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Clinical Teaching And Learning In Respiratory Therapy: An Analysis Of Student And Clinical Instructor Expectations Using The Cognitive Apprenticeship Theory

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CLINICAL TEACHING AND LEARNING IN RESPIRATORY THERAPY: AN
ANALYSIS OF STUDENT AND CLINICAL INSTRUCTOR EXPECTATIONS
USING THE COGNITIVE APPRENTICESHIP THEORY

By

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ABSTRACT

Quality clinical education is an essential element of respiratory therapy education yet, many respiratory therapists who serve as clinical instructors lack formal pedagogical training. To enhance clinical education and align expectations, other healthcare disciplines have utilized the Cognitive Apprenticeship Theory (CAT).

The purpose of this quantitative survey study was to learn more about clinical education in respiratory therapy by examining the expectations of both clinical instructors and students regarding the CAT teaching methods. Since the required entry level education, credentials, and licensing have been a recent source of controversy within the profession, the impact of these variables was also assessed.

A modified version of the Maastricht Clinical Teaching Questionnaire (MCTQ), first created by Stalmeijer et al. (2010), was sent to and disseminated by program directors of entry level respiratory therapy programs accredited by the Commission on Accreditation for Respiratory Care (CoARC). A total of $N = 248$ responses from clinical instructors ($n = 85$) and students ($n = 163$) were collected and analyzed.

Results indicate that both clinical instructors and students expect the teaching methods of the CAT to be used (average percentage of agreement = 98.8% and = 95.9%, respectively). Despite high levels of agreement, clinical instructors had statistically significant ($p < .05$) higher expectations than students regarding the expectations for clinical instructors to demonstrate how to perform skills ($p = .019$), adjust their teaching

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activities to the level of the student's experience (p = .001), and to ask students questions in order to increase the students' understanding (p = .006). No significant differences were found when comparing gender and type of credential held by the clinical instructor. A statistically significant positive correlation was found between the program degree level and the level of education completed by the clinical instructor. Statistically significant negative correlations were found between clinical instructor experience and the expectations for them to encourage students to formulate and pursue learning goals.

Overall, the findings clarify the expectations of clinical instructors and students regarding clinical education in respiratory therapy. Furthermore, the results support the use of the CAT teaching methods in the field of respiratory therapy to meet clinical teaching and learning expectations.

Keywords: Cognitive Apprenticeship Theory, Respiratory Therapy, clinical education, expectations, Maastricht Clinical Teaching Questionnaire (MCTQ).

CHAPTER I

INTRODUCTION

Respiratory therapy is a relatively new healthcare field that emerged in the early 1900s. Since its inception, advances in technology, medication, pulmonary therapies, autonomy, and safety have contributed to the growth of respiratory therapy and expanded its scope of practice resulting in a need for a higher level of education and training for entry into practice. Respiratory therapy programs provide classroom, laboratory, and clinical education in order to properly prepare successful graduates and to comply with accreditation standards (Commission on Accreditation for Respiratory Care [CoARC], December 2019). The foundational physiological, pharmacological, and technical components of respiratory therapy are learned in the classroom setting and applied in the laboratory setting where students practice technical skills. Finally, students are able to apply the knowledge and skills they have gained to the real-world during their clinical practicum experiences where they further develop practical, social, and critical thinking skills through supervised, direct patient care (Aldhahir et al., 2020; Dahlke et al., 2016; Esmaeli et al., 2014; Kelly, 2007; O'Brien et al., 2014; Parvan et al., 2018; Tiwari et al., 2005).

Since graduates of respiratory therapy programs must be prepared to practice in a variety of settings, with patients across the life span, and at all levels of acuity, high quality clinical education is essential. Clinical education provides students with the opportunity to master required clinical competencies directly with patients under the supervision of a licensed respiratory therapist (CoARC, 2019, December). Many respiratory therapy programs do not have the budget to hire dedicated clinical instructors, so students are supervised by respiratory therapists currently staffed at teaching hospitals who take responsibility for a student along with their daily workload. These clinical instructors typically have not received additional formal

education on learning theory or teaching methods (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). Therefore, it is important to continually study clinical education in respiratory therapy in order to provide the most effective learning experiences for respiratory therapy students.

<div align="center">**Background**</div>

Respiratory Therapy Profession

The respiratory therapy profession began with the discovery of the medical benefits of oxygen in 1907 (Hess et al., 2021; Kacmarek et al., 2017). The demand for oxygen therapy and other medical gases expanded rapidly requiring specially trained staff, called oxygen orderlies, to oversee their administration (AARC, n.d.; Kacmarek et al., 2017). This profession continued to advance and evolve and is now known as respiratory therapy.   Respiratory therapists work in a variety of settings including hospitals, intensive care units, emergency rooms, newborn and pediatric units, operating rooms, patient homes, sleep laboratories, skilled nursing facilities, doctor's offices, asthma education programs, smoking cessation programs, air transport and ambulance programs, and in case management programs (AARC, 2020e). The scope of practice for a respiratory therapist has expanded to include diagnosing and recommending treatments for lung and breathing disorders, interviewing patients, completing physical exams, consulting with physicians, analyzing breath, tissue, and blood specimens to determine gas levels, inserting and managing artificial airways and mechanical ventilation, responding to medical emergencies, and educating patients and their family members (AARC, 2020d).

