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## Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors

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# **Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors**

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of the requirements for the degree  
Doctor of Education in Educational Leadership

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**Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors**

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## Abstract

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Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors

Chair of Dissertation Committee: Bonnie L. Beach, Ph.D.

The purpose of this dissertation was to explore the level of teaching self-efficacy of clinical preceptors instructing diagnostic medical sonography students in bachelor's degree accredited sonography programs. Clinical preceptors are often very skilled healthcare professionals in their chosen discipline but may have little to no teaching experience. This represents a less than ideal situation because of the integral role they play in the education of the students they supervise. To provide clinical preceptors with the skills and pedagogical techniques they need in order to be successful, training and education should be provided to help prepare them for their roles. While a minority of preceptors do receive some type of training, the majority do not and may feel unprepared and overwhelmed with their teaching responsibilities. In addition, research suggests that if preceptors do not fully understand their role in the educational process, both they and their students will suffer.

This study surveyed sonography clinical preceptors to gauge their overall level of teaching self-efficacy. Their responses suggest that the respondents have a high level of confidence in their abilities to transmit knowledge and abilities to their students. However, it was found that preceptors who had received some type of professional development for their role as preceptor had a statistically significant higher level of teaching self-efficacy than preceptors who had not received any type of training or education for their role. Ultimately, this research revealed an opportunity to make improvements to the onboarding process for sonography preceptors so they will be more confident in their teaching abilities and so their students can reap the benefits of their knowledge and expertise.

## Dedication

*This dissertation is dedicated to my patient, kind, loving husband who has shouldered so many of my responsibilities these past few years and never complained. Your selflessness and encouragement have been my rock and I couldn't have done it without you.*

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## Chapter 1: Introduction

Education for healthcare professionals is conducted in a different manner than many other fields of study within higher education. Healthcare education requires not only didactic coursework but also hands-on clinical experiences as a vital component in the process of educating future healthcare professionals (Nisbet, 2006). The two types of educational experiences complement one another. Foundational skills and theories are taught in classrooms on the college or university campus prior to students beginning their clinical education (Conway-Klaassen et al., 2012). Then through the process of clinical education that theory is translated into practice. In the clinical setting, students incorporate what they have been taught in the classroom into the skills they will use to become competent providers of healthcare services (Ernstzen et al., 2009). Textbook readings and lecture theories become entwined with authentic experiences carried out in actual healthcare settings with real-life patients. The cognitive domain meets the psychomotor and effective domains in clinical education (Ingrassia, 2011). The ultimate goal is to help students acquire clinical proficiency in the skills of their chosen profession (Weidner & Henning, 2002). These types of learning experiences are simply not available in the classroom (Greenfield et al., 2012).

Clinical education is supervised by clinical preceptors. A clinical preceptor is an experienced staff member who assumes the role of instructor for students engaging in clinical education (Altmann, 2006). Clinical preceptors may be known by different titles in different regions and from country to country including clinical associate, clinical educator, clinical faculty, and instructor (Reid et al., 2013). Clinical preceptors facilitate and evaluate student learning during clinical education rotations (Letizia & Jennrich, 1998).

Clinical preceptors have a number of responsibilities. They are charged with not only helping to further the education of the student but with facilitating the student's professional development (Cunningham et al., 2015). They assist students in the development of clinical

skills (Greenfield et al., 2012) and serve as role models who exemplify professional behavior (Rye & Boone, 2009a). Because university or program faculty do not have a constant presence in the clinical setting, it is the preceptor's responsibility to provide continual feedback and support to the student as well as assessment and evaluation data to both the student and faculty (Burns et al., 2006). They are the eyes and ears of faculty members. Student evaluation is perhaps one of the most important roles of the preceptor. The student will not be able to learn and grow without constructive feedback of their performance as well as information about what they can do to improve (Steves, 2005).

Unfortunately, many preceptors step into this clinical teaching role without having received any type of formal training in educational theories, even though these teaching techniques are known to improve student learning and enhance their overall experience (Cunningham et al., 2015). Preceptors are often expert clinicians who may find themselves unprepared to manage the many clinical teaching challenges that call for specific educational and evaluative strategies (Suplee et al., 2014). This is concerning in light of the fact that health profession student success can depend on the effectiveness or ineffectiveness of their clinical preceptor (Palmer & Naccarato, 2007).

Because student success in large part rests on the shoulders of their preceptors, it is vitally important that preceptors receive proper training and education for these roles. Research suggests that if preceptors do not fully understand their role in the educational process, both they and their students will suffer (Hewitt & Lewallen, 2010). A formal preceptor preparation program should be considered essential and should be designed to properly prepare preceptors who will then work to ensure the development of safe and competent healthcare practitioners (Baltimore, 2004). Prior preparation will help to ensure that the clinical preceptor will possess knowledge of effective teaching behaviors (O'Shea & Parsons, 1979). Through an orientation process, preceptors should be made aware of the university's expectations as well as students'

course-specific clinical learning objectives (Jnah & Robinson, 2015). Further, the orientation process should provide opportunities for preceptors to gain an understanding of the principles of adult education, appropriate student learning assessment techniques, and clinical performance evaluation processes (Laforet-Fliesser et al., 1999). If not provided with a proper onboarding process, preceptors may struggle with a lack of self-confidence and with evaluating student progression during their clinical rotations (Giordano et al., 2007).

The lack of proper training, coupled with role ambiguity, can potentially lead to decreased feelings of self-efficacy for clinical preceptors. The theory of self-efficacy was developed by Bandura (1977). Perceived self-efficacy examines how well individuals feel they are performing tasks or roles. Self-efficacy helps determine the choices that people make, how much overall effort they will expend on a certain task, and their level of perseverance in the face of challenges (Bandura, 1977). In the case of preceptors, self-efficacy relates to their perceived ability to contribute to student learning and to affect their clinical performance. Although preceptors may possess a high level of personal self-efficacy due to their clinical expertise, their self-efficacy in regard to teaching may be less highly developed (Kim & Shin, 2017). A low sense of self-efficacy on the part of preceptors can lead to role dissatisfaction for them, and a poor clinical experience for their students.

### **Statement of the Problem**

Research has demonstrated that while clinical preceptors are an integral part of the healthcare clinical education process, they often have little to no knowledge of instructional pedagogy and can benefit from formal training and education to improve their effectiveness in the clinical teaching roles. While many studies have examined topics that should be included in training programs, little research has delved into the perceived ability of clinical preceptors to perform their roles. Furthermore, research specifically examining the perceived teaching self-

efficacy of clinical preceptors working with diagnostic medical sonography students is nonexistent.

### **Theoretical Framework**

The self-efficacy of sonography preceptors will be assessed using a quantitative research study that is grounded in a post-positivist paradigm. This paradigm is based on the belief that reality can be discovered through objective observation, measurement, and interpretation of data (Sousa et al., 2007). Post-positivism believes that there is an objective reality that can be observed and quantified (Seers & Critelton, 2001). Through a post-positivist approach, ideas and concepts can be reduced to variables, allowing for the exploration of the relationships between and among the variables (Sousa et al., 2007). Quantitative data will be collected based on the epistemology of an outsider perspective in order to minimize researcher interference (Terrell, 2016). The researcher will use survey research to conduct a descriptive correlational design research study. This type of research design describes variables and the relationships that occur between and among them (Sousa et al., 2007).

### **Significance of the Study**

The literature reveals little research into the perceived teaching self-efficacy of clinical preceptors, and no literature was found pertaining specifically to clinical preceptors working with diagnostic medical sonography students. This represents a gap in the literature. The purpose of this research is to evaluate the perceived teaching self-efficacy of clinical preceptors teaching diagnostic medical sonography students in accredited bachelor's degree programs. The knowledge gained from this study will help to improve the educational process for both sonography preceptors and students. The implications from this research will help educational leaders understand how to better prepare sonography preceptors and improve the overall clinical experience for both the preceptors and the students.

### **Research Questions**

1. What is the level of teaching self-efficacy of clinical preceptors teaching diagnostic medical sonography students in accredited bachelor's degree programs?
2. Is there a difference in the teaching self-efficacy of preceptors who have received prior training and those who have not received training?
3. Is there a relationship between the amount and type of training for the preceptor role and the level of teaching self-efficacy?
4. Is there a relationship between educational levels and teaching self-efficacy?
5. Is there a relationship between years of service and teaching self-efficacy?

### **Definition of Terms**

*Clinical Education:* “the provision of guidance and feedback on personal, professional and educational development in the trainee's experience of providing appropriate patient care” (Kilminster et al., 2007).

*Clinical Setting:* those hospitals or other health care facilities where students have the opportunity to utilize their didactic preparation to gain the necessary practical knowledge and clinical skills that will prepare them for practice in their future healthcare careers; a place where students are given the opportunity to learn from other healthcare professionals (Alghamdi et al., 2019).

*Clinical teaching:* “that instruction which occurs in settings and situations in which the student is giving direct care to real clients as part of a planned learning activity (O'Shea & Parsons, 1979, p. 411).

*Effective clinical teaching:* those actions, activities, and verbalizations of the clinical instructor which facilitate student learning in the clinical environment (Knox & Mogan, 1985).

*Effective Teaching Behaviors:* those behaviors (actions, activities, and verbalization) by clinical preceptors which facilitate students' learning in the clinical setting (O'Shea & Parsons, 1979).



*Preceptor*: “An individual at the clinical education site that directly instructs and supervises students during their clinical learning experiences” (Greenfield et al., 2012).

*Self-efficacy*: “People’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but the judgments of what one can do with whatever skills one possesses” (Bandura, 1986, p. 391).

*Teaching ability*: the process of transmission of knowledge, skills, and attitudes, and the creation of an atmosphere in which this is done (Knox & Mogan, 1985).

## Chapter 2: Literature Review

The educational process for allied health professionals involves not only didactic education but competency-based clinical education as well. This hands-on practice of skills learned in the classroom takes place in a clinical education setting where students practice and hone what they have learned in a real-world setting on actual patients (Altmann, 2006; Ernstzen et al., 2009; Greenfield et al., 2012). This experiential learning process is especially important for students in diagnostic medical sonography programs who must perform hundreds of hours in the clinical setting to be able to demonstrate clinical competency (Commission on Accreditation of Allied Health Education Programs, 2019). While didactic education usually takes place in a college or university setting under the guidance of qualified faculty members, clinical education is often supervised by volunteer clinical instructors or preceptors who are experts in their field but may have no formal training or experience in the educational process or knowledge of pedagogy (Henderson et al., 2006; McLeod et al., 2003; Suplee et al., 2014). Sonography students as well as students in all allied health education programs will receive better clinical instruction when placed with a clinical instructor or preceptor who has received enough education and professional development to properly instruct and evaluate their clinical performance.

A review of the literature reveals some common themes that must be considered when discussing the delivery of clinical education. Several inquiry questions were formulated based on those themes. What are the origins of the clinical education model, and why is it important to the educational process of healthcare professionals? What are the characteristics of a good clinical preceptor and how are they selected? What are the roles and responsibilities of clinical preceptors? What are the advantages and disadvantages of serving as a preceptor? Is there a need to provide professional development training to preceptors in healthcare education, and if so, what should be taught in this training? What support should faculty be providing for clinical

instructors and preceptors? Most importantly, what is the perceived teaching self-efficacy of clinical preceptors? Specific research should be directed toward the perceptions of preceptors in the field of diagnostic medical sonography education, as little if any research was uncovered regarding this particular area of education.

### **History of Clinical Education**

The current educational process for healthcare professionals is modeled after the methods used to educate physicians, yet even future medical doctors were not always afforded the luxury of involvement in clinical education. In the mid-19<sup>th</sup> century, physician instruction was almost wholly didactic and mainly involved rote memorization. Many students graduated without ever having touched an actual patient or having any type of practical clinical experience. Over time, it became more and more evident that practical hands-on experience was necessary to produce competent healthcare professionals (Ludmerer, 1985).

After the American Civil War, educators came to the realization that medical students could no longer be passive observers but must be active participants in patient care in order to properly learn their craft. Students needed to experience the actual conditions that they would be exposed to in their medical practice, not simply hear about them in a lecture (Ludmerer, 1985).

