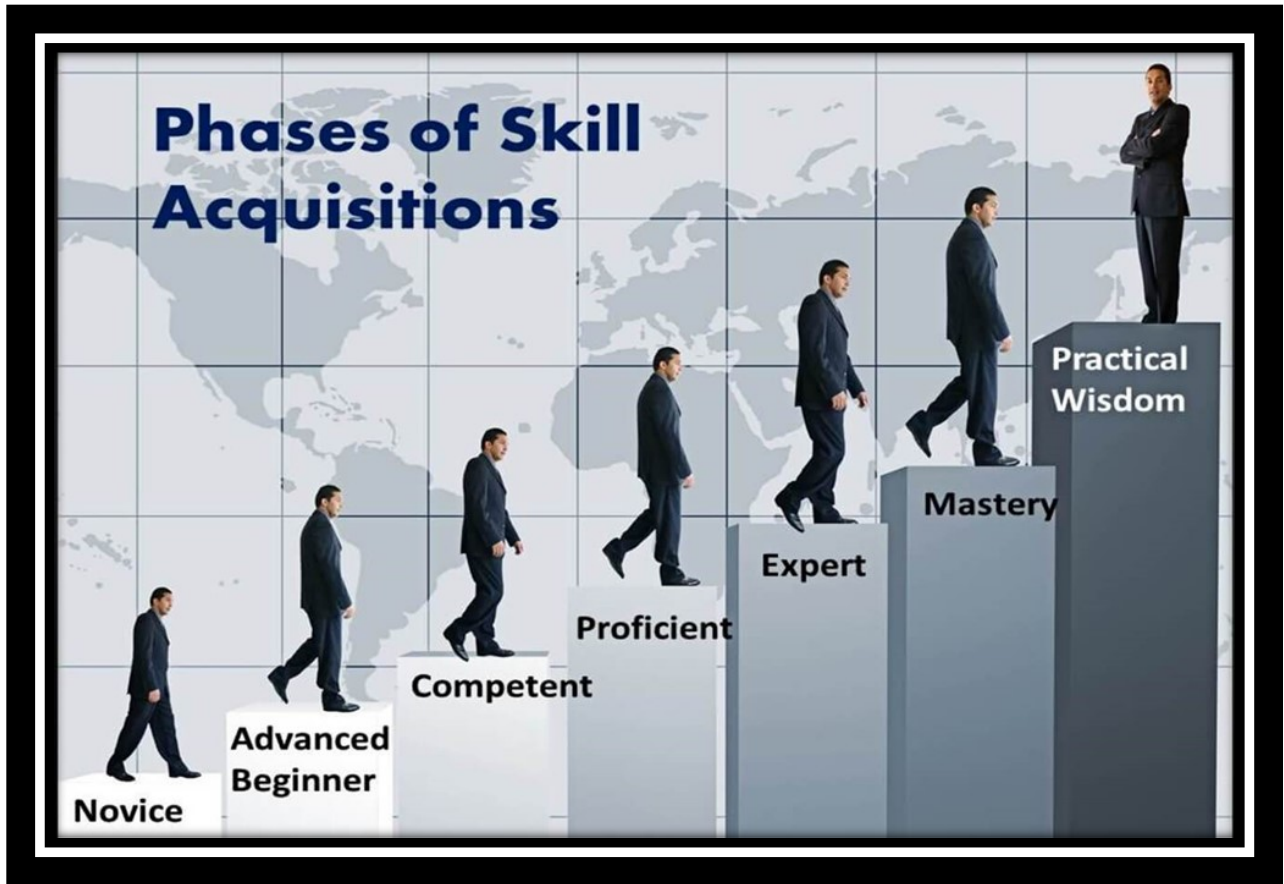
At the Mastery Phase of skill development, the Expert sonographer/employee moves

beyond expertise to the Mastery, which is characterized by practical wisdom and the ability to

teach (mentor) or impart "pearls" to learners at lower levels or stages of skill development.

(Carraccio, Benson, Nixon, & Derstine, 2008). The master demonstrates judgements which set

the regulations, standards, or ideals for practice, understands the "big picture" of the situation, as

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well as the "bigger picture" of context and culture in which the situation occurs. (Carraccio, Benson, Nixon, & Derstine, 2008, p. 765-766).

Although the concepts of Practical Wisdom vary from research to research, as scholars discuss the revised Dreyfus Model, I agree that it includes the following, as proposed by Attri (2017) "Practical Wisdom is the closure of the cycle and describes the giving back from the master to the domain, enhancing the domain body of knowledge itself (Attri, 2017, para. 19). The master now serves as a role model/mentor to assist those at the lower levels of skill acquisition cope with stressors that seem especially overwhelming in the workplace.