In 2020, the United States of America had approximately 135,800 respiratory therapists (U.S. Bureau of Labor Statistics, 2020). In the past two years, due in part to the Covid-19 pandemic, we have 700 fewer respiratory therapists (U.S. Bureau of Labor Statistics, 2022). The

need for respiratory therapists is expected to grow by 23% or 31,100 by the year 2030 (U.S. Bureau of Labor Statistics, 2022). This increased demand puts pressure on respiratory therapy programs to increase the number of highly educated respiratory therapy graduates they graduate.

Respiratory Therapy Education

On-the-job training was the accepted standard of education when respiratory therapy first began (Hess et al., 2021; Kacmarek et al., 2017). As the scope of practice grew, educational programs were developed. Initially these programs awarded certificates of training completion, but educational standards became a growing concern in the 1960s at which time two levels of practice were instituted, respiratory technician and respiratory therapist (O'Daniel et al., 1992). It wasn't until 2002 that a college-based associates degree became the required entry-level education (Hess et al., 2021). Continued advancements have prompted the development of the bachelor's and master's degrees in respiratory therapy. There are 345 associate degree programs, 70 baccalaureate degree programs, and five master's degree programs (CoARC, 2020, May). All programs, no matter the degree awarded, are required to prepare graduates at the higher, registered respiratory therapist (RRT) level. While there are no longer two levels of practice, the National Board for Respiratory Care (NBRC) continues to award two levels of credentials, the certified respiratory therapist (CRT) and the registered respiratory therapist (RRT).

The profession's national association, the American Association for Respiratory Care (AARC), licensing board, the NBRC, and accrediting agency, the Commission on Accreditation for Respiratory Care (CoARC), have assembled several task forces over the years to examine the educational process for becoming a respiratory therapist and to make recommendations for future needs and growth. The most recent task force identified the need to transition to the

baccalaureate degree for entry into practice (Doorley et al., 2019). With 82% of all respiratory therapy programs awarding the associate degree, this transition does not come without growing pains (CoARC, 2020, May). There are currently three different entry-level degree offerings, two different credentialing levels, and one scope of practice. These inconsistencies are a source of controversy within the profession and leave the profession open for scrutiny. The one stable factor that will withstand and perhaps even influence the controversy is clinical education. The clinical education component remains at the heart of respiratory therapy education. Research on clinical education in respiratory therapy must continue to be studied in light of teaching and learning practices, educational degrees, and credentialling levels.

Problem Statement

High quality clinical education is a vital component of respiratory therapy programs because it allows students to apply didactic knowledge and skills to the real-world setting (Esmaeli et al., 2014; O'Brien et al., 2014; Parvan et al., 2018; Tiwari et al., 2005). This education is provided by clinical instructors, many of which are staffed respiratory therapists who work at affiliated teaching hospitals. As such, many clinical instructors do not have formal training in teaching and learning methods yet are tasked with educating and meeting the learning expectations of respiratory therapy students in the clinical setting (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b).

Other healthcare disciplines that face a similar scenario have studied the use of the Cognitive Apprenticeship Theory (CAT) in clinical education and found that it is an appropriate teaching and learning theory for healthcare clinical education (Lyons et al., 2017). The establishment and use of the CAT in clinical education has prompted healthcare education leaders to provide clinical instructors with training based on the CAT as a means to further

develop the teaching and learning skills of clinical instructors and to enhance the clinical learning experiences of students (Lyons et al., 2017). Studies show that clinical education is also affected by the expectations held by participants, both students and clinical instructors. Research in other healthcare disciplines has identified the importance of the expectations students have regarding their clinical learning experiences and have come to find that unmet and incongruent expectations lead to poor outcomes (Abelson et al., 2018; Brodie et al., 2004; Lovric et al., 2017). Assessing the expectations of both students and clinical instructors through the lens of the CAT may provide information that can be used to enhance clinical education in the field of respiratory therapy. It is not known if clinical instructor training rooted in the CAT meets the clinical learning expectations of respiratory therapy students and the clinical teaching expectations of respiratory therapy clinical instructors. It is also not known if or how additional variables within the respiratory therapy profession such as gender, program degree level, student experience, instructor education level, instructor credentials, or previous instructor experience impact the expectations of clinical education in respiratory therapy.

<div align="center">**Purpose of the Study**</div>

The purpose of this study was to learn more about clinical teaching and learning in respiratory therapy clinical education by examining the expectations of clinical instructors and students according to the teaching methods described in the Cognitive Apprenticeship Theory (CAT). The CAT teaching methods were used as a foundation though which to study the difference between student and clinical instructor expectations of teaching in the clinical setting. This study also assessed expectations to see if they differ due to gender or instructor credential. In addition, student and clinical instructor expectations were evaluated to determine if there is a

relationship between them and program type, student experience, instructor education, or instructor experience.

Research Questions

The following research questions were addressed by this study:

1. In the respiratory therapy clinical setting, to what extent do clinical instructors expect to use the Cognitive Apprenticeship Theory teaching methods?

2. In the respiratory therapy clinical setting, to what extent do students expect clinical instructors to use the Cognitive Apprenticeship Theory teaching methods?

3. In the respiratory therapy clinical setting, is there a difference between student and clinical instructor expectations of the use of the Cognitive Apprenticeship Theory teaching methods?

4. In the respiratory therapy clinical setting, do student and clinical instructor expectations of clinical education differ due to gender or instructor credentials?

5. In the respiratory therapy clinical setting, is there a relationship between student and clinical instructor expectations of clinical education and program degree level, student experience, instructor education level, or instructor experience?