The first innovation in the education of medical students was known as the section method. With this technique, lecture was supplemented by having small groups of students spend a few hours each day watching the examination of patients in a hospital setting and following the progress of certain select cases. While the section method was a step in the right direction, it still did not involve the pedagogic principle of learning by doing. Instead, it was purely demonstrative. Students observed patient care but did not provide it. They were still merely passive observers (Ludmerer, 1985).

By the early 20<sup>th</sup> century, it became evident that medical students needed more hands-on experience in a clinical environment to become competent practitioners. This led to the clerkship method of instruction. Clerkship rectified the pedagogic weakness of the section method of instruction by realizing the necessity of bringing the patient and the student into close contact (Osler, 1906). In clinical clerkships, students were encouraged to spend the majority of their time carrying out actual patient care activities rather than merely observing. The clinical clerkship was quickly adopted in all American medical schools (Ludmerer, 1985).

The clinical clerkship has stood the test of time and is still considered a valid educational experience just as it was in the early 1900s (Lippard, 1974). The approach of students acquiring clinical skills at the patient's bedside is still accepted as the most effective means of teaching medicine (Packman & Krakov, 1993). It is widely recognized that the process of learning in a clinical environment and the physical act of practicing medical skills is vital to the proper development of competent healthcare professionals (Doughty & Hadgson, 2008). It is only by working with preceptors in a medical environment that students can gain the knowledge and experience that will lead them to a successful future practice (Kaufman, 1976).

Thus, clinical education of all healthcare professionals has evolved from this educational paradigm of physician education and training. It is universally accepted that clinical education in the form of an apprenticeship in which a student learns from a skilled and knowledgeable preceptor through a focused approach is the model for healthcare education. Clinical education has been and will continue to be of vital importance in a student's educational journey from novice to competent practitioner (Weidner & Henning, 2002).

### **The Importance of Clinical Education**

Clinical educational experience is the model of education utilized by healthcare education programs (Altmann, 2006; Ernstzen et al., 2009; O'Callaghan, 2007; Rye & Boone, 2009a; Suplee et al., 2014) and is an essential component of a healthcare student's coursework

(Thimsen, 2021). Graduates of these programs utilize skill-based activities and critical thinking in their practices that directly or indirectly involve the care of patients in a clinical environment. This type of instruction involves more than just motor skills. It can be thought of as a cognitive apprenticeship in which theory is linked to practice (Nisbet, 2006; Smedley, 2008). Clinical education provides students with experiential learning, which is a type of active learning. Through hands-on activities in a real-world environment, students apply concepts learned in the classroom to clinical practice (Knox & Mogan, 1985; Steves, 2005; Thimsen, 2021). In this way, clinical education serves to bridge the gap between theory and practice (Cunningham et al., 2015; Hewitt & Lewallen, 2010). It serves to resolve any conflict between evidence-based theory taught in the classroom and the practices students observe in the clinical environment (Nisbet, 2008; Spouse, 2001). By engaging in supervised clinical experiences, students can practice patient care skills, validate classroom theory, and acquire psychomotor skills that can only be gained when working with actual clients (Oermann, 1996; Rye & Boone, 2009a). The academics taught in the classroom and the education received in clinical experience work in conjunction to develop the future generations of healthcare professionals.

### **The Role of the Preceptor**

Health profession students are supervised in the clinical setting by clinical preceptors. A preceptor is a clinician who engages in a professional relationship with a student for a fixed period of time in order to assist the student in achieving educational goals and objectives (Altmann, 2006; Burns & Northcutt, 2009; Greenfield et al., 2012; Ingrassia, 2011). Preceptors are healthcare practitioners directly involved in student education in a clinical context (Burns et al., 2006; Cunningham et al., 2015). The interaction between a student and a preceptor is a professional relationship in which the two parties work together in a clinical setting with the purpose of achieving course goals and educational objectives (Burns & Northcutt, 2009). These individuals may also be called clinical instructors or clinical educators (Reid et al., 2013). These

terms will be used interchangeably in this review. As described by Rye and Boone (2009b), preceptorship is the most popular model for clinical teaching at both the undergraduate and postgraduate level of healthcare education. They are essential for the educational preparation of qualified allied health professionals (Baltimore, 2004; Rye & Boone, 2009a). One of the greatest strengths of an effective clinical preceptor is the ability to demonstrate their own expertise in the educational experience they provide to future healthcare professionals (Henderson et al., 2006).

In the education of healthcare professionals, many of the abilities they will use in the performance of their future jobs can only be acquired through hands-on clinical practice (Levy et al., 2009; Rye & Boone, 2009b). As noted by Nisbet (2008), clinical instructors guide student learning with the goal of developing professional competence. Their role is to facilitate the process of assimilating new information, not merely to present information (Baltimore, 2004). They are there to guide their students in acquiring both competence and confidence in the acquisition of their new clinical skills (Letizia & Jennrich, 1998). Preceptors are experienced professionals who facilitate and evaluate the learning process while assisting students in developing critical thinking and skill development (Kennedy, 2019; Roman, 2018). Their primary role is to help bridge the gap between theory and practice (Goss, 2015).

### **Preceptor Selection Process**

A number of factors are taken into consideration when selecting individuals to fill this vital teaching role. The one most often cited in the literature is the need for good communication skills (Altmann, 2006; Letizia & Jennrich, 1998; Myrick & Barrett, 1994; Oermann, 1996; Recker-Hughes et al., 2014; Smedley, 2008; Westra & Graziano, 1992). Preceptors must be able to effectively convey instructions, expectations, and feedback to their students in order to facilitate the learning process. They should be motivational, supportive, and able to communicate clear expectations to their students.

A factor deemed equally important in the selection process is sound clinical competency (Altmann, 2006; Buccieri et al., 2013; Letizia & Jennrich, 1998; Oermann, 1996; Recker-Hughes et al., 2014; Rye & Boone, 2009a; Westra & Graziano, 1992). Without sound clinical skills in the chosen healthcare profession, a clinical preceptor will be unable to properly educate and pass along those skills to the next generation of healthcare professionals. However, there is no consistency in the literature about what constitutes clinical competence. It seems to be a subjective matter. Some authors base the selection process on years of clinical experience (Altmann, 2006; Letizia & Jennrich, 1998; Rye & Boone, 2009a), but again there is no standardized number to serve as a guideline. Some suggest as little as six months of experience, while others believe that two years of experience should be the minimum. To go along with years of clinical experience, a preceptor's level of education should also factor into the selection process. This will most likely depend on the educational requirements and terminal degree for each individual profession (Altmann, 2006; Rye & Boone, 2009a).

Preceptors are also sought out for their teaching skills and ability to work effectively with students (Buccieri et al., 2013; Letizia & Jennrich, 1998; Myrick & Barrett, 1994; Recker-Hughes et al., 2014). Other valuable qualities include enthusiasm, a positive attitude, a willingness to volunteer, and exceptional interpersonal skills (Altmann, 2006; Buccieri et al., 2013; Letizia & Jennrich, 1998; Myrick & Barrett, 1994; Oermann, 1996; Rye & Boone, 2009a). Preceptors help students to feel empowered (Rye & Boone, 2009b). They are role models and demonstrate enthusiasm for their jobs (Rye & Boone, 2009a). All these qualities are thought to significantly increase a student's ability to adjust and learn in the clinical environment. Research has shown that students whose preceptor demonstrates positive teaching and leadership qualities experience enhanced educational benefits such as lower attrition rates, higher program completion rates, and the production of healthcare professionals who are prepared for entry-level positions (Zilembo & Monterosso, 2008).

Unfortunately, preceptor selection is often not based on any of the discussed factors but is based simply on a matter of availability. They are often assigned this role by an authority figure and expected to teach without any regard for their desire to do so (Knight, 2018). If the selection process is merely a matter of convenience, it stands to reason that the most appropriate person most likely will not be selected for the job (Altmann, 2006; Letizia & Jenrich, 1998; Myrick & Barrett, 1994; Oermann, 1996). Worse yet, a very negative experience may result for both the student and the preceptor if the role is not taken on willingly (Henderson et al., 2006; Smedley, 2008). An effective preceptor can enhance the learning experience, while ineffective teaching obstructs learning in the clinical environment, affects students' desire to succeed, and impairs students' professional development (Knight, 2018; Knox & Mogan, 1985).

### **Advantages and Disadvantages of the Preceptor Role**

The role of preceptor can be both rewarding and challenging. The literature lists many aspects of the role that clinicians perceive as advantages. Research has shown that preceptors enjoy the intellectual challenge and stimulation that goes along with teaching students (Oermann, 1996; Parsons, 2007; Zilembo & Monterosso, 2008). They know they must stay informed and up to date on current practices in order to properly educate their students and effectively answer any questions they may have. Preceptors also feel that their role affords them professional growth (Altmann, 2006; Giardano, 2007; Laforet-Fliesser et al., 1990; Myrick, 1994) as preceptorship can be a steppingstone to further professional career advancement. Preceptors reported enjoying the honor and recognition they receive for their work as advantages (Laforet-Fliesser et al., 1999; Parsons, 2007). They enjoyed receiving invitations to university and program functions and appreciated benefits such as library privileges and access to various academic resources (Parsons, 2007). Some preceptors even reported tuition reimbursement and monetary compensation as advantages that accompanied their teaching roles (Oermann, 1996). Overall, the advantages most frequently reported were the enjoyment



and satisfaction of sharing knowledge and expertise with future healthcare professionals, as well as the satisfaction of seeing their students grow and mature (Giordano et al., 2007; Henderson et al., 2006; O'Callaghan, 2007). Some feel that their teaching efforts contribute to their profession by shaping the careers of future healthcare professionals (Giordano et al., 2007). All of these factors led to increased job satisfaction for clinical preceptors (Altmann, 2006; Parsons, 2007; Zilembo & Monterosso, 2008). Teaching healthcare students in the clinical setting requires time, patience, hard work, and the acquisition of many new skills, but for some, the overall rewards are worth the effort.

Precepting, however, is not without its own set of challenges. Perhaps the most frequently reported disadvantage was a lack of time to deal with multiple demands from both students and patients simultaneously (Burns et al., 2006; Giordano et al., 2007; Henderson et al., 2006; Laforet-Fliesser et al., 1999; Wu et al., 2018). Many feel the pressure of time constraints and increased workload due to their dual roles as clinical instructors and staff members (Henderson et al., 2006; Rye & Boone, 2009a) where the primary focus in the clinical setting is on the patient, not the student (Knight, 2018). Being torn between two competing demands creates a lack of balance for many preceptors (Cunningham et al., 2015; Giordano et al., 2007). Unfortunately, this situation often results in students taking a secondary role to patient care and possibly missing out on learning opportunities (Ernstzen et al., 2009). Conway-Klaassen et al. (2012) report that preceptors perceive that the presence of students decreases productivity. These multiple demands can lead to a number of negative feelings. Preceptors report feelings of work overload and role dissatisfaction (Baltimore, 2004; Larsen & Zahner, 2011; Parsons, 2007). They complain of added stress to an already stressful position because they take on an increased workload and a responsibility for their students' work (Condrey, 2015; Laforet-Fliesser et al., 1999). Multiple demands, a lack of time, and inadequate preparation for the preceptor role can lead to a number of serious consequences. Among those reported are

burnout, lack of confidence of their abilities, frustration, uncertainty, and feelings of resentment (Burns & Northcutt, 2009; Giordano et al., 2007; Myrick, 1994; Smedley, 2008). Still other preceptors complain of a lack of compensation for their educational responsibilities. This is most likely because many preceptors are volunteers, not paid university faculty (Giordano et al., 2007). All of these factors can lead to feelings of decreased job satisfaction (Baltimore, 2004), as well as a decrease in morale for both the preceptor and the clinical staff (Smedley, 2008). Other clinical instructors view their supervisory role in a negative light because they did not volunteer for the task. Instead, they shoulder their responsibilities unwillingly because they were told it is part of their job or felt they had no say in the matter (Henderson et al., 2006). Such challenges and negative consequences may lead to fewer clinicians willing to accept a role as a preceptor. A lack of qualified preceptors could certainly lead to decreased clinical preparation for healthcare students.