Long-term, experienced employees who have reached either the Mastery or Practical Wisdom Phases of the Dreyfus Model, should become responsible for "mentoring" those at lower levels or prior phases of skill acquisition. "A mentor in the workplace is someone who is capable of providing guidance to a less-experienced employee, the mentee" ("Mentoring in the workplace," n.d., para. 5). The mentor shares his/her knowledge, skills and expertise through direction, demonstration, advice, and encouragement, which benefits the mentee in the long run and the workplace overall.

Having a Mentoring Program in place can benefit not just the new employees, but also the employer and the mentor. The benefits of mentoring for the new graduate/entry-level employee in the workplace include improved performance, increased preparation for future responsibilities, stronger skills, fewer mistakes, and decreased turnover as employees feel more valued. Benefits to the employer include increased productivity, fewer mistakes, and decreased turnover.

The benefits of mentoring for the mentor include the opportunity to develop teaching skills, management skills, and the potential for a life-long connection with the mentee which can

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be beneficial to the careers of both parties and the profession itself. In their first year of employment, through the process of formal mentoring activities, healthcare organizations can provide learning opportunities for new graduate employees which focus on communication techniques, conflict management, prioritization skills, teamwork, leadership development, and patient care skills. Additionally, healthcare organizations should also provide clear direction and expectations for new graduates during this time.

Finally, mentoring of new graduate/entry-level healthcare employees can be beneficial to the patients – the recipients of healthcare services. Through the benefits of a mentoring program for the mentee, the mentor, and the employer, increased competency can occur at all levels of the organization. And, increased organizational competency in the healthcare industry should lead to increased patient safety and satisfaction, and possibly decrease the potential for medical errors in the arena of providing patient care and patient care services.

Conclusions

Although findings from the research performed for this manuscript match many of the broader statements identified in the literature review, specifically that new graduates are missing some important workplace skills. However, these new graduates are not incompetent, they simply have not learned all that is necessary for success in the workplace, and their lack of certain skills can be alleviated through formal mentoring, guidance, and onboarding processes offered through the workplace.

Today's healthcare workplaces are far more complex than they ever were before and when a new graduate is unaccustomed to certain situations, protocols, and occurrences, being mentored becomes a high priority for coping and preventing burnout, medical errors, and adverse patient situations. Gone are the days of hiring a new graduate and expecting him/her to "hit the

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ground running," possessing all the knowledge, skills, experience, and expertise necessary for total competency. They need assistance! Many of the participants in the current study agreed that new graduate sonographers should receive minimum of six months of orientation in the facility/department, followed six months with a mentor before being allowed to work alone, especially in healthcare organizations.

Mentoring can assist with improving clinical judgment and decision-making skills by asking new graduates questions about clinical practice rather than just providing answers. Two-way communication is needed to keep the new graduate informed of strengths and challenges both during and after orientation. No new graduate, in any profession, is capable of demonstrating the competency of a more accomplished and experienced individual/employee, they need coaching to achieve confidence, as they move toward increased competence.

Julius Caesar said "Ut est rerum omnium magister usus", that is "experience is the best teacher". If new graduates receive guidance, support, and encouragement to practice what is learned, mentored both during and after orientation, and provided with a resourceful and civil environment, they can flourish in the workplace, regardless of the culture, to become the next generation of experts. However, based on the generation represented, if a new graduate becomes disillusioned in the workplace with their coworkers or workplace culture; if they face an unreceptive/unsupportive work environment, they are more likely to leave the workplace or even the profession altogether. All that training, education and knowledge new graduates possess is now wasted and is of no benefit to anyone.

APPENDICES

Appendix A: Primary Research Questions

1. What skills/competencies are necessary for success in the workplace as a Diagnostic Medical Sonographer?

2. Do New graduate/entry-level sonographers possess the skills necessary to perform competently in the clinical setting? Are they able to apply those skills appropriately in the workplace?

Appendix B: Invitation to Participate in Research

Researcher Information	Dr. Cris Stream – Primary Investigator Janice Glasper, MEd, RDMS, RVT – PhD Candidate and Student Researcher
Dissertation Research Title	Turning Up the Sound! Senior-Level Sonographers Perspectives on the Workforce Readiness/Competency of New Graduate/Entry-level Sonographers in the Workplace
What you will be required to do as a research participant	As a research participant you will be asked to complete a questionnaire in-person, via phone, or privately (on your own), regarding the following: (1) The importance and use of various workforce skills as they relate to the Diagnostic Medical Sonography Workforce. (2) Your perspectives on the competency of new graduate/entry-level sonographers in the clinical setting.
Research Problem	According to the literature new graduate employees are not prepared to enter the workforce (regardless of the workforce discipline or their education) because they are missing various workforce skills. The skills most often cited by the literature as missing in new grads include communication (reading, writing, listening, & speaking), attention to details, conflict resolution, problem solving, teamwork/collaboration, and critical thinking.
Why you were invited to participate in research	Because you are a credentialed Sonographer with ≥ 8 years of continuous experience working as a Sonographer in a clinical setting, and because you may have experiences working side-by-side with new graduate/entry-level sonographers the workplace.
Usefulness of Research	I am interested in your perspectives on and/or experiences with the competency of new Graduate/Entry-level sonographers as related to the skills listed in the Research Problem. Are these skills important for the Sonographer? Do New Graduates possess these skills and are they able to apply them appropriately in the workplace?
Participation in Research is Confidential & Voluntary	Your participation in research is completely voluntary and all responses will be kept strictly confidential. All data obtained will be de-identified and contain none of your personal information. Only project personnel will have access to participant information.
Researcher Contact Information	If you are interested in participating in research, or would like additional details about participation, Please contact me via email at Janice.glasper@csn.edu, or via phone at xxx-xxx-xxxx.