Conceptual Framework

Clinical Education in Respiratory Therapy

As the scope of practice and educational standards increase in respiratory therapy, so too does the clinical component of respiratory therapy programs. Clinical education allows students to transition into the respiratory therapy profession under the guidance of an expert practitioner. Students are not only given opportunities to put their knowledge and skills into practice in a real-world setting, but they are able to acquire the social and cognitive aspects of the profession as

well (Esmaeli et al., 2014; O'Brien et al., 2014; Parvan et al., 2018; Tiwari et al., 2005). The impact of clinical education is too great not to be continually studied and refined. There are many studies regarding clinical education in healthcare disciplines similar to respiratory therapy, but the research of clinical education in the discipline of respiratory therapy specifically is limited. Several studies have focused on student perceptions of effective clinical instructor characteristics, the clinical environment, and clinical grading practices (Alasmari & Garednhire, 2015; Alghamdi et al., 2019; Ari et al., 2003; Patten, 2019). Another study explored instructor perceptions regarding their experiences of providing clinical education to respiratory therapy students (Jones-Boggs Rye et al., 2007). AlRabeeah et al. (2018) compared student and faculty perceptions of clinical instructor characteristics. The respiratory therapy administrator perspective regarding the characteristics of effective clinical instructors was studied by Aldhahir et al. (2020). Finally, several researchers explored the need for and content of instructor training in respiratory therapy clinical education (Bennion & Rose, 2019; Jones-Boggs & Boone, 2009a, 2009b; Mendoza & Barnes, 2018)

Since many of the respiratory therapists who serve as clinical instructors do not have formal education on the topic of teaching and learning, it is important to provide them with training in this area (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). The studies on clinical education in respiratory therapy, thus far, have not incorporated adult learning theories as a basis for their research on teaching and learning in the clinical setting. The ability to provide theory-based, tailored training has the potential to improve both student and clinical instructor experiences, enhance student learning, clarify expectations, and aid in the achievement of student learning outcomes (Ari et al., 2003; Bennion & Rose, 2019; Jones-Boggs Rye et al., 2007; Jones-Boggs Rye & Boone, 2009a, 2009b; Mendoza & Barnes, 2018). It follows then, that

understanding how the expectations of both students and clinical instructors align with a well-accepted teaching and learning theory will give greater insight into the training needs of both groups, potentially enhancing clinical learning experiences.

Adult learning theories, such as the Cognitive Apprenticeship Theory (CAT), have been applied to clinical education in a variety of healthcare disciplines (Ramis et al., 2019).   The CAT incorporates cognitive teaching and learning aspects within the traditional apprenticeship model (Colllins et al., 1987). Disciplines such as nursing and medicine have completed studies on clinical education based on the CAT. The educational components of these disciplines include classroom, laboratory, and clinical learning delivered in a curricular structure that is similar to that of respiratory therapy programs. Given these similarities, it would follow that clinical education in respiratory therapy may benefit from incorporating the CAT in clinical instructor training in order to enhance clinical education in the discipline.

Cognitive Apprenticeship Theory

The Cognitive Apprenticeship Theory (CAT) provides an evidence-based framework for studying the teaching methods utilized by clinical instructors in the clinical setting. The CAT was developed by Collins et al. (1987) as a new method for teaching reading, writing, and mathematics. The theory is composed of four components: content, methods, sequence, and sociology and their respective sub-components as outlined in Figure 1 (Collins et al., 1987). Since clinical education requires a novice to observe and learn from an expert, this apprenticeship-based learning theory is appropriate for the study of clinical education healthcare and has been used by healthcare disciplines such as nursing, pharmacy, and dentistry (Lyons et al., 2017).

Figure 1

Cognitive Apprenticeship Theory Components and Sub-Components
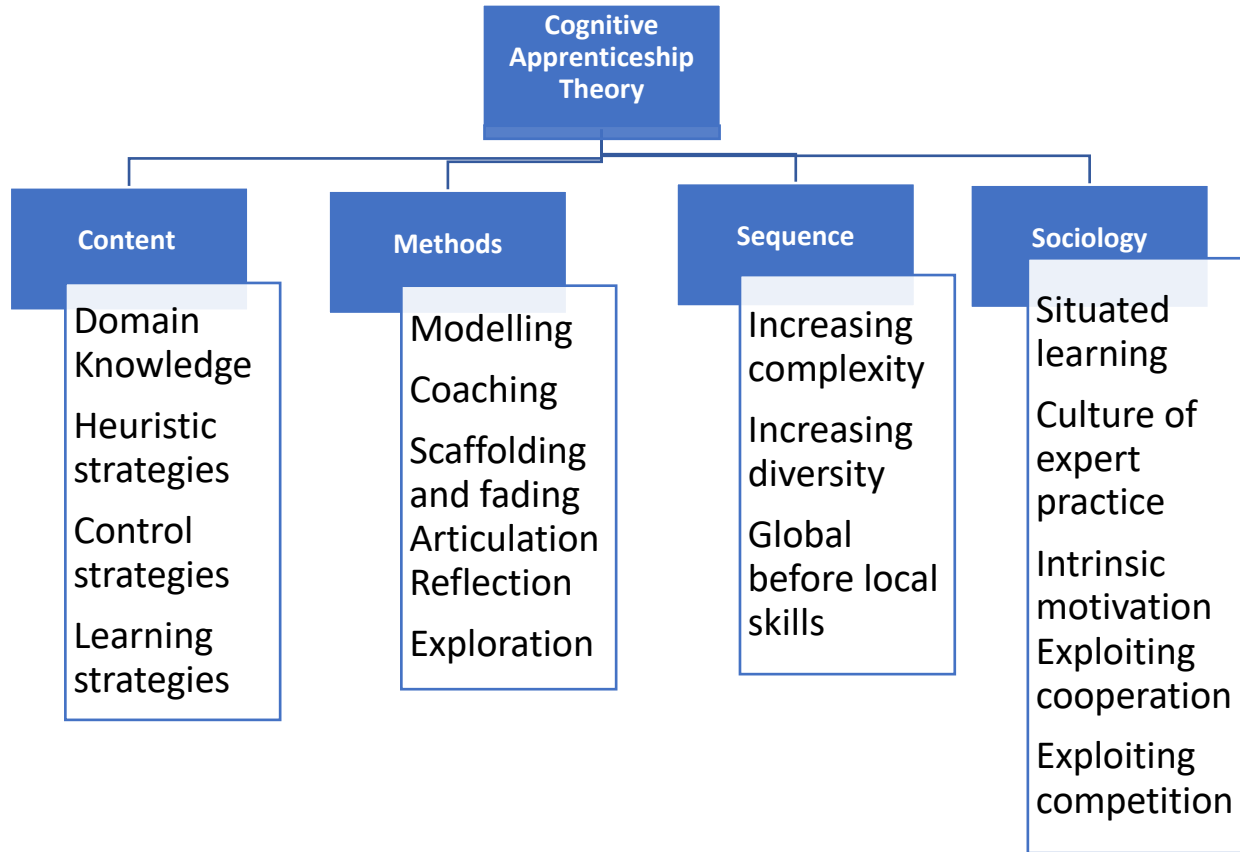
Note. This figure outlines the domains of the Cognitive Apprenticeship Theory and was created based on the publication of Collins et al. (1987).