### ***The Need for Preceptor Training and Education***

Despite the importance of clinical instructors and preceptors to the clinical education process, these individuals often find themselves unprepared to step into these critical roles. Preceptors most often are employees of the clinical affiliate and offer their services as unpaid volunteers from outside of an academic institution. While they may be competent practitioners, few have undergone formal or even informal training about educational concepts and principles (Buccieri et al., 2013; Henderson et al., 2006; McLeod, 2003; Suplee et al., 2014; Recker-Hughes et al., 2014). There is a pervading assumption that clinical expertise carries over into teaching and that a skilled healthcare practitioner can simply step into the role of clinical preceptor without any preparation. However, this assumption is not true (Henderson et al., 2006; Knight, 2018; Suplee et al., 2014; Thimsen, 2021). Professional development in the form of some type of formal preceptor education is necessary to prepare preceptors for their roles

(Kennedy, 2019). Education and training will help them to feel knowledgeable about their role so they can provide the educational support they need to effectively educate students.

Because of a lack of training and preparation, the literature finds that preceptors often do not have a clear understanding of their role in the academic program nor in the overall process of the education of the students who are assigned to them (Conway-Klaassen et al., 2012; Giordano et al., 2007; Hewitt & Lewallen, 2010; Suplee et al., 2014). Without a clear understanding of this role and how the preceptor contributes to the educational process, both the preceptor and the student can suffer. Sometimes the information to be disseminated is simple in nature and addresses the procedures of the educational program. For example, preceptors may be unaware of topics as basic as program policies (Hewitt & Lewallen, 2010; Hunt et al., 2013; Suplee et al., 2014). Simply being provided information about attendance, dress codes, disciplinary procedures, confidentiality, and academic integrity can help preceptors feel more comfortable in their roles. The same holds true for the curricular portion of the program. Without proper training and orientation, preceptors may be unaware of course content, objectives, learning outcomes, and student expectations. They may not understand exactly where the course their students are enrolled in fits into the overall sequence of the program (Conway-Klaassen et al., 2012; Glynn et al., 2017; Hunt et al., 2013; Jnah & Robinson, 2015). Familiarization with the course sequence of the educational program and where their students fit into that sequence ensures that preceptors know what skills have already been taught and what the student still needs to learn. Furthermore, they should be made aware of the required time frame for the demonstration of competency in clinical skills. Providing material such as the overall program curricular design, syllabi for individual courses, and textbooks can provide clarity, avoid confusion, and ensure consistency across the program (Hewitt & Lewallen, 2010; Suplee, 2014).

Because of their different educational backgrounds, clinical instructors may be confused about exactly what needs to be taught to students and appropriate teaching strategies. Without training and preparation, they may fall back on the knowledge of how they themselves were taught instead of utilizing specific teaching strategies and evidence-based approaches (Conway-Klaassen et al., 2012; Hewitt & Lewallen, 2010; Suplee et al., 2014). Due to lack of knowledge and inconsistencies in backgrounds and prior training, there may not be consistent procedures in place to ensure that evidence-based professional standards are being met in the clinical rotation (Recker-Hughes et al., 2014). Improper teaching methods can result in negative effects on student learning outcomes (Thimsen, 2021). There must be a method in place that will produce consistency in teaching approaches and standardization of the clinical experience. This can only be achieved through professional development.

Perhaps the greatest difficulties lie in the fact that many clinical instructors do not understand pedagogical concepts. They seldom have any formal training in areas such as teaching methodology, evaluation of clinical performance, or learning styles prior to receiving students (Thimsen, 2021). They may not fully understand the intricacies involved with teaching, evaluating, and communicating effectively with students (McLeod et al., 2003). The literature reveals two particular areas where preceptors seem to struggle the most. The first deals with providing effective feedback and performing evaluations of student work (Hewitt & Lewallen, 2010; Hunt et al., 2013; Liao et al., 2019; Reid et al., 2013; Suplee et al., 2014). Preceptors reveal that they are often uncomfortable with this aspect of teaching, mostly because they are unfamiliar with the process. Research has also shown that preceptors need instruction in teaching and learning theory and strategies in order to become more effective in their work (Buccieri et al., 2013; Conway-Klaassen et al., 2012; Phillips, 2006; Recker-Hughes et al., 2014). While they may be experts in their chosen field, they cannot be expected to become effective teachers without proper training and education about pedagogical techniques. The

bottom line is that preceptors will be able to better perform their roles and do so more confidently if they are offered some type of formal training and preparation (Altmann, 2006; Buccieri et al., 2013; Burns & Northcutt, 2009; Clay et al., 1999; O'Callaghan, 2007). Research has shown that professional development translates into improved teaching effectiveness and therefore improved student learning outcomes (Roman, 2018). Without training, there is a lack of continuity in students' educations. Ultimately both the student and the preceptor will suffer due to this lack of preparation (Hewitt & Lewallen, 2010).

### **Faculty Support for Preceptors**

The literature makes a compelling case regarding the need for proper training and orientation of preceptors involved with healthcare educational programs. Program faculty leaders should ideally be the ones providing the training for preceptors who are working with their students. Training from faculty will provide preceptors with the support they need to perform their roles effectively and to face any challenges that might arise (Suplee et al., 2014). Faculty can also assist preceptors with professional development and continuing education (Giordano et al., 2007). Research has shown that preceptors find it helpful if faculty define their expectations up front. Preceptors also request faculty instruction on matters involving adult education principles and techniques, as well as assessment and evaluation of student performance (Laforet-Fliesser et al., 1999).

In addition to providing educational training, the literature demonstrates the need for ongoing support for clinical preceptors from leadership. Providing support increases the quality of the student's educational experience and ensures that the preceptor will be able to help produce competent healthcare practitioners (Thimsen, 2021). Support is most helpful at the beginning of clinical experiences when they are first learning their roles and require additional guidance (Laforet-Fliesser et al., 1999). Zilembo and Monterosso (2008) state that preceptor support for their role should occur as a collaborative effort between the preceptor, the

healthcare organization, and the college or university that houses the healthcare program. Faculty should be a visible presence at clinical sites at regular intervals. They should convey to the clinical instructors the importance of their roles in clinical education. Faculty should keep open lines of communication with their clinical partners and accept any input they may have for the improvement of the clinical education process. Timely communication can clear up misconceptions that might occur between program faculty and clinical instructors (Conway-Klaassen et al., 2012). Continuous feedback between program leadership and preceptors is essential for program success (O'Callaghan, 2007). This is especially true since the clinical instructor is often not employed by the college or university (Smedley, 2008). Clinical instructors should also be asked to play a role in the program accreditation process (Giordano et al., 2007). Overall, research shows that faculty support for preceptors can enhance the preceptors' understanding of their role which in turn will result in a standardized clinical experience for their students (Conway-Klaassen et al., 2012). Without the benefit of training and support from faculty leadership, fewer healthcare professionals will be willing to take on the role of preceptor. This will ultimately lead to decreased levels of preparedness for students in healthcare educational programs (Parsons, 2007).

### **Pedagogy of the Preceptor**

Due to the fact that most preceptors have little to no prior teaching experience, it is important that some basic pedagogical techniques be taught to preceptors. These roles can be quite complex and require knowledge in a multitude of content areas such as clinical and content expertise, role modeling, educational facilitation and collaboration, coaching, advocacy, and evaluation (Phillips, 2006; Reid et al., 2013). The literature suggests a number of learning theories and strategies that can help preceptors to be more effective and successful.

For example, preceptors must be prepared to instruct students through the process of demonstration and modeling (Baltimore, 2004; Burns et al., 2006; Clay et al., 1999; Erestzen et

al., 2009; Kelly, 2007). Prior to entering the clinical setting, many health profession students have received classroom instruction specific to their particular careers. A clinical preceptor must be able to demonstrate the clinical skills necessary to perform as a professional in that particular field. They have to be able to relate the knowledge students have learned in the classroom to the tasks they will encounter in the clinical environment (Thimsen, 2021). They must also be prepared to serve as a role model for students in order to set the tone for their future careers. Through the pedagogical practice of demonstration, preceptors are effectively linking classroom theory to practice by modeling evidence-based approaches to proper patient care (Ernstzen et al., 2009; Glynn et al., 2017; Greenfield et al., 2012).

Preceptors should be prepared to incorporate the practice of incremental learning into the educational process. Instruction should be based on the student's current level and be allowed to progress as the student gains greater knowledge and skills (Greenfield et al., 2012). Preceptors should be familiar with the current knowledge base of their students and assign their educational tasks accordingly (Burns et al., 2006). Clinical expectations should be based on a student's current experience level so as not to place them in situations in which they have no prior training or experience (Baltimore, 2004). Such a situation could result in confusion and loss of confidence for the student, as well as potentially placing the patient at risk of injury or harm.

Preceptors should be aware of the students' individualized learning styles and be prepared to incorporate student-centered teaching strategies into their instructional methods (Burns et al., 2006; Ernstzen et al., 2009; Greenfield et al., 2012; McLeod et al., 2003; Roman, 2018). Because not all students learn in the same manner, it is important for preceptors to make every attempt to match their instructional technique to the student's learning style in order to achieve the best results (Baltimore, 2004). Adaptability to each individual's learning needs

will ensure that students are reached in the manner most conducive for them, therefore producing the most effective results (Smedley, 2008).

In regard to individual learning needs, preceptors must be aware of and utilize adult learning principles (Altmann, 2006; Letizia & Jennrich, 1998; Kennedy, 2019; Levy et al., 2009; Smedley, 2008). As adult learners, college students bring previous knowledge and life experiences into the educational process. New information will best be incorporated into learning when it can be related to these past experiences (Baltimore, 2004). Preceptors must understand that adult learners are active learners who learn best when participating in the educational process (Ernstzen et al., 2009; Greenfield et al., 2012). They are goal-oriented and eager to learn (Kelly, 2007). They would much rather discuss a topic or engage in a project than passively listen to a lecture. Thus, it is the preceptor's responsibility to be a facilitator of learning. They must help students to assimilate new information by actively engaging with it, not merely by presenting it (Baltimore, 2004). By keeping these adult learning principles in mind, preceptors will be much more likely to engage the students they are teaching.

Preceptors must also utilize the pedagogy of clinical reasoning and problem-solving. It is vitally important that healthcare students engage in activities that will stimulate their critical thinking abilities (Ernstzen et al., 2009; Glynn et al., 2017; Greenfield et al., 2012; Hunt et al., 2013). In the clinical setting, critical thinking involves informed decision-making based upon the careful identification of issues and problems utilizing various forms of data that are available to the healthcare provider (Baltimore, 2004; Condrey, 2015). To cultivate critical thinking skills, preceptors must teach students the skill of linking educational knowledge to professional knowledge in order to guide and inform decisions (Kelly, 2007).

The provision of appropriate feedback to students is another important pedagogical concept (Greenfield et al., 2012, Levy et al., 2009; Liao et al., 2019; Nash & Flowers, 2017). Preceptors should ensure that feedback is constructive, clear, and unambiguous (Baltimore,



2004). By learning the skill involved in the feedback process, preceptors can help to create competence and confidence in their students which will ultimately help to build their self-esteem. Greater confidence and self-esteem lead to more successful performance and more appropriate decision-making on the part of the students (Ernstzen et al., 2009; Palmer & Naccarato, 2007).

The pedagogical skill most often mentioned in the literature involves evaluation and assessment of student learners (Glynn et al., 2017; Hunt et al., 2013; Liao et al., 2019; Recker-Hughes et al., 2014). Evaluating student performance is a weighty responsibility and should not be taken lightly. A preceptor's evaluation of student performance is a necessary and valuable part of the clinical experience. Evaluating learning outcomes helps ensure that students are competent to progress in their specific programs. It also assures that professional standards are being maintained (Palmer & Naccarato, 2007). Preceptors cannot adequately perform this important duty unless they thoroughly understand the educational program's clinical education goals and objectives (Smedley, 2008). They must be made familiar with the curriculum, objectives, and goals for the clinical course and the evaluation tools being utilized by the program (Burns et al., 2006).

Regardless of the field of study, research consistently demonstrates that healthcare education programs benefit from preceptor training programs that stress learning theory and the use of effective communication strategies with students (Conway-Klaassen et al., 2012; Thimsen, 2021). Such basic pedagogic concepts serve to enhance the abilities of clinical instructors and improve long-term student success (McLeod et al., 2003). Over the long term, a formal preparation program for preceptors ensures the development of competent and safe healthcare practitioners, which will ultimately benefit the general public as a whole (Baltimore, 2004).