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Additional Contact Information	For questions or concerns about this research please contact Dr. Chris Stream at xxx-xxx-xxxx, or via email at chris.stream@unlv.edu
Thank you for your time, attention, and consideration of this request. All are sincerely appreciated.	

Appendix C: Letter of Introduction to Research and Informed Consent

Study Title: Turning Up the Sound! Senior-Level Sonographers' Perspectives on the Competency and Workforce Readiness of New Graduate/Entry-Level Sonographers in the Workplace

Researchers: Dr. Christopher Stream, PhD – Primary Investigator
Janice Glasper, Med, RDMS, RVT – Ph.D. Candidate and Student Researcher

Participant: Before agreeing to participate in this research, you are strongly encouraged to read the following explanation of this study which describes the purpose and procedures of the study. Also described is your right to withdraw from the study at any time. This study has been approved by the University of Nevada, Las Vegas' Office of Research Integrity.

Should you decide to participate in this research please sign/date the consent form, and return all pages to the researcher - Janice Glasper, via fax at 702-651-5722 or via email at Janice.glasper@csn.edu. To contact the researcher via phone, please call 702-651-5698. The researcher will contact you about date/time for your interview.

Note: To participate in this research project, you must meet **all** the following criteria:

1. You are currently employed as a Diagnostic Medical Sonographer, Cardiac Sonographer, or Vascular Sonographer.

2. You are credentialed in one or more of the following Sonographic Specialty areas: Abdominal, Obstetric/Gynecologic, Neurological, Musculoskeletal, Breast, Vascular, Adult Echo, or Pediatric Echo.

3. You have maintained continuous employment as a Sonographer in the clinical setting for $\geq$ 8 years.

4. You currently work or have worked side-by-side with at least one New Graduate/ Entry-level Sonographer in the clinical setting. For the purposes of research, **a New Graduate/Entry-Level Sonographer is defined as** a recent college graduate who has been employed as a Diagnostic Medical Sonographer for $\leq$ 3 years, and graduated from a Sonography Education Program preferably accredited by the Commission Accreditation of Allied Health Education Programs (CAAHEP). **Note**: Graduates of a CAAHEP Accredited Sonography Program is preferred, but not required.

Explanation of Procedures - This study is designed to determine the importance and necessity of specific workplace competencies for the Diagnostic Medical Sonography Workforce and to describe New Graduate-Entry Level Sonographers' abilities to apply those competencies in the clinical setting. The purpose of the study is to learn more about the workforce-readiness of Entry-level sonographers because (1) The sonography workforce and information about them as contributors to our nation's healthcare workforce, has rarely been grounded in theory; (2) Although there exists an unlimited amount of literature and research on the use of sonography as a diagnostic imaging tool, the individuals who make up this workforce, have rarely been the focus of scholarly inquiry; (3) According to the literature, new graduate/entry-level employees are not prepared to enter the workforce, regardless of their education (2-year or 4-year degree completion), or chosen field of work. And, (4) The literature includes surveys and comments provided by Human Resource Professionals, CEOs, and Business owners, managers and leaders. However, there is little or no research on the competency of new graduate/entry-level employees,

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based on the perspectives and experiences of the senior-level employees, who work side-by-side or in very close proximity to those new graduate/entry-level employees.

Participant Initials _____

Informed Consent

Department of: <u>**Workforce Development and Organizational Leadership**</u>

<u>**TITLE OF STUDY**</u>: **Turning up the Sound! Senior-Level Sonographers' Perspectives on the Competency/Workforce Readiness of New Graduate/Entry-Level Sonographers in the Workplace**

<u>**INVESTIGATORS**</u>:   Dr. Chris Stream – Principal Investigator

                           Janice L. Glasper – PhD Candidate and Researcher

For questions or concerns about the study, you may contact **Dr. Chris Stream at 702-806-9067, or via email at chris.stream@unlv.edu.**

For questions regarding the rights of research subjects, any complaints or comments regarding the way the study was conducted, please contact **the UNLV Office of Research Integrity—Human Subjects at 702-895-2794, toll free at 877-895-2784 or via email at IRB@unlv.edu.**

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Purpose of the Study

You are invited to participate in a research study. The purpose of the study is to describe the importance/necessity of certain workplace competencies, and to provide your perspectives on the abilities of new-graduate/entry-level sonographers to apply those competencies in the clinical setting. Specific competencies/skills to be discussed for this research include: Communication (reading, writing, speaking and listening); Attention to details; critical thinking, conflict resolution; technological application, and teamwork/collaboration.