Content

The content component refers to four different types of knowledge that are required by the learner: domain knowledge, problem-solving strategies, control strategies, and learning strategies (Collins et al., 1987). The curriculum of respiratory therapy programs must address the content included on the National Board for Respiratory Care (NBRC) examinations that are required for licensure in respiratory therapy. The most recent NBRC exam outline includes

clinical assessment, diagnostic testing, evaluation of patient data, troubleshooting, and initiation and modification of interventions (NBRC, 2018b). Thus, the content component of the CAT is naturally addressed within respiratory therapy programs by trained, paid faculty members. As such, there was no need to include this component of the CAT in this study.

Methods

This component of the CAT addresses teaching methods including modelling, coaching, scaffolding, articulation, reflection, and exploration (Collins et al., 1987). These teaching methods are at the heart of the CAT as they address the acquisition of the cognitive and metacognitive skills required in a specific discipline (Collins et al., 1987). Medical related fields such as nursing, pharmacy, and dentistry, have studied clinical instruction in relation to these sub-components (Lyons et al., 2017). The application of these teaching methods to clinical education in respiratory therapy was one focus of this study.

Sequence

The sequence component of the CAT addresses the changing needs of learners and suggests that education be structured in such a way as to accommodate these changes by increasing the complexity of tasks, increasing the diversity of task application, and understanding the general process prior to attending to the fine details (Collins et al., 1987). The curriculum of respiratory therapy programs naturally fits the sequence domain and was not included in this study.

Sociology

The sociology component of the CAT focuses on the need for learners to, "learn skills in the context of their application to realistic problems, within a culture focused on, and defined by, expert practice" (Collins et al., 1987, p. 20). Clinical learning experiences require students to be

fully immersed in and actively participate in respiratory therapy in the real world. Since the

Commission on Accreditation for Respiratory Care (CoARC) requires students to participate in

clinical learning, the sociology component of the CAT is naturally addressed within respiratory

therapy programs and further research was not required for this study (CoARC, 2019,

December).

Application of Theory in Practice

As previously mentioned, the content, sequence, and sociology components of the CAT

are naturally embedded in the curricular structure of respiratory therapy programs. The

remaining component of the CAT, the methods component, has been studied in relation to the

clinical education provided by many different healthcare disciplines. Most prominently, it has

been extensively researched in medical school education by Stalmeijer et al. (2008, 2009, 2010,

2013) who worked to create an instrument to evaluate clinical teaching based on the methods

component of the CAT. These studies resulted in the development, refinement, and

establishment of the Maastricht Clinical Teaching Questionnaire (MCTQ) as a valid and reliable

tool for assessing clinical education (Stalmeijer et al., 2008, 2009, 2010, 2013). As such, this

study, with permission (personal communication, May 3, 2021), utilized a modified version of

the MCTQ to further understand the expectations of students and clinical instructors regarding

respiratory therapy clinical education as rooted in the methods component of the CAT.

Student and Clinical Instructor Expectations

Knowledge of expectations based on a well-accepted teaching and learning theory is key

to understanding the current state of clinical education as well as what is needed to further

enhance the educational experience. While student and clinical instructor expectations have not

been studied in the field of respiratory therapy, they have been studied in relation to clinical

education in other healthcare fields. Students displayed more dissatisfaction, increased anxiety,

and more struggles when they perceived their real clinical experiences did not meet their

expectations (Hamshire et al., 2013; O'Brien et al., 2007; Wenrich et al., 2010). Several studies

found that the dissatisfaction experienced due to unmet expectations of clinical learning lead to

attrition (Abelson et al., 2018; Brodie et al., 2004; Lovric et al., 2017). Findings also show that it

is important for students and clinical instructors to have similar expectations regarding clinical

learning in order to establish a learner-centered environment (Brown et al., 2011; Cowen et al.,

2018; Edberg & Andersson, 2015; Lovric et al., 2017; Van Roermund et al., 2014).