### **Self-Efficacy**

While much has been written about the importance of clinical instruction and the need for training and preparation for the preceptors who assume this role, little attention has been paid to how preceptors feel about their ability to accomplish this task.

Psychologist Albert Bandura was the first to introduce the behavioral learning concept of self-efficacy (1977). Perceived self-efficacy is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses" (Bandura, 1986, p. 391). Self-efficacy involves an individual's beliefs about their capability to perform a task at a certain level of proficiency (Bandura, 1984). It also plays a role in determining the choices people make, the amount of effort they will expend on a task, their level of perseverance when faced with challenges, and their levels of anxiety or confidence (Parsons, 2007). Self-efficacy theory helps to explain the relationship between confidence in effective behavior and prior instruction or experience (Bandura, 1977). Self-efficacy is enhanced by environmental factors such as communication or the support from individuals with expertise in a task. These social supports have been shown to help individuals overcome obstacles and reach behavioral goals by increasing one's self-efficacy (Bandura, 1986).

Teaching self-efficacy is a teacher's belief that they can exert an influence over their students that will bring about learning. It stems from the teacher's confidence that he can effect change with his teaching ability and is related to perceived capability in specific situations and tasks (Nugent et al., 1999; van der Bijl & Shortridge-Baggett, 2001). Teaching self-efficacy is comprised of two factors: teaching efficacy and personal efficacy. Many preceptors possess a strong sense of personal efficacy due to their many years of clinical experience. However, their teaching self-efficacy may be less well-developed (Kim & Shin, 2017). This implies that even in

preceptors with a strong sense of personal efficacy, teaching self-efficacy may be lacking (Nugent et al., 1999; van der Bijl & Shortridge-Baggett, 2001).

Preceptor teaching self-efficacy is vitally important due to the fact that preceptor confidence and ability can either advance or obstruct learning in the clinical setting (Knox & Mogan, 1985). Preceptor teaching self-efficacy has been shown to directly influence student learning achievements (Kim & Shin, 2017). Higher self-efficacy will result in a better teaching attitude and stronger expectations of the ability to affect learning in students (Li & Su, 2014). In fact, research has shown that preceptors who have a strong sense of self-efficacy are likely to apply more effort to their work. They tend to demonstrate positive behaviors such as clearly conveying expectations, persistence, and diligence in sustaining and completing tasks. Preceptors with a high sense of self-efficacy engage in behaviors that are distinctly different from preceptors with low self-efficacy (Nugent et al., 1999).

Preceptors with a low sense of self-efficacy may experience a lack of confidence in their teaching abilities. They may feel that they are unable to adequately provide students with what they need during their clinical rotations (Giordano et al., 2007). Preceptors must possess both personal as well as teaching self-efficacy in order to effectively instruct healthcare students. In order to develop high levels of teaching self-efficacy, they must have a clear understanding of the educational process. This cannot be accomplished without a systematic educational process that focuses on teaching principles that will prepare clinical preceptors for their educational activity (Kim & Shin, 2017). Without proper preparation, preceptors will be faced with limited knowledge of the educational process. This situation can result in feelings of loss of control over the teaching environment and consequently a decreased sense of teaching self-efficacy (Nugent et al., 1999).

## **Summary**

Clinical instructors and preceptors play a vital role in the education of allied health professionals. Preceptors help bridge the gap between classroom theory and real-world practice by providing students with the essential practice they require to become proficient in their future careers. Unfortunately, many find themselves unprepared for their roles. Many preceptors are experts in their healthcare field but have little background in education. They often have no experience in the pedagogical techniques necessary for the effective education of their students. At a minimum, preceptors should be exposed to principles of adult education and evaluation techniques prior to stepping into their roles as clinical educators. This type of onboarding process could help to improve the perceived teaching self-efficacy of clinical preceptors. Improved teaching self-efficacy translates to more positive beliefs in their ability to positively influence student learning. It will also increase self-confidence and provide a more positive clinical learning experience for healthcare students.

The literature reveals that there is a definite need for training of preceptors and clinical instructors. Structured education and training by faculty leadership can enhance the knowledge and abilities of preceptors, as well as increase their perceived teaching self-efficacy. These efforts will ultimately create a more positive experience for both students and the preceptors themselves (Smedley, 2008). The literature that was reviewed pertained to healthcare fields such as nursing, medical technology, physician's assistants, and respiratory therapy. Little if any literature exists as to how these premises apply to the field of diagnostic medical sonography. Due to this gap in the literature, more research is needed to study the perceived self-efficacy of sonography clinical instructors and preceptors and to assess their need for education and training.

### Chapter 3: Methodology

Education for healthcare professionals is twofold and consists of both didactic education and clinical education (Cunningham et al., 2015; Hewitt & Lewallen, 2010; Knox & Mogan, 1985; Nisbet, 2008; Smedley, 2008; Steves, 2005). The didactic portion of the educational process is conducted by college or university faculty in a classroom environment while clinical education takes place in a healthcare setting under the supervision of a clinical preceptor (Altmann, 2006; Burns & Northcutt, 2009; Cunningham et al., 2015; Rye & Boone, 2009b). The clinical preceptor is responsible for the supervision, instruction, and evaluation of the student while they are in their clinical assignment (Baltimore, 2004; Cunningham et al., 2015; Henderson et al., 2006; Nisbet, 2008; Steves, 2005). While faculty members in higher education have teaching experience and training in instructional pedagogy, the same does not often hold true for clinical preceptors. These individuals may be technical experts in their chosen field but have little to no actual teaching experience (Henderson et al., 2006; McLeod et al., 2003; O'Callaghan, 2016; Suplee et al., 2014). They are often unpaid volunteers who assume the responsibility for teaching students in addition to their existing clinical workload (Laforet-Fliesser et al., 1999; Recker-Hughes et al., 2014; Rye & Boone, 2009a). It is essential that preceptors be supported in their efforts by faculty leadership at their sponsoring institution. Faculty should be at the forefront of providing the essential training that preceptors need in order to effectively perform their teaching responsibilities (Laforet-Fliesser et al., 1999; O'Callaghan, 2016; Suplee et al., 2014). Even if training has been provided, the question remains as to whether preceptors feel that they are effectively performing their roles (Kim & Shin, 2017; Laforet-Fliesser et al., 1999; Nugent et al., 1999; van der Bijl & Shortridge-Baggett, 2001). The literature reveals little research into the perceived teaching self-efficacy of clinical preceptors, and no literature was found pertaining specifically to clinical preceptors working with diagnostic medical sonography students. This represents a gap in the literature.

## **Purpose**

The purpose of this quantitative research study was to evaluate the teaching self-efficacy of clinical preceptors instructing diagnostic medical sonography students in accredited bachelor's degree programs in the United States in 2021. This research aimed to answer the following questions as they relate to clinical preceptors in accredited diagnostic medical sonography bachelor's degree programs in the United States:

1. What is the level of teaching self-efficacy of clinical preceptors teaching diagnostic medical sonography students in accredited bachelor's degree programs?
2. Is there a difference in the teaching self-efficacy of preceptors who have received prior training and those who have not received training?
3. Is there a relationship between the amount and type of training for the preceptor role and the level of teaching self-efficacy?
4. Is there a relationship between educational levels and teaching self-efficacy?
5. Is there a relationship between years of service and teaching self-efficacy?

Through a single, cross-sectional survey approach, this study sought to fill gaps in the literature related to sonography preceptors' teaching self-efficacy in the clinical setting. The knowledge gained from this study will help to improve the educational process for both sonography preceptors and the students they educate. The implications from this research will help educational leaders understand how to better prepare sonography preceptors and improve the overall clinical experience for both the preceptors and the students that they teach.

## **The Research Design**

In order to assess the self-efficacy of sonography preceptors, the researcher conducted quantitative research that is grounded in a post-positivist paradigm. This paradigm is based on the belief that reality can be discovered through objective observation, measurement, and

interpretation of data (Sousa et al., 2007). Post-positivism believes that there is an objective reality that can be observed and quantified (Sears & Critelton, 2001). Through a post-positivist approach, ideas and concepts can be reduced to variables, allowing for the exploration of the relationships between and among the variables (Sousa et al., 2007). Quantitative data was collected based on the epistemology of an outsider perspective in order to minimize researcher interference (Terrell, 2016). The researcher used survey research to conduct a descriptive correlational design research study. This type of research design describes variables and the relationships that occur between and among them (Sousa et al., 2007).

### ***Survey Design***

The survey that the researcher used for this study was developed from a review of the literature. It was adapted from two surveys that investigated teaching self-efficacy and clinical teaching effectiveness: the Self-Efficacy Toward Teaching Inventory (SETTI) and the Nursing Clinical Teacher Effectiveness Inventory (NCTEI) (Knox & Mogan, 1985; Nugent et al., 1999). The SETTI was originally designed by Tollerud (1990) and was utilized to measure the perceived teaching self-efficacy of doctoral students and graduates of counselor education programs. It was later revised by Nugent et al. (1999) to assess the perceived self-efficacy of new nurse educators. The researcher used 19 of the 48 statements in this survey, specifically the ones that pertained only to clinical education. The NCTEI was developed by Knox and Mogan (1985) and was originally used to evaluate the importance of clinical teacher behaviors from the perspective of nursing students, graduates, and faculty members. The researcher used 32 of the original 47 questions, specifically the ones pertaining to clinical teaching ability, evaluation, and interpersonal relations. The researcher reworded the questions to ask preceptors to self-evaluate their effectiveness in performing these clinical teaching behaviors. Permission was obtained for the use of these survey instruments in this study (see Appendix A). Together, these combined surveys have been adapted to include language that is specific to

diagnostic medical sonography clinical education and will constitute the newly formed Sonography Preceptor Teaching Self-Efficacy Inventory (SPTSEI). This survey provided a more holistic view of sonography preceptors' perceptions of their ability to influence student learning in the clinical setting (Appendix B). All survey questions asked preceptors to rate their level of agreement with the statements using a scale of 1 to 10, with one being "strongly disagree" and 10 being "strongly agree." The researcher used a scale of 10 as opposed to a scale of 5 because research has shown that a longer scale is more accurate and can be used as interval data for parametric statistical analysis (Awang et al., 2016).

**SPTSEI Survey Instrument.** The SPTSEI survey contains three main parts. The largest section at the beginning of the survey focuses specifically on teaching self-efficacy and is divided into three sections. The first section focuses on teaching ability and contains 22 statements designed to gauge the participant's perceived level of ability to effectively instruct students. The second section focuses on the evaluation process. It contains 13 statements designed to gauge the participant's perceived level of ability to evaluate the performance of the students they are teaching. The third section focuses on interpersonal relations with students. It contains 10 statements designed to evaluate the participant's perceived level of ability to relate with their students. Each section asks participants to respond to a statement by selecting a scale response from 1 to 10 of "strongly disagree" to "strongly agree."

The second section of the survey focuses on the prior training and education of preceptors. The first question inquires if the preceptor has received training for their role as a clinical educator. If they answer in the affirmative, they will be asked three additional follow-up questions that inquire about the type and duration of the training that they received. A final question asks participants to rate their perception of the importance of a preceptor training program provided by the sponsoring educational institution.



The last section of the survey was used to gather demographic information about the survey respondents. The researcher asks for information regarding years of experience as a diagnostic medical sonographer, number of years working with students, and highest level of education. The researcher inquires if the respondent had any training or education prior to stepping into their role as a clinical preceptor, and if so, what was the nature and the length of the training process and who provided the training. The researcher also asks how many students are receiving clinical education at their healthcare institution. A lack of response in this section did not eliminate the participant's entire survey from inclusion in data analysis since this section was aimed at obtaining descriptive statistics about the sonographers' prior and current experiences in teaching students. The remaining demographic information asks for information regarding age, gender, and race.

### ***Pilot Study***

Although the survey was based on established instruments with proven reliability and validity, the researcher did not use either survey in its entirety. The researcher also reworded some of the statements and shifted the focus to the evaluation of the respondents' own level of teaching self-efficacy. Therefore, the researcher conducted pilot testing of the survey in order to establish its reliability and validity prior to its use in gathering data for research.