Participants

You are being asked to participate in the study because you fit the following criteria: (1) You are currently employed as Diagnostic Medical Sonographer. (2) You have 8 or more years of continuous employment and experience working as a Sonographer in the clinical setting. (3) You possess current credentials/certifications from the American Registry of Diagnostic Medical Sonography (ARDMS), Cardiovascular Credentialing International (CCI) and/or the American Registry Radiologic Technology (ARRT), in one or more of the following Sonographic specialty areas: Abdominal, Obstetrical/Gynecological, Vascular, Musculoskeletal, Neurologic, Breast, Adult Echo, Pediatric Echo, and (4) You currently work, or have worked side-by-side with one or more new graduate/entry-level sonographer(s) in the clinical setting.

Procedures: **If you volunteer to participate in this study, you will be asked to do the following:**

1. Choose an interview format of either in person or by phone, or choose completion of the questionnaire on your own.

2. Choose a time and date for your interview within a 3-week period provided by the researcher.

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3. All in-person or phone interviews will take approximately 1 hour.

4. The interview protocol and consent to participate in research, will be fully explained and provided to you prior to scheduling any interview.

***Your consent to participate in research must be signed and submitted to the researcher via email to Janice.glasper@csn.edu or via fax to 702-651-5722, prior to scheduling any interview.

5. <u>**Completion of the Questionnaire on Your Own**</u>: You may opt to complete the questionnaire on your own and submit to the researcher after completion. There will be no need for in-person interview with this option. However, a follow-up conversation may be required. These conversations may occur via phone.

6. <u>**Interview In-Person**</u>: If you choose the in-person interview, your consent must include a valid phone number and the best day/time to schedule your interview. You will receive a signed copy of the consent form via fax or email, 1-week prior to your scheduled interview date. The consent form will have the date, time, and place (room) for your interview. In-person interviews will take place at UNLV's School of Medicine Campus located at 2040 West Charleston Blvd., Las Vegas, NV 89102. The room where the interview will take place will be private, free from interruptions, locked before, during and immediately after the interview, and undisclosed to anyone except the researchers and you (the participant). You will receive a reminder of your interview via email and phone message 48 hours prior to your scheduled interview date.

7. <u>**Interview by Phone**</u>: If you choose to be interviewed by phone, your consent must include a valid phone number and the best day/time to contact you for your interview. Two weeks prior to your scheduled phone interview, you will receive a signed copy of this form via fax or email, with the date/time of your scheduled phone interview. During your phone interview, you will be placed on speaker, audio-recorded (with your prior consent), and the researcher will be behind a closed and locked door to protect your privacy. You will receive a reminder of your interview via email and phone message 48 hours prior to your scheduled interview date.

8. <u>**Rescheduling Your Interview**</u>: If you are unable to participate in the scheduled interview, please contact the researcher immediately to reschedule.

9. <u>**Audio-Recording of Interviews**</u>: All interviews will be audio-recorded verbatim, to ensure that your comments are accurately obtained. However, you have the option to opt-out of being audio-recorded. If you choose not to be audio-recorded during your interview, the researcher will take field notes or hand-written notes instead.

10. If additional time is necessary to complete the interview, a second interview may be scheduled to take place by phone.

11. Information obtained during your interview will be transcribed by the researcher into a draft interview transcript.

12. Within 48 hours of the date of your interview, you will receive via email or fax, the **Draft interview transcript**.

13. You will be provided with 7 business days to review the draft interview transcript for accuracy and

validation of content. You are encouraged to add, delete and/or revise information in the transcript as you see fit.

14.   After you have completed your review and revision of the transcript, please forward the transcript (with any revisions), back to the researcher.

15.   The researcher will make all necessary revisions to the draft interview transcript and forward the **Final interview Transcript** (within 2 business days) back to you for your final review. If the interview has been audio-recorded, the tape will be destroyed or erased immediately upon receiving your approval of the Final interview transcript.

16.   Any report made public resulting from this study will not include any information that will make it possible to identify you. Research records will be kept in a locked file and only the researchers will have access to the keys.

17.   All final transcripts, consents, and field notes will be kept in a locked file cabinet for a maximum period of 3 years. Upon conclusion of that 3-year storage period, all paper documents will be shredded and all electronic media, if any, will be erased or destroyed.