Furthermore, educational programs should work to meet student expectations or at least provide

education to bring student expectations closer to reality (Andersson & Edberg, 2012; Brown et

al., 2011; Elcigil & Sari, 2006; Golos & Tekuzener, 2019; Hendaus et al., 2016; Midgley, 2006;

Qi Suen et al., 2016). Since unmet and maligned expectations contribute to poor outcomes and

attrition, this study explored student and clinical instructor expectations regarding clinical

educational experiences in relation to the teaching methods found in the CAT.

Potential Significance of the Study

This study is significant because it may improve the understanding of teaching practices

in respiratory therapy clinical education and potentially improve the clinical learning experience

for both students and clinical instructors. The results may be used to provide direction for both

student and clinical instructor education and training. Theory-based advanced training in this

area may increase the quality of clinical education in respiratory therapy. In addition, the

knowledge of student expectations regarding their clinical education may allow respiratory

therapy programs to meet expectations and/or provide students with information that will bring

their expectations closer to reality, both of which may alleviate the poor outcomes associated

with unmet student expectations and potentially decrease student attrition. The knowledge of clinical instructor expectations may influence the training provided to clinical instructors and enhance student clinical instruction. The insight gained by studying the alignment of student and clinical instructor expectations may identify areas of malignment that could be addressed to help meet the expectations of both parties which may help improve outcomes.   Finally, knowing the impact that variables such as gender, program degree level, instructor education level, instructor credentials, and instructor experience have on the expectations of clinical education may contribute to the conversation regarding the advancement of the profession.

Methodological Overview

This is a quantitative survey study that utilized an adaptation of the Maastricht Clinical Teaching Questionnaire (MCTQ) with permission from Stalmeijer et al. (2010) (personal communication, May 3, 2021). An invitation to participate in the study was sent to the program directors of all entry level respiratory therapy programs accredited by the Commission on Accreditation for Respiratory Care (CoARC). Program directors were asked to share the survey link with their currently enrolled students and currently active clinical instructors. Clinical instructor and student responses were collected and recorded with Qualtrics Survey Software.

The collected data was analyzed in order to answer the research questions. In order to validate the reliability of the MCTQ with this particular population, Cronbach's alpha was determined for both clinical instructor and student responses. Descriptive statistics, including the percentage of some form of agreement with each survey item, were used to determine if clinical instructors and students expect the CAT teaching methods to be utilized in respiratory therapy clinical education. Independent t-tests were used to assess for differences between clinical instructor and student expectations and between expectations, gender, and clinical instructor

credentials. Finally, correlations were used to identify relationships between clinical instructor and student responses and program degree level, student clinical experience, instructor education level, and instructor experience.

Delimitations

Delimitations refer to choices made by a researcher that will potentially impact the study. Participant recruitment and sampling methods present the main delimitations for this study. The inclusion of all respiratory therapy programs accredited by the Commission on Accreditation for Respiratory Care (CoARC) allowed the program directors to act as the gatekeeper to their students and clinical instructors which may have impacted the study. Alternative recruitment and sampling methods were researched and considered; however, this method was determined to be the best fit for this study.

Assumptions

In order for this study to be successful, several assumptions had to be made. For example, it was assumed that respiratory therapy programs would be willing to participate in the study and that students and clinical instructors would take the time to complete the survey completely and honestly.

Operational Definitions

American Association for Respiratory Care (AARC): The AARC is the not-for-profit professional association for the field of respiratory therapy that leads 50 state respiratory therapy societies and 10 Specialty Sections to meet the needs of its members (AARC, 2020a).

Clinical education: Clinical education refers to the, "acquisition of required clinical competencies in a patient care setting under the supervision of a qualified instructor" (CoARC, 2019, December).

Clinical instructor: An experienced professional who is paired up with a student to provide

hands-on, discipline specific education in the real-world environment (Jones-Boggs Rye & Boone,

2009a).

Cognitive Apprenticeship Theory (CAT): CAT elevates the traditional apprenticeship

model by incorporating cognitive features at all levels, essentially "making thinking visible" for

students (Collins et al., 1991, p. 1).

Commission on Accreditation for Respiratory Care (CoARC): CoARC is the accrediting

body for the profession of Respiratory Therapy whose mission, "is to ensure that high quality

educational programs prepare competent respiratory therapists for practice, education, research,

and service" (CoARC, 2020a).

National Board for Respiratory Care (NBRC): The NBRC is the credentialing agency for

the profession of respiratory therapy offering board examinations and credentials in seven specific

areas of respiratory therapy.

Respiratory Therapy: respiratory therapy is "a specialized healthcare field where

practitioners are trained in pulmonary medicine in order to work therapeutically with people

suffering from a pulmonary disease" (AARC, 2020c).

Summary

While clinical education is an integral part of a respiratory therapist's education, it has

not been studied in relation to an adult learning theory nor expectations. This study examined

both student and instructor expectations of clinical education within the framework of the

Cognitive Apprenticeship Theory. Results of the study may be used to enhance clinical

education offerings in the field of Respiratory Therapy. The following chapters provide an in-

depth exploration of currently available literature on the subject, as well as an overview of the methods used, the results obtained, and a discussion of the findings.