**Population and Sample.** The population for the pilot study was sonography preceptors associated with a single CAAHEP accredited bachelor program of diagnostic medical sonography at a university in the Midwest. This population was specifically chosen because its members could easily be excluded from the final research study for this dissertation in order to eliminate a potential source of bias (Nardi, 2018). The pilot study population was also chosen to be representative of the full population for the entire study and thus provided a good sample population to determine the validity and reliability of the survey instrument (Hertzog, 2008). This

population comprised approximately 28 sonography preceptors including a mix of genders, race, age, and other demographic factors under examination.

**Research Procedures.** The pilot survey was administered as an online survey using Qualtrics online survey platform. Approval for the pilot study was secured from the Institutional Review Board (IRB) at the University of Southern Indiana. The researcher recruited participants for this pilot study through an electronic mail request directly to preceptors of a CAAHEP accredited bachelor level program. Voluntary consent was implied when participants proceeded to the online survey through the link. Data collection for the pilot study began immediately following survey distribution and continued for two weeks to obtain a sufficient response rate. The pilot study yielded 30 responses.

**Statistical Tests Conducted.** The SPTSEI survey instrument is a new survey tool made from the combination of multiple surveys already published in the literature. Establishing construct validity and reliability of the survey instrument was the primary focus of the pilot study. Because the SPTSEI survey was developed from previously validated survey instruments, a pilot study was conducted to measure the survey's validity and reliability. It is essential to ascertain the validity of a survey instrument prior to conducting research to ensure that the survey instrument is measuring the construct that it was designed to measure and that it produces meaningful results (Nardi, 2018).

**Validity.** Multiple methods can be utilized to assess the validity of a survey instrument. Among these methods are content, face, construct, and criterion validity. In addition, Nardi (2018) suggests establishing survey item reliability to ensure consistency of data.

To examine the face and content validity of the SPTSEI survey, the researcher delivered the survey electronically to medical imaging educators who are familiar with the research process to review the survey in its entirety. Using experts in the field to review survey instruments is an accepted practice for establishing face and content validity (Nardi, 2018).

Feedback prompted the researcher to add a statement at the beginning of the survey defining the construct of interest to better inform participants of the purpose of the survey and the research study.

**Reliability.** To establish the reliability of the survey instrument, the researcher measured internal consistency by calculating a Cronbach's Alpha for each scale for the survey. Cronbach's Alpha is viewed as the most appropriate measure of reliability when making use of Likert scales and is used to measure internal consistency across the parts of a survey instrument (Taherdoost, 2016). The results demonstrated a Cronbach's Alpha of 0.848 or greater on all three scales designed to measure teaching ability, evaluation of student performance, and interpersonal relations respectively. Taherdoost (2016) supports an internal consistency coefficient of 0.7 or higher to ensure survey tool reliability. Because each scale achieved an internal consistency higher than 0.7, no survey items needed to be removed for the full study.

### **Full Study**

**Population and Sample.** A non-probability purposive sample of clinical preceptors in accredited baccalaureate programs in the United States was studied (Rea & Parker, 2014). There are currently 46 such programs in the United States. The researcher surveyed preceptors in sonography programs accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). The ages of the participants ranged from approximately 20 years of age to above 60 years of age. Participants were contacted through the program directors of the baccalaureate programs. The email contact information for all program directors is available on the website for the Commission on Accreditation of Allied Health Education Programs (CAAHEP). The researcher collected data using an electronic survey produced using Qualtrics survey software. The researcher sent an email letter explaining the research intent and purpose to the sonography program directors. The email asked them to distribute the letter,

survey link, and informed consent to all their clinical preceptors associated with their respective programs. Research has shown that participants are more likely to complete electronic surveys received from authority figures compared to surveys received from individuals or organizations that they do not know personally (Saleh & Bista, 2017), thus the impetus for reaching out to program directors. Individual programs vary in size and the number of preceptors utilized in the program. The researcher estimated that each program would have at least five preceptors for an approximate sample size of 230 participants. Out of those who would receive this survey, it was estimated that one fourth or approximately 60 preceptors would complete the survey.

**Research Procedures.** The research was conducted after the approval of the proposal by the dissertation committee and the institutional review board. Qualtrics survey software was used to construct the survey in an electronic format, deliver the survey, and collect the participants' responses. Data collection lasted for two weeks. The researcher contacted the program directors via email at each of the accredited sonography bachelor's degree programs in the United States. Email addresses for the program directors are available on the Commission for Accreditation of Allied Health Education Programs (CAAHEP) website. An email with a letter of explanation, informed consent (Appendix C), and a link to the Qualtrics survey were sent to all program directors asking them to distribute the information to all their clinical preceptors teaching in their programs. The email included the purpose of the study, detailed instructions, informed consent procedures, and a link to the survey. Study participants could click on the survey link if they wished to take the survey but could decline to take the survey by not clicking on the link. Study participants could withdraw from the study at any time by stopping or closing the survey without completing and submitting it. The survey link was active for a period of two weeks. After that time frame, the survey link was deactivated. The survey should have taken approximately 10 minutes to complete. As an incentive to complete

the survey, the researcher offered \$10.00 Starbucks gift cards to 10 randomly chosen participants.

In order to maintain anonymity and safeguard the subject's participation, any data collected was kept confidential as no personal identifying information was being requested. All data was password protected in a secure online network. Survey responses were presented in an aggregate form in study results.

**Plans for Data Analysis.** The researcher conducted statistical analysis on the data collected from the survey using SPSS. A variety of statistical tests were utilized to answer the research questions associated with the study. The researcher reported descriptive statistics such as means and standard deviations on demographic data. The researcher utilized parametric testing to analyze the Likert scale data. Independent variables included years of service, years working with students, evidence of prior preceptor training, type of training, and level of education. The dependent variable was the preceptors' level of teaching self-efficacy. The researcher conducted *t*-tests, multiple regression analysis, and ANOVA statistical testing to examine differences in levels of self-efficacy based on these independent variables. The researcher also examined the relationship between demographic variables and the level of teaching self-efficacy by performing multiple regression analysis to attempt to predict which independent variable had the most influence over the dependent variable and if it was statistically significant.

**Variables.** The independent variables for this study were the various demographic factors of gender, age, years of service, highest level of education, and the length of preceptor training. The dependent variable for this study was the level of preceptor teaching self-efficacy as determined by the SPESEI survey.

**Research Question 1.** What is the level of teaching self-efficacy of clinical preceptors teaching diagnostic medical sonography students in accredited bachelor's degree programs in

the United States? The researcher created an overall teaching self-efficacy score based on the scale responses of the questions in Section 1 of the survey. The score was further broken down into scores based on perceptions of teaching ability, ability to evaluate students, and interpersonal relationships with students. Descriptive statistics were used to calculate the mean teaching self-efficacy score and the standard deviation of scores to address the first research question.

**Research Question 2.** Is there a difference in the level of teaching self-efficacy of preceptors who have received prior training and those who have not received training? The calculated teaching self-efficacy score from Section 1 of the survey was grouped according to whether the preceptor had received prior training for their role. A *t*-test was conducted to determine if there was a difference between these two groups. The independent variable for this research question was whether a preceptor had received training for their role. The dependent variable was the preceptor's overall teaching self-efficacy score.

**Research Question 3.** Is there a relationship between the amount and type of training for the preceptor role and the level of teaching self-efficacy? In Part 2 of the survey, there was a section that asks participants who have received prior training to select the type of training they received (face-to-face, pre-recorded, written material, or live online) and to also list the length of time they spent in the training activity. In order to determine the impact of the two independent variables on the overall teaching self-efficacy index in the group who had received prior training, a multiple regression analysis was conducted. This analysis helped determine if the amount and type of training a preceptor received influences the level of teaching self-efficacy. The independent variables for this question were the type of training and the amount of training. The dependent variable was the teaching self-efficacy score.

**Research Question 4.** Is there a relationship between educational levels and the level of teaching self-efficacy of clinical preceptors? In Part 2 of the survey, there was a section that

asked participants to report their highest level of education (certificate, associate degree, bachelor's degree, master's degree, doctoral degree). In order to examine the differences in means across these various demographic factors, the researcher conducted a one-way analysis of variance (ANOVA). This analysis helped to determine if the preceptor's level of education influences the overall level of teaching self-efficacy. The independent variable for this question was the highest level of education attained by the participant. The dependent variable was the teaching self-efficacy score.

**Research Question 5.** Is there a relationship between years of service and the level of teaching self-efficacy of clinical preceptors? In Part 3 of the survey, there were two questions asking survey participants to report the number of years they have spent working in the field of sonography as well as the number of years they have worked precepting students. Linear regression analysis was conducted to determine if there is a relationship between these factors and overall teaching self-efficacy. This analysis helped determine if the preceptor's prior experience as a sonographer and as a preceptor influences the overall level of teaching self-efficacy. The independent variables for this question were the number of years working as a sonographer and the number of years precepting sonography students. The dependent variable was the teaching self-efficacy score.

### **Ethical Considerations**

Data collection from all participants was kept confidential. No participants were identified by name or by any other manner during or after the course of the study. Data from the surveys were stored online in a cloud-based system administered by Qualtrics and was password protected. Any data extracted and downloaded from Qualtrics was kept on a cloud-based network drive that is password protected as well. Because the surveys would be kept confidential, no undue influence was placed on participants. During data analysis, only

aggregated data was reported. Upon dissemination, no identifying data was discussed regarding the participants.

The level of risk for the participants was minimal. The researcher and her faculty sponsor were the only people who would have access to the survey results. There was a risk of discomfort if participants did not like filling out surveys or answering questions. The researcher attempted to keep the experience as enjoyable as possible by taking the minimal amount of time from participants' schedules and creating a survey that had a low number of items.

### **Limitations**

Respondents represented a nonrandom selection of sonography clinical preceptors. As such, the ability to generalize these results to other populations is unknown. Since the survey instrument required self-reporting of data, some subjects may not have been truthful in their responses. Self-reporting is vulnerable to over-rater or under-rater bias. Therefore, some subjects may give consistently low or high ratings. Because participation in this study was voluntary, it is possible that there was something unique about the individuals who volunteered to fill out the survey as compared to those who decided not to participate.

### **Delimitations**

The major delimitation of this study is that it was restricted to CAAHEP accredited bachelor's degree programs in the United States. These programs all adhere to the same published curriculum standards of the accrediting body.

### **Conclusion**

The research for this dissertation seeks to explore the level of teaching self-efficacy of sonography preceptors working with students in CAAHEP accredited bachelor-level diagnostic medical sonography programs in the United States. Literature suggests that without proper training and education, these individuals may feel unprepared for their roles. This could lead to



inadequate clinical preparation of the students they teach, as well as increased stress and job dissatisfaction for preceptors.

This study provided quantitative statistical analysis of the relationship between prior training and certain other demographic variables and the level of teaching self-efficacy of sonography preceptors. This information will help to reveal which factors serve to increase a preceptor's perceived ability to influence student learning and how faculty can best support them in their roles. Examining the needs of preceptors and increasing their teaching self-efficacy will ultimately benefit sonography students in the long run.

## Chapter 4: Results

This study was designed to collect data on the teaching self-efficacy of clinical preceptors in accredited bachelor's degree sonography programs in the United States. The research instrument used in this study was the Sonography Preceptor Teaching Self-Efficacy Inventory (SPTSEI). The SPTSEI asked participants to rate their perceived ability to effectively instruct, evaluate, and interact with students through a series of 45 statements about their clinical teaching behaviors. Participants were asked to rate themselves on how well they feel they perform these teaching behaviors by selecting a scale response from 1 to 10 with 1 defined as "strongly disagree" and 10 defined as "strongly agree." Adding the scores of all the responses together created a self-efficacy index or score for each participant. Along with other demographic data, this score was used to answer the research questions that were posed. This chapter is the presentation of the data collected from the study.

### **Description of the Sample**

Emails were sent to program directors of 46 Commission on Accreditation of Allied Health Education Programs (CAAHEP), accredited sonography programs that offer bachelor's degrees, asking them to distribute the survey link to all their clinical preceptors teaching in their programs. Of these possible survey candidates, 48 clinical preceptors responded to the survey. Four of the surveys were not filled out in their entirety. Because a self-efficacy index could not be calculated from these three respondents, their incomplete survey data was not included. This left 44 participants for the final data analysis.