18.   You will be provided with a final copy of the research report.

Benefits of Participation

There may not be any direct benefits to you as a participant in this study. However, participation in research could provide the opportunity: (1) To contribute to research by discussing your feelings, perspectives, and concerns related to the workforce readiness of entry-level sonographers. (2) To inform sonography educators, healthcare employers, and the sonography workforce itself, about the workforce readiness and competence of new graduate entry-level sonographers and their potential need for additional training/mentoring before graduation occurs and/or after employment begins. (3) To provide sonography educators with relevant information necessary to develop curriculum activities suited to the clinical learning environment, and ideas on how teaching and mentoring practices in the clinical environment can enhance the graduate sonographers' confidence and competence. Finally (4) To contribute to the literature on the workforce known as Diagnostic Medical Sonographers. (5) Possible publication of the research in a professional journal, in book form, or presented at professional meetings.

Risks and Discomforts

There are risks involved in all research studies. However, there are no anticipated risks to you due to your participation in this research study. You may be uncomfortable answering some questions.

Cost/Compensation

There may not be any financial costs resulting from your participation in this study. The participant interview will take approximately 1 hour to complete, and you will not be compensated for your time.

Confidentiality

The information gathered during this study will be kept as confidential as possible. No reference will be made in either written or verbal materials that could link you to this study. All records will be secured in a locked file cabinet during this project. Only the researchers will have access to the keys, the study data and information. There will not be any identifying names on the questionnaires or interview transcripts. Your name and any other identifying details will never be revealed in any publication of the results of this study. The audio tapes will be destroyed immediately following completion and your approval of the final

transcript. All documents associated with research will be kept in a locked file cabinet for up to 3 years following completion of the study. Once the 3-year period expires, all paper documents and consents will be shredded and electronic media, if any, will be permanently erased or destroyed.

Voluntary Participation and Withdrawal without Prejudice

Participation in this study is strictly voluntary. You are free to withdraw consent and discontinue participation in this study at any time without prejudice to your relations to UNLV, or personal penalty. You are also free to refuse to answer any question(s) you may be asked. You are also encouraged to ask questions about the study before, during, and/or after conclusion of research.

Further Questions and Follow-Up

The researcher's contact information has been provided to you and you are encouraged to ask the researchers any questions that occur to you before or during the interview. If you have additional questions once the interview is completed, or after conclusion of the research study, you are encouraged to contact the researcher using the contact information provided.

If you have any concerns about the research procedure or any portion of the research process, please contact the Primary Investigator Dr. Chris Stream at (702) 806-9067 or via email at chris.stream@unlv.edu. You may also contact the Executive Director of UNLV's Office of Research Integrity at 702-895-5948.

Participant Consent

I have read the above information and agree to participate in this study. I am at least 18 years of age. I understand that I am free to refuse to answer any question(s), and that I can withdraw from the study at any time without prejudice or penalty. I understand that my identity and responses will be kept anonymous and confidential.

Choose one of the following Options and provide the requested information if applicable:

☐ In-Person Interview   ☐ Phone Interview   ☐ Complete questionnaire on your own
and submit to researcher after

completion

Email: _____

Fax: _____

Phone: _____

_____
Participant Name (Please Print)

_____   _____
Participant Signature   **Date**

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Consent to be Audio Recorded

I agree to be audio recorded for the purposes of this research study. **Note**: If you would prefer not to be audio recorded or "opt-out" of audio-recording, or if you have decided to complete the questionnaire on your own, please **leave this section blank**.

_____

Participant Name (Please Print)

_____   _____

Participant Signature   **Date**

Please return all pages of this consent via email to Janice.glasper@csn.edu or via Fax to 702-651-5722, prior to participation in research

Appendix D: Research Interview Questionnaire/Survey Instrument

Section One

This Portion of the Survey is Specifically Related to information About You/the Participant.

1. Did you graduate from a CAAHEP Accredited Diagnostic Medical Sonography Program?   _____Yes   _____ No
2. Are you familiar with National Education Curriculum for Diagnostic Medical Sonography Education?   _____Yes _____ No
3. How many years have you been employed as a Diagnostic Medical/Cardiovascular/Vascular Sonographer?   _____
4. In what type of clinical setting are you employed?   ___Hospital   ___Imaging Facility   ___Diagnostic Out-Patient Facility ____Physician Office   ____Entrepreneur   ____Other (Specify) _____
4. What registries/certifications/credentials do you currently possess?   List all agency credentials if applicable.
5. Have you worked with one or more new graduate/entry-level Sonographers within the last year?   _____Yes   _____No

6. What is your current age _____	7. What is your gender? _____Male _____Female _____N/A

Section Two

2a. How Important are the Following Skills for the DMS Professional?