CHAPTER II

LITERATURE REVIEW

Respiratory therapy is a relatively new healthcare profession, "where practitioners are trained in pulmonary medicine in order to work therapeutically with people suffering from pulmonary disease" (American Association for Respiratory Care [AARC], 2020c). Since its birth, the profession has grown immensely in both scope of practice and educational needs. This growth has required the development of respiratory therapy departments in the hospital, respiratory therapy programs to provide education, national accrediting and licensure agencies, as well as state and national professional associations. While the educational preparation required for respiratory therapists has evolved dramatically, clinical education remains at the heart of the respiratory therapy curriculum.

Clinical education continues to be a vital component of the education of a respiratory therapist as it provides students with unique learning opportunities only offered in the clinical setting (Jones-Boggs Rye & Boone, 2009a). As such, clinical education warrants attention and research on ways it can be improved. Since the profession and its educational requirements have advanced, it is important to know if those advancements have impacted the clinical learning expectations of students and their clinical instructors. With such advancements, it would follow that clinical education should be guided by well-established teaching and learning theory. The Cognitive Apprenticeship Theory (CAT) has been utilized by many healthcare disciplines outside of respiratory therapy to guide clinical educational experiences and could be applied to the field of respiratory therapy as well. This literature review will further establish the development of the field of respiratory therapy, clinical education, the use of the CAT in clinical education, and the importance of student and clinical instructor expectations in order to establish

the need to study the CAT in respiratory therapy clinical education from the perspectives of both students and clinical instructors.

Background of the Respiratory Therapy Profession

In order to fully understand the purpose of the proposed study, it is important to understand the history of the respiratory therapy profession as well as the evolution of its educational and credentialling requirements. While advancements have been made, many remnants of the past remain intact and continue to influence the profession. Studying the impact of influential elements, such as program type, educational degree level, and credentials, is a relevant and important part of the study.

History of Respiratory Therapy

Respiratory therapy began in 1907 when oxygen was first used for its healing properties. (Hess et al., 2021; Kacmarek et al., 2017). On-the-job training was provided for what were called oxygen orderlies (American Association for Respiratory Care [AARC], n.d.). As the professional duties and knowledge grew, so did the educational requirements. Entry-level educational requirements started with on-the-job training where physicians would teach oxygen orderlies how to do what was needed. As the list of responsibilities for oxygen orderlies grew and a more well-defined scope of practice was formed, the on-the-job training transitioned into schools of inhalation therapy that offered a certificate of competency upon completion (AARC, n.d.). By 1960 the American Registry of Inhalation Therapists began administering oral and written exams through which the title of registered inhalation therapist was awarded (AARC, n.d.). The profession continued to grow and changed its name to respiratory therapy in 1972.

History of Education in Respiratory Therapy

Transition to the Associate Degree

The concern about the educational composition of respiratory therapy programs began in the 1960s when the first accreditation standards were implemented by the American Medical Association and further updated four times by 1986 (O'Daniel et al, 1992). At this time the accreditation standards dictated two levels of practice, respiratory technician and respiratory therapist, as well as the length of training required for each, 10 months and 20 months respectively (O'Daniel et al, 1992).

Standards and expectations began to change in 1986 when the Committee on Allied Health Education and Accreditation approved, *Essentials and Guidelines of an Accredited Education Program for the Respiratory Therapy Technician and the Respiratory Therapist* (Smith, 1989). For the first time, this guide did not dictate the length of time a student must spend in a respiratory therapy program. Rather, the guide stated that the length of a program must allow students to meet the goals and standards determined by each individual program (Smith, 1989; O'Daniel, 1992).

The American Association for Respiratory Therapy, which is now known as the American Association for Respiratory Care (AARC), identified the need for and assembled a task force which published two studies regarding the educational needs and length of educational programs in respiratory therapy (Duce & Cullen, 1993; O'Daniel, 1992). These studies concluded that the two levels of education could continue, but that the current one-year entry-level certificate was inadequate preparation for future respiratory therapists (Douce & Cullen, 1993). The results indicated that a majority favored two or more years of education for entry into the practice and that an associate degree would be adequate for this entry-level education

(Douce & Cullen, 1993). Furthermore, it was determined that the advanced level of practice would require three-and-a-half years of education or more paving the way for baccalaureate degree programs (Douce & Cullen, 1993).

Many respiratory therapy programs had to make changes to comply with the anticipated move to the entry-level associate degree. Sponsorship of respiratory therapy programs moved from hospitals to academic institutions which ignited changes in program length, curriculum, prerequisites, and accreditation status (Douce, 1999). In 2002, the college-based associate degree was established as the minimum level of education required for entry into respiratory therapy practice (Hess et al., 2021).

By 2003 the AARC Steering Committee of the Coalition for Baccalaureate and Graduate Respiratory Therapy Education (CoBGRTE) released a white paper titled, *Development of Baccalaureate and Graduate Degrees in in Respiratory Care.* This paper presented the rationale for increased education levels in respiratory therapy. The differences between entry-level and advanced respiratory therapist had diminished and entry-level therapists were now expected to be able to fill the role of the advanced therapist upon graduation (Coalition for Baccalaureate and Graduate Respiratory Therapy Education [CoBGRTE] Steering Committee, 2003).

Transition to Higher Level Degrees

The profession was growing at a rapid rate and respiratory therapists were now expected to navigate increasingly more complex clinical work due to advancements in therapeutic techniques, medications, medical devices, and patient population with progressively complex cardiopulmonary diseases (CoBGRTE Steering Committee, 2003). Respiratory therapy services were also expanding into the diagnosis and treatment of sleep disorders, disease management and education, health promotion, pulmonary rehabilitation, home care, public health, tobacco

cessation, and more (CoBGRTE Steering Committee, 2003). Additionally, many agencies and organizations did not, and still do not, recognize a discipline as a profession, nor do they adequately reimburse for their services, unless a baccalaureate degree is required (CoBGRTE Steering Committee, 2003). Because of this, the white paper published in 2003 also called for an increase in the number of baccalaureate and graduate degree programs in respiratory therapy; at the time there were 60 programs at the baccalaureate degree level and just a few at the graduate degree level (CoBGRTE Steering Committee, 2003).