### ***Demographics***

In order to understand the participants in the study more clearly, several questions in the survey were demographic in nature. These questions were designed to help identify the exact population of participants by inquiring about topics such as age, educational levels, and number of years working in the sonography profession.

Of the 44 participants in the study, 39 were female (89%) while the remaining five were male (11%). The age of survey participants ranged from 21 to 64 years of age, with the mean age being 38.86 years of age ( $SD = 11.57$ ). These individuals had a wide range of sonography experience, ranging from sonographers who had only worked in the field for one year up to sonographers with 31 years of experience ( $M = 13.64$ ,  $SD = 9.16$ ). Participants also demonstrated a wide range in the number of years they had been serving as a preceptor working with sonography students. Their years of experience ranged from one year up to 20 years, with a mean of 9.60 years ( $SD = 6.09$ ).

Preceptors also worked in departments of varying sizes. When asked about the number of employees at each clinical site who were providing instruction to students, the responses ranged from a minimum of one to a maximum of 21 sonographers working in the sonography department ( $M = 5.93$ ,  $SD = 4.60$ ). Sonography departments also varied in the number of students present who were engaging in clinical education. Some departments only served as a clinical affiliate site for one student, while others had as many as 21 students participating in clinical education ( $M = 5.23$ ,  $SD = 5.79$ ).

Study participants reported varying levels of education with 4.5% having a certificate, 29.5% having an associate degree, 56.8% having a bachelor's degree, 6.8% having a master's degree, and 2.3% having a doctoral degree as their highest level of education. Eleven of the 44 participants, or 25%, reported having received some type of training for their role as a clinical preceptor. Table 1 provides a summary of this demographic data.

**Table 1***Demographic Information*

Age	<i>n</i>	Percentage
20-29	11	26.2
30-39	11	26.2
40-49	12	28.6
50-59	5	11.9
≥ 60	3	7.1
Years of Sonography Experience		
≤ 5 years	7	15.9
6-10 years	11	25.0
11-15 years	8	18.2
16-20 years	9	20.5
21-25 years	3	6.8
≥ 26 years	6	13.6
Years of Preceptor Experience		
≤ 5 years	13	30.2
6-10 years	9	20.9
11-15 years	13	30.2
16-20 years	8	18.6
21-25 years	0	0
≥ 26 years	0	0
Preceptor Preparation		
Yes	11	25.0
No	33	75.0
Highest Level of Education		
Certificate	2	4.5
Associate degree	13	29.5
Bachelor's degree	25	56.8
Master's degree	3	6.8
Doctorate	1	2.3

**Summary of the Results**

Data were analyzed using SPSS. Data analysis consisted of *t*-test analysis, multiple regression analysis, and a one-way ANOVA. An alpha level of 0.05 was set to determine significance for the analysis of the statistical data. The statistical results are presented in the following discussion as they relate to each of the research questions.

### **Research Question 1**

What is the level of teaching self-efficacy of clinical preceptors teaching diagnostic medical sonography students in accredited bachelor's degree programs in the United States? In order to answer this question, a self-efficacy index or score was created for each participant by adding together their responses to 45 statements about clinical teaching behaviors. The mean, range, and standard deviation of the self-efficacy index were calculated. This score gave an indication of each preceptor's teaching self-efficacy or the belief in their ability to effectively handle the tasks, obligations, and challenges related to teaching and their ability to influence student academic outcomes. The maximum score possible was 450. Participants' scores ranged from a minimum of 279 to a maximum of 450 with a mean score of 397.25 ( $SD = 41.77$ ). The range of scores is presented in Table 2.

**Table 2**

*Teaching Self-Efficacy Scores*

Scores	Frequency	Percent
275-300	2	4.5
301-325	0	0
326-350	4	9.1
351-375	8	18.2
376-400	5	11.4
401-425	10	22.7
426-450	15	34.1
Total	44	100.0

The 45 statements used to create the teaching self-efficacy index were broken down into three separate categories. The mean, range, and standard deviation for each category were computed. The first category was teaching ability. This section consisted of 22 statements for a maximum score possible of 220. The scores in this section ranged from a minimum of 133 to a

maximum of 220, with the mean being 190.18 ( $SD = 21.36$ ). The second category dealt with the evaluation of student performance. This section contained 13 statements for a maximum score of 130. The scores in this section ranged from a minimum of 71 to a maximum of 130 with a mean of 116.05 ( $SD = 13.33$ ). The third and final section explored the ability of the preceptor to engage in constructive interpersonal relations with a student. This section contained 10 statements for a maximum possible score of 100. The scores in this section ranged from a minimum of 62 to a maximum of 100 with a mean score of 91.02 ( $SD = 9.70$ ). Scores for each section of the survey are detailed in Table 3.

**Table 3**

*Teaching Self-Efficacy Scores by Survey Section*

Section 1: Teaching Ability		
Scores	Frequency	Percent
125-150	2	4.5
151-175	9	20.5
176-200	19	43.2
201-220	14	31.8
Total	44	100.0
Section 2: Evaluation of Student Performance		
Scores	Frequency	Percent
70-85	2	4.5
86-100	2	4.5
101-115	13	29.6
116-130	27	61.4
Total	44	100.0
Section 3: Interpersonal Relations		
Scores	Frequency	Percent
60-70	2	4.5
71-80	5	11.4
81-90	10	22.7
91-100	27	61.4
Total	44	100.0

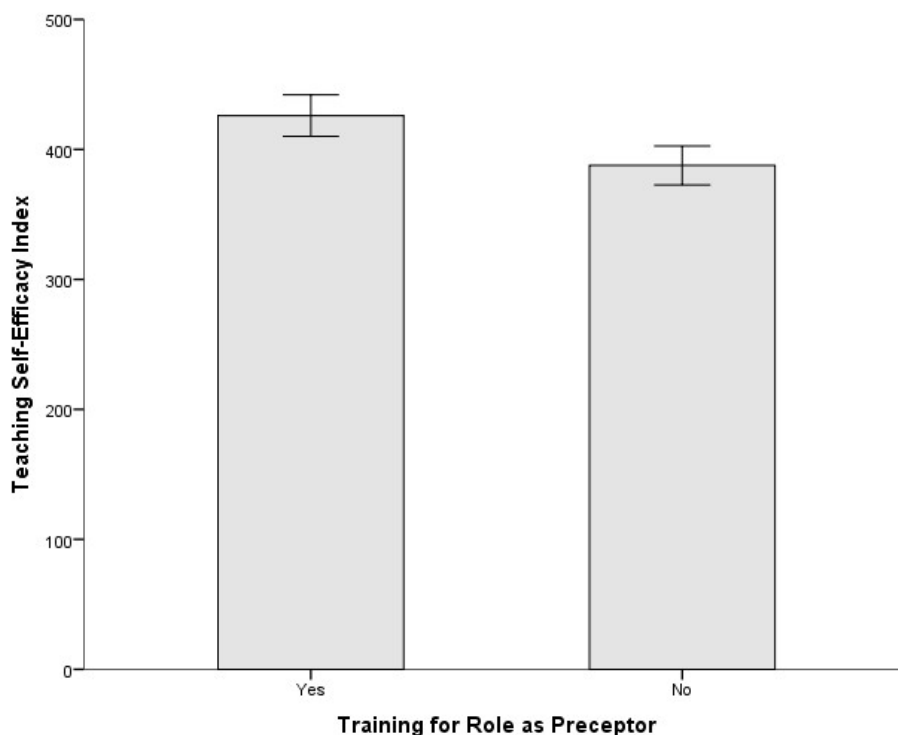
**Research Question 2**

Is there a difference in the level of teaching self-efficacy between preceptors who had received prior training for their teaching role and those who have not received training? A *t*-test was conducted to determine if there is a difference between these two groups.

There were 11 participants in the group who had received prior training and 33 participants in the group who had not received prior training. A Welch *t*-test was run to determine if there were differences in the mean teaching self-efficacy index between the two groups due to the assumption of homogeneity of variances being violated, as assessed by Levene's test for equality of variances ( $p = .034$ ). There were no outliers in the data as assessed by inspection of a boxplot. The mean teaching self-efficacy index of those who received training prior to becoming a clinical preceptor was higher ( $426.00 \pm 23.79$ ) than those who had not received any training ( $387.67 \pm 42.30$ ), a statistically significant difference of 38.33 (95% CI, 17.37 to 59.29),  $t(31.31) = 3.73$ ,  $p = .001$ . See Figure 1.

**Figure 1**

*Comparison of Mean Teaching Self-Efficacy Index as a Function of Training*



When asked to rate the perceived importance on a scale of 1 to 10 of having a preceptor-training program available from the sponsoring educational program, the mean importance score was 8.07 ( $SD = 2.27$ ), with 1 representing “not at all important” and 10 representing “very important.” Of all those who participated in the survey, 42% of the participants ( $n = 20$ ) rated a preceptor training program as “very important.”

### **Research Question 3**

Is there a relationship between the amount and type of training for the preceptor role and the level of teaching self-efficacy? Multiple regression analysis was chosen to determine the impact of these two independent variables on the overall teaching self-efficacy index in the group who had received prior training.



A multiple regression was run to predict the teaching self-efficacy index score from the type of training and the length of training received. The multiple regression model did not statistically significantly predict the teaching self-efficacy index score  $F(2, 8) = .385, p > .05, \text{adj. } R^2 = -.140$ . Neither variable added statistically significantly to the prediction,  $p > .05$ .

Regression coefficients and standard errors can be found in Table 4.

**Table 4**

*Multiple Regression Results for Length and Type of Training*

Teaching Self-efficacy	<i>B</i>	95% CI for <i>B</i>		<i>SE B</i>	$\beta$	$R^2$	$\Delta R^2$
		<i>LL</i>	<i>UL</i>				
Model						.09	-.14
Constant	409.07	358.50	459.65	21.93			
Length of training	4.20	-7.20	15.61	4.95	.32		
Type of training	4.27	-12.46	20.99	7.25	.22		

*Note.* Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient;  $\beta$  = standardized coefficient;  $R^2$  = coefficient of determination;  $\Delta R^2$  = adjusted  $R^2$ .

#### **Research Question 4**

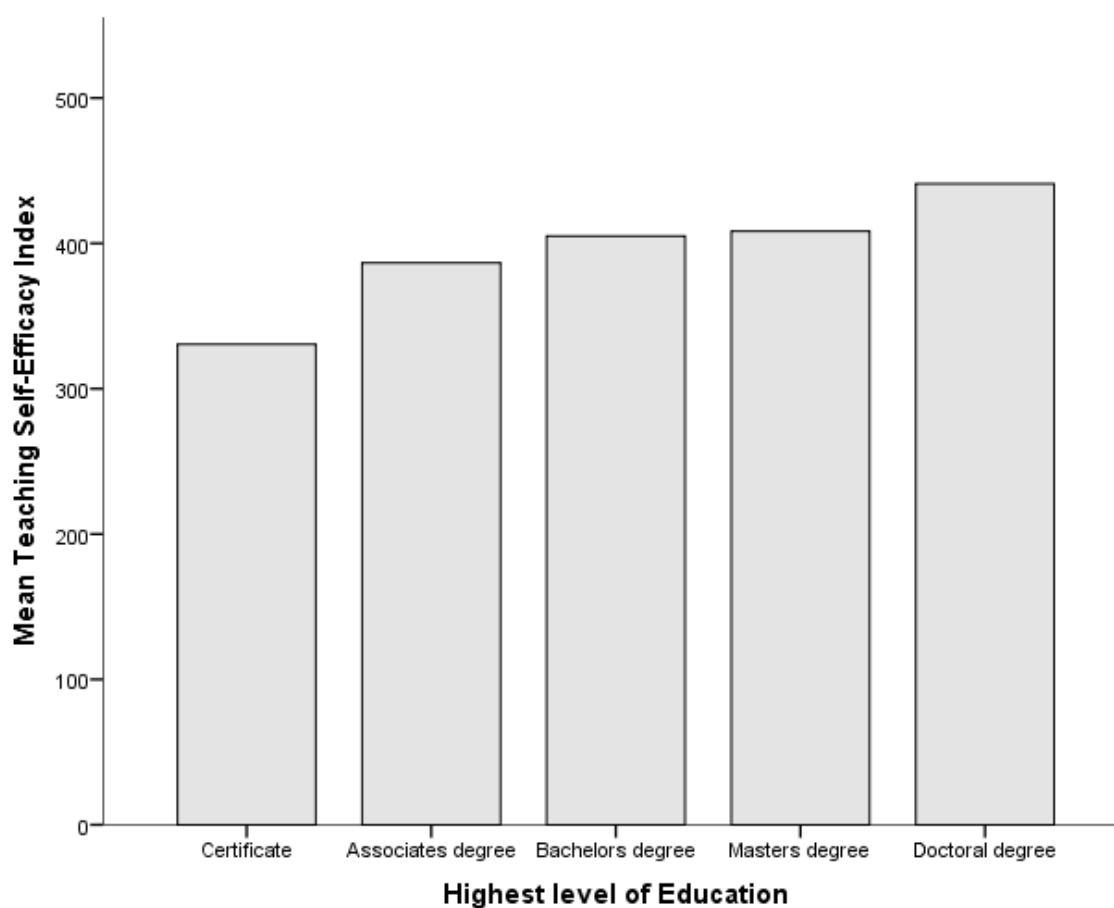
Is there a relationship between educational levels and the level of teaching self-efficacy of clinical preceptors? This analysis will help determine if the preceptor's level of education influences the overall level of teaching self-efficacy.