FOUNDATIONAL COMPETENCIES & SKILLS	NOT IMPORTANT (1)	SOMEWHAT IMPORTANT (2)	VERY IMPORTANT (3)	CRUCIAL (4)
Attendance				

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Professionalism				
Attention to Details				
Quality of Work Produced				
Quantity of Work Produced				
Communication Skills • **Reading**				
• **Writing**				
• **Listening**				
• **Verbal/Speaking**				
Response to Supervision/Ability to accept Direction and Criticism				
Interpersonal/Teamwork Skills				
Critical Thinking Skills				
Conflict Resolution Skills				
Problem Solving Skills				
Technology Skills				
Diversity/Cultural Competency Skills				

2b. Please Answer the Following Questions.

1. What is your philosophy or beliefs on sonography education?

2. How would you compare sonography education today with how you were educated/trained?

3. When you entered the workplace as a new graduate/entry-level sonographer:

   a. What challenges did you face?

   b. How were you able to overcome those challenges to become the senior-level sonographer you are now?

4. In your opinion how long (in years) of continuous employment, beginning with the initial entry into the workplace, does it take to become a competent Sonographer?

5. How would you respond to the following statement? "There is no additional training needed, once employment begins, to attain competency in the skills needed to perform as a Diagnostic Medical/Cardiovascular/Vascular Sonographer."

Section Three

3a. Rate New Graduate/Entry-level Sonographers' Abilities to Demonstrate these Skills/Competencies Appropriately in the Clinical Setting.

WORKPLACE COMPETENCIES	Needs Improvement Not yet demonstrating the skills/competencies required Needs additional training (1)	Inconsistent Needs occasional reminding, mentoring or additional instructions (2)	Competent Demonstrates the skills with few exceptions, along with a willingness to improve. (3)	Advanced Consistently demonstrates competency. Exceeds expectations and has emerged as a leader, improving the overall team. (4)
Professionalism				
Critical Thinking				
Conflict Resolution Skills				
Problem Solving Skills				
Communication Skills • **Reading**				
• **Writing**				
• **Listening**				
• **Verbal/Speaking**				
Attention to Details				

Response to Supervision/Accepts Direction and Criticism				
Interpersonal Skills-Teamwork and Collaboration				
Diversity and Cultural Competency Skills				
Computer Literacy (Technology Skills)				

3b. Please Answer the Following Questions and Provide Any Additional Comments You Have.

1. Do new graduate/entry-level sonographers possess the skills and competencies necessary for success upon entry into the workplace?

2. What are some of the greatest challenges/struggles faced by new graduate sonographers in the workplace?

3. What actions/activities/attitudes of new-graduate sonographers have you observed which may have caused difficulty with their ability to transition into the workplace?

4. What actions/activities/attitudes of new-graduate sonographers have your observed which helped them transition as competent employees in the workplace?

5. What can educators do to help better prepare new graduates sonographers for the workplace?

6. Do you have any additional comments about the workforce readiness/competency of New Graduate/Entry-Level Sonographers?

Appendix E: Template - Notification of Non-Selection to Participate in Research

Subject/Study Title: Turning Up the Sound! Senior-Level Sonographers' Perspectives on the Competency and Workforce Readiness of New Graduate/Entry-Level Sonographers in the Workplace

From/Researchers: Janice Glasper, Med, RDMS, RVT – Ph.D. Candidate
                          Dr. Christopher Stream, PhD – Supervisor/Primary Investigator

Hello [name],

Thank you so much for your willingness to serve as a participant in the research for my dissertation. Your willingness to participate was sincerely appreciate. Unfortunately, you don't meet the specific requirements necessary to participate in research.

The current research focus does not allow for the inclusion of many participants specifically, those who don't meet the minimum criteria necessary for inclusion in research.

Participants selected for participation must meet the following criteria to be included in research:

- Must have $\geq$ to 8 years of continuous employment as a Diagnostic Medical Sonographer in a clinical setting.
- Must have a minimum of six months or more of experience working side-by-side with one or more new graduate/entry-level sonographers (within the last year) in a clinical setting.

You were not selected to participate in research because you did not meet one or more of the afore mentioned criteria. However, although you were not selected to participate in research, please note that the results of research may be shared with you after the conclusion of the study and upon your request.

Do not hesitate to keep in touch and reach out to me if you would like the results of research to be shared with you.

For questions or concerns about the study, you may contact Dr. Chris Stream at 702-806-9067, or via email at chris.stream@unlv.edu.

Best,

Janice L. Glasper

Janice Glasper, MEd, RDMS, RVT

Ph.D. Candidate and Student Researcher

Researcher Field Notes/Additional Comments/Follow-Up Interview Form

Participant Interview Code/Unique Identifier: _____

Initial interview completed by (Phone or In-person & location): _____

Participant completed questionnaire privately and returned to the researcher: <u>Y</u>___<u>N</u>_

    Date survey/questionnaire received from Participant: _____

<hr>

<u>**Field Notes**</u>**: Completed via Phone**

Interview Date: _____   **Time: (start)** _____   **(end)** _____

In advance, review responses from Participant's Questionnaire: Add notes, questions, or the need for clarification in this section of the Field Notes Form. Clarify during this follow-up conversation with participants.