These educational advancement concepts were revisited in the spring of 2007 when the AARC assembled a task force to envision the respiratory therapist of the future. The task force met three times, publishing their findings after each meeting, creating the *2015 and Beyond* articles. The culmination of these meetings resulted in a recommendation that the certified respiratory therapist (CRT) examination be retired in favor of the more advanced registered respiratory therapist (RRT) credential and that the RRT credential be required for licensure at the state level (Barnes et al., 2010; Barnes et al., 2011b; Kacmarek et al., 2009). It was also recommended that only respiratory therapy programs at the baccalaureate degree be considered for accreditation; no new associate degree programs would be considered (Barnes et al., 2011b). Finally, the task force recommended that all accredited programs after the year 2020 offer only baccalaureate degrees, essentially calling for the entry-level education to increase to the baccalaureate degree level (Barnes et al., 2011b).

In support of the *2015 and Beyond Conferences*, the Coalition for Baccalaureate and Graduate Respiratory Therapy Education (CoBGRTE) was established as a task force of the American Association for Respiratory Care (AARC) with the mission to advance education in the field of respiratory therapy (Coalition for Baccalaureate and Graduate Respiratory Therapy

Education [CoBGRTE], 2022). The AARC continues to support the educational advancement in

respiratory therapy and recently published an Issue Paper that states, "the purpose of this

document is to demonstrate the need to advance the minimum education of a respiratory therapist

from an associate degree to a baccalaureate degree and to advance the licensure of practitioners

to the RRT credential for entry to practice" (Doorley et al., 2019, p. 1). The Commission on

Accreditation for Respiratory Care (CoARC) has also responded by changing accreditation

standard 1.01 to state that respiratory therapy programs, "must award graduates of the program a

baccalaureate or graduate degree upon completion of the program" (CoARC, 2019, December, p.

7). Existing associate degree programs are able to maintain their accreditation through CoARC,

however new associate degree programs will not be eligible for accreditation (CoARC, 2020b).

Furthermore, these agencies are also pushing for the elimination of the CRT credential in favor

of mandating the RRT credential for all practicing respiratory therapists in the United States. It

appears that it is only a matter of time before hospitals and state licensing boards begin to require

the baccalaureate degree and the RRT credential.

 In 2020 the Commission on Accreditation for Respiratory Care (CoARC) reported that

there were 345 (82% of total) associate degree programs, 70 (17 % of total) baccalaureate degree

programs, and five (1 % of total) master's degree programs in the United States (CoARC, 2020,

May). In addition, Arizona, California, Ohio, Oregon, New Jersey, and New Mexico now

require the RRT for entry to licensure (AARC, 2020b). For the reasons stated above and the little

progress made in increasing the level of education provided in U.S. respiratory therapy

programs, there is a renewed national movement to transition to the baccalaureate degree for

entry into practice by the year 2030 (Doorley et al., 2019).

Credentialing in Respiratory Care

The National Board for Respiratory Care (NBRC) established and oversees all credentialing board examinations in the field of respiratory therapy. The most common credentials awarded by the NBRC are the Certified Respiratory Therapist (CRT) and the Registered Respiratory Therapist (RRT). In order to receive the CRT, candidates must pass the Therapist Multiple Choice (TMC) exam with the low-cut score or higher. The *Therapist Multiple Choice Examination Detailed Content Outline* is available on the NBRC website and includes detailed sections on patient data; troubleshooting and quality control of devices and infection control; and initiation and modification of interventions (National Board for Respiratory Care [NBRC], 2018b). If the TMC is passed at the high-cut score, candidates receive the CRT credential but are then eligible to take the Clinical Simulation Examination (CSE). The *Clinical Simulation Examination Detailed Content Outlin*e includes detailed simulation-based questions about adult chronic airways disease, adult trauma, adult cardiovascular, adult neurological or neuromuscular, adult medical or surgical, pediatric, and neonatal scenarios (NBRC, 2018a). When the CSE is passed, candidates receive the RRT credential.

The Commission on Accreditation for Respiratory Care (CoARC) is the only accrediting agency for respiratory therapy programs in the Unites States. CoARC provides accreditation to associate, baccalaureate, and master's degree programs in respiratory therapy paying close attention to program administration and sponsorship; institutional and personnel resources; program goals, outcomes, and assessment; curriculum; and fair practices and recordkeeping (Commission on Accreditation for Respiratory Care [CoARC], 2015). Currently, CoARC requires all of their accredited programs to prepare students to achieve the RRT credential, no

matter the type of degree the candidate has obtained (Doorley et al., 2019). In order to meet these requirements, respiratory therapy degree programs require more credits and time to complete (Doorley et al., 2019). This overload of credits and additional time required to complete the associate degree in respiratory therapy support the argument to make the baccalaureate degree the entry-level degree in the field of respiratory therapy.