A one-way ANOVA was conducted to determine if the teaching self-efficacy score of sonography preceptors was different for groups with different levels of education. Participants were classified into five groups: certificate ( $n = 2$ ), associate degree ( $n = 13$ ), bachelor's degree ( $n = 25$ ), master's degree ( $n = 3$ ), and doctoral degree ( $n = 1$ ). There were no outliers, as assessed by boxplot; data was normally distributed for each group, as assessed by Shapiro-Wilk test ( $p > .05$ ); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ( $p = .086$ ). The teaching self-efficacy index increased from the

certificate ( $n = 2$ ,  $M = 330.50$ ,  $SD = 70.00$ ), to associate degree ( $n = 13$ ,  $M = 386.62$ ,  $SD = 41.13$ ), to bachelor's degree ( $n = 25$ ,  $M = 405.04$ ,  $SD = 34.58$ ), to master's degree ( $n = 3$ ,  $M = 408.33$ ,  $SD = 17.24$ ), to doctoral degree ( $n = 1$ ,  $M = 441$ ), in that order, but the differences between these education level groups were not statistically significant,  $F(4, 39) = 2.27$ ,  $p = 0.79$ . See Figure 2.

**Figure 2**

*Mean Teaching Self-Efficacy Index as a Function of Educational Level*



### **Research Question 5**

Is there a relationship between years of service and the level of teaching self-efficacy of clinical preceptors? Analysis of these factors will help determine if experience has an influence on the overall level of teaching self-efficacy. A multiple regression analysis was run to predict

teaching self-efficacy scores from the number of years working as a sonographer and the number of years serving as a sonography preceptor. The multiple regression model did not statistically significantly predict the teaching self-efficacy score,  $F(2, 40) = .220, p = .804$ .

Neither variable added statistically significantly to the prediction. Regression coefficients and standard errors can be found in Table 5 (below).

**Table 5**

*Multiple Regression Results for Years of Service*

Teaching Self-efficacy	<i>B</i>	95% CI for <i>B</i>		<i>SE B</i>	$\beta$	$R^2$	$\Delta R^2$
		<i>LL</i>	<i>UL</i>				
Model						.01	-.04
Constant	400.78	375.87	452.69	12.33			
# of years as a sonographer	-.82	-3.36	1.72	1.26	-.18		
# of years as a preceptor	.90	-2.92	4.72	1.89	.13		

*Note.* Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient;  $\beta$  = standardized coefficient;  $R^2$  = coefficient of determination;  $\Delta R^2$  = adjusted  $R^2$ .

**Summary**

In Chapter 5, the findings and conclusions from the research study are discussed for each of the research questions. Implications of the study based on the findings of the study and the literature review are addressed. Additionally, recommendations for further research and limitations of the study are discussed.

## **Chapter 5: Discussion**

The purpose of this quantitative study was to explore the teaching self-efficacy of sonography clinical preceptors in accredited bachelor's degree programs. The most important role of clinical preceptors is to educate sonography students to become clinically competent and prepare them for entry into practice. Studies and literature have demonstrated that while clinical preceptors may be competent practitioners, they may have little to no experience in the teaching process and could therefore benefit from professional development to hone their knowledge of pedagogical techniques and better prepare them to facilitate student learning. A prepared and confident clinical preceptor will possess a higher level of teaching self-efficacy and will be better prepared to affect learning in their students through their teaching abilities.

This chapter discusses the findings of each research question and the implications of the findings on the teaching self-efficacy of sonography clinical preceptors regarding prior training and experience for their roles. Additionally, the limitations of this study and recommendations for future research will be discussed. Finally, all conclusions are based on the findings of the study and either support or contribute to existing research.

### **Discussion**

#### ***Research Question 1***

What is the overall level of teaching self-efficacy of clinical preceptors teaching sonography students in accredited bachelor's degree programs in the United States? While there is a pervading assumption that clinical expertise carries over into teaching and that a skilled healthcare practitioner can simply step into the role of clinical preceptor without any preparation, this assumption may not be true (Henderson et al., 2006; Knight, 2018; Suplee et al., 2014; Thimsen, 2021). Existing research suggests that clinical preceptors may be lacking in teaching self-efficacy (Kim & Shin, 2017) and may not have a clear understanding of their role and the process of educating the students that are assigned to them (Conway-Klaassen et al.,

2012; Giordano et al., 2007; Hewitt & Lewallen, 2010; Suplee et al., 2014). No research was found that specifically addressed the teaching self-efficacy of sonography clinical preceptors.

However, the findings from this study indicate that participants feel very confident in their teaching ability, their interpersonal relationship with their students, and their ability to evaluate student performance in the clinical setting. This confidence translates into a high level of overall teaching self-efficacy. The majority of study participants seemed to have a strong belief in their ability to effectively handle the tasks, obligations, and challenges related to their teaching and their ability to influence positive academic outcomes for the students they are teaching. These results conflict with the findings of Kim and Shin (2017) who found that a high level of teaching self-efficacy cannot be accomplished without a systematic educational process that focuses on teaching principles that will prepare clinical preceptors for their educational activity, as 75% of participants in this study had not received any type of training prior to assuming their role as preceptors.

The relatively high level of teaching self-efficacy found in this study may be due to the fact that preceptors are falling back on the knowledge of how they themselves were taught as students. However, this does not mean that they are employing evidence-based teaching strategies, suggesting that despite high teaching self-efficacy scores, training and professional development may still be necessary to ensure that consistent teaching approaches and standardization of clinical experiences based on evidence are being utilized (Recker-Hughes et al., 2014). Furthermore, the literature has shown that preceptors tend to struggle with providing effecting feedback and performing evaluations of student work, most often because they are unfamiliar with the process (Hewitt & Lewallen, 2010; Hunt et al., 2013; Liao et al., 2019; Reid et al., 2013; Suplee et al., 2014). The relatively high scores from the evaluation of student performance of this study seem to refute this claim, suggesting that sonography clinical preceptors do indeed feel comfortable evaluating the students they are charged with educating.

**Research Question 2**

Is there a difference in the level of teaching self-efficacy of preceptors who have received prior training and those who have not received training? The literature indicated that while preceptors are often experts in their clinical practice, their clinical expertise does not always translate into teaching ability (Henderson et al., 2006; Suplee et al., 2014). This lack of preparation seems to indicate the importance of and the need for training and professional development for clinical preceptors. They cannot be expected to become effective teachers without proper training and education about pedagogical techniques. Studies have shown that preceptors need instruction in teaching and learning theory and strategies in order to become more effective in their work (Buccieri et al., 2013; Conway-Klaassen et al., 2012; Phillips, 2006; Recker-Hughes et al., 2014).

To explore the importance of prior training, this study asked participants if they had received any type of training or education prior to receiving and instructing students at their clinical site. Only 11 of the 44 participants or 25% of respondents indicated that they had received any training for their role as a sonography clinical preceptor. This finding agrees with the literature in the fact that few preceptors have undergone formal or even informal training about educational concepts and principles (Buccieri et al., 2013; Henderson et al., 2006; McLeod, 2003; Suplee et al., 2014; Recker-Hughes et al., 2014).

Statistical analysis was conducted to ascertain if there was a difference in the level of teaching self-efficacy between preceptors who had received prior training for their teaching role and those who had not. The analysis of the data regarding the impact of professional development on the self-efficacy of clinical preceptors demonstrated a statistically significant positive difference between the two groups, with the mean self-efficacy index of those who had received prior training higher on average than those who had not received any training. Results from these analyses indicated that prior training is indeed positively impactful on the level of

teaching self-efficacy. This finding supports what has been reported in the literature.

Preceptors are better able to perform their roles and to do so more confidently if they are offered some type of formal training and preparation (Altmann, 2006; Buccieri et al., 2013; Burns & Northcutt, 2009; Clay et al., 1999; O'Callaghan, 2007). To further reinforce the importance of training, study participants were asked to rate the perceived importance of having a preceptor-training program available from the sponsoring educational program. The mean score indicated that whether or not they had received any training for their role, study participants still recognized the value of professional development.

In regard to implications for practice, the correlation between prior training and higher reported teaching self-efficacy scores should be convincing evidence to university faculty and clinical coordinators that professional development and educational workshops are beneficial to sonography clinical preceptors. Training from faculty will provide preceptors with the support they need to perform their roles effectively and to face any challenges that might arise (Suplee et al., 2014). Furthermore, research has shown that preceptors greatly value effective communication with their sponsoring program faculty and the instruction and mentoring that they provide (Hudak et al., 2018).

### ***Research Question 3***

Is there a relationship between the amount and type of training for the preceptor role and the level of teaching self-efficacy? Prior research has identified the importance of preceptor training and education to ensure a clear understanding of duties and responsibilities as well as pedagogical techniques to help improve student learning (Kennedy, 2019). The results of this study determined that neither the format nor the amount of training received added statistically significantly to the prediction of teaching self-efficacy. This serves to demonstrate that while training and professional development for preceptors have been found to be important, the

training format and the length of the training appear to be less impactful on the overall level of teaching self-efficacy.

Thus, while the literature agrees that some type of training is essential to the success of the clinical preceptor (Buccieri et al., 2013; Conway-Klaassen et al., 2012; Phillips, 2006; Recker-Hughes et al., 2014), very little is discussed as to the most effective format or the most appropriate length of training. One study (Liao et al., 2019) made a specific recommendation of a 10-hour course. Another study by Giordano et al. (2007) described a training program that consisted of four modules addressing topics in “educational psychology, administration, roles and responsibilities of preceptors, learning and communication styles, conflict management, and techniques to develop high-level thinkers in questioning and problem solving” (p. 242) that can be accessed online, but did not specify a time frame for completing the modules. While a great deal of the literature is very specific about the curriculum of a training program and its desired outcomes for clinical preceptors, not much is discussed as to the delivery method and how long it should take. The fact remains that regardless of how these educational endeavors are accomplished, some effort toward training produces greater teaching self-efficacy in the preceptors who receive it than none at all.

#### ***Research Question 4***

Is there a relationship between educational levels and the level of teaching self-efficacy of clinical preceptors? The selection process for candidates to serve as clinical preceptors varies across the different healthcare professions. For example, to qualify for consideration as a preceptor of physical therapy students a candidate must be a licensed physical therapist in the state in which the clinical education occurs, should demonstrate competence as a clinician, should practice in a legal and ethical manner, should demonstrate a desire to educate students, and should display evidence of teaching skills (Recker-Hughes et al., 2014). More often than not, preceptors are selected solely for their availability or number of years of experience



(Altmann, 2006). The literature does agree that along with years of clinical experience, a preceptor's level of education should also factor into the selection process, depending on the educational requirements and terminal degree for each individual profession (Altmann, 2006; Rye & Boone, 2009a). In general, very little mention is made in the literature in regard to the level of education as a qualification, such as highest degree earned. There appear to be no standardized criteria as to who is best qualified to serve as a clinical preceptor, and no studies were found that mentioned anything about sonography preceptors and their unique teaching challenges.