Follow-up Questions:

    1. Other than communication, critical thinking, conflict resolution/problem solving, teamwork/collaboration, and attention to details, are there any other skills necessary for success in the workplace as a diagnostic medical sonographer?

    2. In your opinion, is the practice of sonography a low, medium, or high stress workforce discipline?

        a. Why?

        b. Do any of the reasons you mentioned above contribute to the struggle's new graduate/entry-level employees may face in the workplace? Explain.

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Education

University of Nevada, Las Vegas

Ph.D. – Workforce Development and Organizational Leadership	**2021**
M.Ed. – Educational Leadership w Emphasis on Workforce Education	**2004**
BS – Radiologic Technology with Emphasis on Diagnostic Medical Sonography	**1991**

Experience

College of Southern Nevada

Dean, Engelstad School of Health Sciences   2018 – Present

- Provide leadership, support, advice and direction to the Department Chairs, classified staff, and Health Programs Advisors in the School.
- Responsible for oversight, review, revision, and reallocation as necessary, of more than 350 budgets in the school, totaling approximately $1.2 million.
- Provided leadership in curriculum development/review, to include academic program review of all health sciences programs in the school.
- Provided leadership and support for specialized accreditation of all health sciences programs in the school that have external accreditation requirements. Participated in support of program faculties, curriculum and learners in the accreditation site visit for Medical Assisting, Dental Hygiene, Dental Assisting.
- Facilitated new program development and expansion of programs both inside the school and outside the institution, through collaboration with the ESH's Leadership Team/Dept Chairs.
- Coordinated annual assessment of all program's SLOs with both Department Chairs and Program Directors.

Director of Health Programs Advising and Limited Entry Admissions   2014 – Present

- Supervise, review and evaluation of 10 employees to include Health Programs Advisors, three AAs, and the Limited Entry Coordinator.
- Review of limited entry applications for various potential learners, provide advice, direction, and next steps to complete.
- Research to resolution of all issues/concerns/complaints related to the Limited Entry Process
- Oversight of the WC Online Appointment System to include facilitation, development, and revision of all employee schedules, as well as communication with Health Sciences

learners to assist them with navigation of the appointment system, PW resets, and account re-establishment.

- Departmental assessment for effectiveness and employee production.

Administrator, CSN Dental Faculty Practice   2018 – Present

- Provide leadership and direction to address the employee needs, the needs for budget allocation related to equipment repair and replacement, and addressing the problems and concerns including the ever- increasing deficit.
- Provide support for equipment replacement through either Perkins funding or Budget requests
- Provide program data analysis and next steps toward recovery to CSN Administration and BOR
- Collaborate with the WC Campus Provost and Dental Director for next steps and best practices for facilitation and oversight of a self-funded account.
- Provide data analysis report, assessment activities, and outcomes to BOR to include production, expenses, billing, and collection activities, as well as progress toward financial stability.

Director, Achieving the Dream, CSN   2012 - 2014

- Lead CSN's "Dream Team" consisting of 75 members from all areas of the institution, in planning, development, delivery and assessment of comprehensive strategies, for realizing the Achieving the Dream (ATD) goals of CSN for all its constituents.
- Communicated CSN's ATD goals, best practices, and objectives for learner and institutional success across the institution, local community, and legislative leaders.
- Worked closely with ATD coaches, CSN Administration, Dream Team members and Student Government, for input, advice, direction, and review of best practices in promoting and implementing learner success initiatives.

Chairman, Department of Dental, Diagnostic, and Rehab Services, CSN   2009 -2012

- Direct, supervise and evaluate 45 full-time faculty, 52 part-time faculty and 9 support staff spread across 13 health sciences programs, with a learner population for all programs of approximately 1800. Work closely with program learners to ensure that department is meeting their educational needs. Also conducted formal investigations related to documentation, advice and resolution of faculty and/or learner related issues.
- Performed budget review for all programs and provided recommendations to school Dean for fiscal expenditures. Also approved faculty workloads and department/program expenditures, work requests, and additional responsibilities related to budget utilization.
- Communicated to faculties and staff, the policies and procedures regarding learners, course/program curriculum development and instruction, examination policies, syllabus policy, and other instructional matters. Communicated policy changes or directives from the school/institutional administrators across all program faculty, staff and learners.
- Collaborated with Administration (School Dean), faculty, staff, and program learners to ensure that goals and objectives of the School of Health Sciences are met, in support of the school's strategic plan as well as CSN's mission and strategic plan.

Director, Diagnostic Medical Sonography Program   2004 - 2009

- Collaborated with program faculties to ensure quality, standards, and professionalism of Diagnostic Medical Sonography is maintained throughout curriculum, and instruction of program learners.
- Planned, evaluated, and revised Sonography Program's curricula, course content, course materials, and methods of instruction as indicated by Joint Review Commission (JRC) accreditation standards and guidelines.
- Remain informed about developments in the field of sonography by reading current literature, talking with colleagues, and participating in professional conferences, workshops and seminars.
- Corresponded with the Commission on Accreditation of Allied Health Education Programs (CAAHEP) and the Joint Review Commission on Diagnostic Medical Sonography (JRC-DMS) to ensure accreditation standards and guidelines for programmatic accreditation is met and to maintain successful programmatic accreditation status.
- Responsible for the instructional delivery of SON 101, 101L, 160, 195, 235, 245, 250, 255, 260, 275L, and 276L

Additional Related Experience – Diagnostic Medical Sonography Professional
- 30-year history of continuous employment as a Diagnostic Medical Sonographer in Nevada,
- 20-year history as a Sonography educator in Nevada.
- 16-year history as an accreditation site visitor for the Commission on Accreditation of Allied Health Education Programs (CAAHEP), evaluating sonography educational programs across the U.S. for consideration of their request for initial or continued accreditation.
- American Registry for Diagnostic Medical Sonography (ARDMS) Registered Diagnostic Medical Sonographer since 1984 (more than 30 years)
- Possess credentials in Abdominal, Obstetrics/Gynecology, and Vascular Sonography.
- Employment experience spread over the hospital setting, diagnostic outpatient facilities and physician offices.
- Extensive experience working side-by-side with very experienced sonographers (those with more experience than me), new-graduate/entry-level sonographers, and student sonographers.
- Possesses credentials and worked as a Radiological Technologist for seven years in a clinical setting.
- Possesses several years of experience working as a CT (CAT Scan) Technologist in the clinical setting.
- Professional Development activities required to maintain credentials are up-to-date and appropriately aligned with best practices in Sonography.
- Served as an Expert Witness in a Legal Litigation Case - Performed a review of ultrasound images, patient medical records, and provided summary write-up of the case for legal litigation.

Accomplishments
- Participated with support from the Vice Chancellor and the Nursing Program faculties to develop and promote legislation to allow simulation to be utilized to replace a significant portion of the clinical requirements, specifically for the Nursing Assistant Program learners.

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- Developed mandatory procedures and processes for learners to follow to ensure their successful application to the Limited Entry Program of their choice.
- Wrote a successful Perkins Grant request for three Health Programs Advisors to participate in much needed professional development activities.
- Implemented an online appointment system (WC Online), making it easier for learners to make advising appointments and easier for me to track and assess advising activities.
- Developed an interdepartmental process whereby the knowledge and skills necessary to facilitate limited entry procedures could be transferred across the entire department, and thereby strengthen communication, reduce potential errors and improve learner access through successful application.
- Chaired the Engelstad School of Health Science's Strategic Plan Committee. And, in conjunction with the committee members, was able to revise the School's Strategic Plan to align with the LEAP Principles from AACU, as well as align with and promote the missions and goals of CSN's institutional strategic plan.
- Developed, wrote and implemented a 25-page formal plan of action to include interventions for improving learner success at CSN. This ATD Implementation plan included mandatory procedures for all new-to-CSN learners to follow, and online-student-success modules offered through Student Lingo.
- Developed an additional 15-page ATD formal plan of action to improve learner success and completion rates for future consideration.
- Spoke before Nevada's Board of Regents on Diversity Issues and implementation of various initiatives at CSN to address diversity and inclusion.
- Successfully completed CSN's Educational Leadership Institute in 2012. Served as an active member of CSN's AD Hoc Program Evaluation and Review Committee, to develop the CSN standards and guidelines for programmatic evaluation.
- Presented/hosted workshop on Future Employment Trends in Nevada at the Nevada Association for Career and Technical Education (NACTE) conference.
- Implemented various programmatic changes in curriculum and laboratory activities, such as new curriculum standards for CAAHEP, and clinical tracking system for program learners, as recommended by CSN community partners and/or the Sonography Advisory Board Committee.
- Wrote successful grant request in the amount of $350,000 resulting in the purchase of 4 new ultrasound units, totaling more than $600,000, for the DMS Program and its learners.
- Completed CSN's 10-Week Leadership Academy

Memberships
- Society for Diagnostic Medical Sonographers (SDMS)
- Nevada Association for Career and Technical Education (NACTE)
- Las Vegas HEALS (Health, Education, Advocacy, and Leadership in Southern Nevada) for Advancing Healthcare in Southern Nevada
- Desert Meadows AHEC (Allied Health Education Council)

- Commission on Accreditation of Allied Health Education Programs (CAAHEP)
- Joint Review Committee on Diagnostic Medical Sonography (JRC-DMS)
- Member, Nevada Ultrasound Society