Because the selection criteria for clinical preceptors are often vague, this study sought to examine if the highest level of education that a preceptor had achieved had any influence on the overall level of teaching self-efficacy. Statistical analysis of collected data showed that the teaching self-efficacy index did increase with each level of educational achievement earned; however, the differences between each of these educational groups were not statistically significant. Nonetheless, education level does appear to make a small impact and could potentially be used as a selection criterion for sonography preceptors.

### ***Research Question 5***

Is there a relationship between years of service and the level of teaching self-efficacy of clinical preceptors? On this matter, the literature is clear that at least part of the preceptor selection process should be based on years of clinical experience (Altmann, 2006; Letizia & Jennrich, 1998; Rye & Boone, 2009a). However, there is no standardized number to serve as a guideline for who is most suited for the job. Some studies suggest as little as six months of experience, while others believe that at least two years of experience should be the minimum criteria. Possession of sound clinical skills in the chosen healthcare profession is an important teaching quality, and a clinical preceptor who does not have this experience will be unable to properly educate and pass along those skills to the next generation of healthcare professionals.

Interestingly, analysis of survey data did not statistically significantly predict the teaching self-efficacy score based on years of service. Neither years of service as a sonographer nor years of service as a clinical preceptor added statistically significantly to the prediction of overall teaching self-efficacy. Thus, while the literature states that experience is an important criterion for the selection of effective clinical preceptors (Altmann, 2006; Letizia & Jennrich, 1998; Rye & Boone, 2009a), this study seems to refute that finding. Choosing an individual based solely on their years of experience does not appear to ensure greater teaching self-efficacy.

### **Limitations**

Although this study does contribute to the existing body of research regarding the teaching self-efficacy of sonography clinical preceptors, there are several limitations. First, the sample size was small due to the response rate from the total population sample. The small overall sample size limits the generalizability of the findings. Thus, the findings may not reflect those of the general population of sonography preceptors. In addition, only preceptors from accredited bachelor's degree programs were surveyed. There are many other accredited sonography programs that offer associate degrees. Therefore, the results of this study may not be generalizable to preceptors in those types of programs. Second, survey respondents represent a nonrandom selection of sonography clinical preceptors and as such, the ability to generalize the results to other populations is unknown. In addition, this survey is grounded in quantitative data which was collected from a survey where preceptors self-reported perceptions about their own teaching self-efficacy. Because the survey instrument required self-reporting, some subjects may not have been truthful in their responses. Self-reporting of constructs is vulnerable to over-rater or under-rater bias. Therefore, some subjects may have given consistently low or high ratings that may not be completely reflective of their actual teaching self-efficacy. Regardless of the single variable that prompted a preceptor to participate in the study and provide specific responses, the results of the study—while an important contribution

to existing research—are not generalizable. However, these results do provide implications for future healthcare practice.

### **Implications for Practice**

The results of this study indicate that sonographers who have received prior training for their role have a greater level of teaching self-efficacy than those preceptors who have not received prior training. Thus, some form of training is essential to producing sonography preceptors who are comfortable in their role and who feel that they can successfully exert an influence over their students that will bring about learning in the clinical setting. Because preceptor teaching self-efficacy has been shown to directly influence student learning achievements (Kim & Shin, 2017), it is essential that preceptors possess a high level of teaching self-efficacy. It is therefore critically important that proper training and education in support of preceptors be provided in order for them to perform their role effectively and to face any challenges that might arise in the process of clinical education (Suplee et al., 2014). Preceptor training should be a top priority for college or university sponsoring program faculty who are sending their students to these healthcare institutions for their clinical education. Faculty support for preceptors will enhance the preceptors' understanding of their role which in turn will result in a standardized clinical experience for their students (Conway-Klaassen et al., 2012).

### **Recommendations for Further Research**

This study contributes to the existing body of research on sonography preceptor teaching self-efficacy; however, there are opportunities for additional research. To begin, this study only included sonography preceptors involved with accredited bachelor's degree programs. To expand on the data, a replication of this study could be completed to include a larger sample size that would include preceptors teaching in certificate associate degree sonography programs to investigate if these individuals have the same level teaching self-efficacy as preceptors in bachelor-level programs.

Additionally, this study did not account for the impact of preceptor teaching self-efficacy on actual student academic achievement. Further inquiry could delve deeper into how the level of teaching self-efficacy affects student achievement in the clinical portion of their sonography programs.

Further research might also delve into uncovering the most effective delivery method for preceptor training. A qualitative study could help determine if preceptors would prefer real-time interaction as a teaching method as opposed to asynchronous learning opportunities such as online modules or printed materials and which method produces the best results. A further recommendation could include pre- and post-analysis of teaching self-efficacy levels of a grouping of preceptors as they go through a formal training program.

Finally, a qualitative study could examine what topics preceptors feel would be most important to include in their training. This might include the teaching issues that preceptors struggle with the most. A study of this type could lead to further development and refinement of a faculty-led professional development program for clinical preceptors.

### **Summary**

In conclusion, this research study exposed the importance of a properly prepared clinical preceptor in the education of diagnostic medical sonography students. The results indicate that sonography preceptors who have had prior training for their teaching roles possess a higher level of teaching self-efficacy than those who have not received any type of training. This higher level of teaching self-efficacy then translates into more positive beliefs in their ability to positively influence student learning. Ultimately, this increased teaching ability and self-confidence will provide a more positive and productive clinical learning experience for diagnostic medical sonography students.

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## Appendices

## Appendix A

## National Clinical Teaching Effectiveness Inventory (NCTEI)

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## Appendix B

### Sonography Preceptor Teaching Self-Efficacy Inventory (SPTSEI)



#### UNIVERSITY OF SOUTHERN INDIANA

#### *Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors*

IRBNet ID Number: 1704746-1

Informed Consent Document

Online or Web Based Survey

You are invited to participate in a research study on the perceived effectiveness of clinical instruction in preceptors working with diagnostic medical sonography students in the clinical setting. This study is being conducted by Katherine Peak, a doctoral student of educational leadership at the University of Southern Indiana, under the supervision of her faculty sponsor Dr. Bonnie Beach. Ms. Peak can be reached by email at [krpeak@usi.edu](mailto:krpeak@usi.edu) or by telephone at (812) 228-5160.

This study will take approximately 10-15 minutes of your time. You will be asked to complete an online survey about how well you feel you are able to influence the learning of the diagnostic medical sonography students you teach in the clinical setting. Your participation in this research study will benefit USI's sonography program by informing the researcher of ways in which USI sonography faculty can assist with training and educating clinical preceptors in the future.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. Consent is implied when you begin the survey. You may skip any questions you do not wish to answer. If you do not wish to complete this survey simply close your browser.

Your participation in this research will be completely confidential. No personally identifiable information will be collected in this survey. Responses will be presented in aggregate form. Only myself and my faculty sponsor Dr. Beach will have access to the data that is collected. Data will be stored on a password-protected computer in my locked office at USI. There are no risks to individuals participating in this survey beyond those that exist in daily life.

Please print a copy of this consent form for your records if you so desire.



**Survey of Preceptors of Diagnostic Medical Sonography Students:  
Sonography Preceptor Teaching Self-Efficacy Inventory (SPTSEI)**

A sonography clinical preceptor is a highly-skilled, certified diagnostic medical sonographer who wants to share his/her talents with eager students who desire to learn how to perform sonographic procedures accurately and efficiently. The use of sonography department staff as clinical instructors or preceptors is the model for clinical education for diagnostic medical sonography programs. Often these individuals are unpaid volunteers, or the responsibility is part of their job description.

*Teaching self-efficacy* is defined as one's belief in their ability to effectively handle the tasks, obligations, and challenges related to their teaching and their ability to influence academic outcomes (e.g., students' achievement and motivation) Please answer the following questions about sonography preceptor teaching self-efficacy.

**Part I: Teaching Self-Efficacy**

**Teaching Ability**

Please rate your perceived level of teaching ability. Using a scale of 1-10, with 1 being Strongly Disagree and 10 being Strongly Agree, please rate each statement to indicate how well you feel you do the following:

Strongly Disagree                      Strongly Agree  
1                      2                      3                      4                      5                      6                      7                      8                      9                      10

I explain things clearly.

I emphasize what is important.

I stimulate student interest in the subject.

I remain accessible to students.

I demonstrate clinical procedures and techniques.

I guide students' development of clinical skills.

I provide specific practice opportunity.

I am well prepared for teaching.

I enjoy teaching.

I encourage active participation in discussion.

I gear instruction to students' level of readiness.

I quickly grasp what students are asking or telling me.

I answer carefully and precisely questions raised by students.

I question students to elicit underlying reasoning.

I help students organize their thoughts about patient problems.

I promote student independence.

I develop teaching strategies that promote critical thinking.

I set clinical expectations that are appropriate for the level of the learner, given the learner's academic and clinical background.

I modify clinical strategies based on learner's level of performance.

I ask questions in a clinical setting that stimulate problem-solving.

I adjust clinical assignments to students' level of performance and confidence.





### **Interpersonal Relations with Students**

Please rate your perceived level of ability to relate with students in the clinical setting. Using a scale of 1-10, with 1 being Strongly Disagree and 10 being Strongly Agree, please rate each statement to indicate how well you feel you do the following:

Strongly disagree      1      2      3      4      5      6      7      8      9      10      Strongly agree

I provide support and encouragement to students.

I am approachable.

I encourage a climate of mutual respect.

I listen attentively.

I show a personal interest in students.

I demonstrate empathy.

I demonstrate confidence in the student.

I assist students in new patient care situations.

I stimulate the student to want to learn professional behavior and competence.

I use evaluations from students to improve teaching.





**Part II: Preceptor Training/Education**

In your role as a clinical instructors/preceptor, did you receive any type of training or education prior to receiving and instructing students?

Yes

No





If you received training/education for your role as a sonography preceptor, how was the content delivered? (Please check all that apply).

Face-to-face classroom instruction

A training manual/written material to study

Pre-recorded video/audio instructions; computer based modules

Live online workshops/web video conferencing

What was the length of the training you received?

4 hours of less

1 day (8 hours)

2 days (16 hours)

3 days (24 hours)

other (please describe)

Who delivered the training for your role as sonography preceptor?

sonography program university/college faculty

sonography program clinical coordinator

healthcare institution manager/supervisor

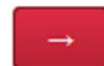
other (please describe)



Please rate your perceived importance of having a preceptor-training program available by your educational program:

Not at all important      Somewhat important      Very important  
1      2      3      4      5      6      7      8      9      10

Click to write Choice 1







### **Part III: Demographics**

Location of your healthcare institution (state):

Number of clinical instructors/preceptors employed by the clinical affiliate who provide instruction to sonography students assigned to that clinical site:

Number of sonography students receiving clinical instruction at your clinical affiliate site:

Gender:

Male

Female

Non-binary

Prefer not to answer





Your age:

18-22

23-27

28-32

33-37

38-42

43-47

48-52

53-57

58-62

Over 63

Your race:

White

Black or African American

American Indian or Alaska Native

Asian

Native Hawaiian or Pacific Islander

Other



Number of years working as a sonographer:

Number of years working with students:

Highest level of education:

Certificate

Associates degree

Bachelors degree

Masters degree

Doctoral degree





Thank you for your time. If you would like to be entered into a random drawing for a \$10.00 Starbucks gift card, please enter your email address in the box below. When you are finished with the survey, please click on the Submit button.



## Appendix C

**UNIVERSITY OF SOUTHERN INDIANA**  
***Teaching Self-Efficacy of Diagnostic Medical Sonography Clinical Preceptors***  
***IRBNet ID Number: 1704746-1***  
**Informed Consent Document**  
**Online or Web Based Survey**

You are invited to participate in a research study on the perceived effectiveness of clinical instruction in preceptors working with diagnostic medical sonography students in the clinical setting. This study is being conducted by Katherine Peak, a doctoral student of educational leadership at the University of Southern Indiana, under the supervision of her faculty sponsor Dr. Bonnie Beach. Ms. Peak can be reached by email at [krpeak@usi.edu](mailto:krpeak@usi.edu) or by telephone at (812) 228-5160.

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