Studies have been done that add to this argument. In 2010 respiratory therapy program directors were surveyed regarding the content they included in their curricula. The results showed that, in all categories, baccalaureate programs teach more of the content deemed necessary by the *2015 and Beyond Conference* than associate degree programs (Barnes et al., 2011a). Kacmarek et al. surveyed respiratory therapy department directors and managers regarding their staffing preferences and found that, while there was no significant difference in preference of academic preparation, 41.8% of respondents agreed that the baccalaureate or master's degree should be required in order to obtain a license to practice (2012). In addition, 81.2% of those surveyed agreed that the RRT credential should be required to practice respiratory therapy (Kacmarek et al., 2012). Smith et al. also found that sixty-four percent of respondents of a survey of New York State respiratory therapists felt that the baccalaureate degree should become the entry-level degree for the profession (2017). Most recently, a survey of managers and directors of respiratory therapy departments in Pennsylvania showed that 50% prefer to staff respiratory therapists who have earned a baccalaureate degree and that 77.3% prefer to staff those who have earned the RRT credential (Armaghan et al., 2020). While these studies show more support for the entry-level RRT credential than they do for the entry-level baccalaureate degree they also support the entry-level degree advancement.

Current Educational Requirements in Respiratory Therapy

Classroom, laboratory, and clinical education are requirements of accredited respiratory therapy programs. CoARC standard 1.03 states:

The sponsor must be capable of providing required general education courses or have a process for accepting transfer credit from other regionally or nationally accredited institutions for these courses and must be capable of providing the didactic and laboratory instruction, as well as the clinical experience requisite to respiratory care education. (CoARC, December 2019, p. 7)

As such, the program curriculum, schedule, faculty, and facilities must be capable of meeting this standard. The key faculty roles in respiratory therapy programs are the Program Director and the Director of Clinical Education (DCE). The Program Director is responsible for all administrative and educational aspects of the respiratory therapy program (CoARC, December 2019). The DCE is responsible for:

all aspects of the clinical experiences of students enrolled in the program, including organization, administration, continuous review and revision, planning for and development of locations (with appropriate supervision) for evolving practice skills, and the general effectiveness of the clinical experience. (CoARC, December 2019, p. 13)

In addition, each program must, "have sufficient personnel resources to provide effective instruction in the didactic, laboratory, and clinical setting" (CoARC, December 2019, p. 16).

Classroom Education

Classroom education is the first vital component of the education of a respiratory therapist. The didactic offerings of a respiratory therapy program provide the foundational understanding required for practicing respiratory therapists. The curriculum closely follows the

content matrix provided by the National Board for Respiratory Care (NBRC), as required by CoARC, in order to adequately prepare students in all areas covered by the national board examinations. General content areas include patient data, troubleshooting and quality control of devices and infection control, and initiation and modification of interventions (National Board for Respiratory Care [NBRC], 2018b).

Laboratory Education

Students apply classroom knowledge in the laboratory setting as they acquire the technical skills needed for the profession. CoARC accreditation standards require the availability of adequate resources for instruction including laboratory equipment and supplies as well as capital equipment like ventilators and mannequins (CoARC, December 2019). The laboratory serves as a safe environment for students to practice their skills in preparation for actual practice in the clinical setting. Students are required to complete skill competencies in the laboratory prior to being allowed to practice those skills in the supervised clinical environment.

Clinical Education

Clinical education is the culmination of the classroom and laboratory education and is the most integral component of healthcare education in any discipline (Alasmari & Gardenhire, 2015). The purpose of clinical education is to allow students to apply the knowledge and skills learned in the classroom and laboratory settings to the real-world patient care setting so they are able to develop the practical and social skills that are necessary for a competent healthcare professional (Aldhahir et al., 2020; Dahlke et al., 2016; Esmaeli et al., 2014; Kelly, 2007; O'Brien et al., 2014; Parvan et al., 2018; Tiwari et al., 2005). In this setting, the patient, rather than the student, is the primary focus which creates an unstructured and inconsistent learning environment (Knight, 2018). Clinical education challenges students to apply critical thinking

and decision-making skills which prepares them for entry into practice (Dahlke et al., 2016; Paul, 2014).

Given the real-world nature of clinical education, several challenges exist. Clinical education is made possible by affiliation agreements or memorandums of understanding (MOUs) between institutions of higher education and medical facilities. These contracts allow students to be in the patient care setting and practice under the license of their assigned clinical instructor. In most cases, clinical instructors are respiratory therapists who are hired by the hospital to provide direct patient care; these respiratory therapists are assigned a student in addition to their regularly assigned workload. While some respiratory therapists have a passion for providing education in the clinical setting, others may not. In addition, respiratory therapists do not receive formal pedagogical education as part of their respiratory therapy training (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). Thus, the clinical instructors' skill and comfort levels will vary greatly when providing clinical education to respiratory therapy students.

For these reasons, CoARC requires respiratory therapy programs to provide training for the clinical instructors affiliated with their program. The CoARC standards were updated in 2018, with clarifications published on December 13, 2019 (CoARC, 2019, December). Previous interpretations of these standards required documentation of annual inter-rater reliability testing and subsequent instructor education. The updated interpretive guideline places less importance on the inter-rater reliability testing and documentation and more importance on instructor training provided by the respiratory therapy program (CoARC, 2019, December). As such, it is important for DCEs to have an evidence-based way of determining and addressing the educational needs of the instructors associated with their respiratory therapy programs.

Research on Respiratory Therapy Clinical Education

Since respiratory therapy is a relatively new healthcare discipline that is only now attempting to require the bachelor's degree for licensure there is limited research on clinical education in the field. A comprehensive literature review regarding clinical education in the respiratory therapy profession was completed by reviewing each table of contents for every edition of the Respiratory Care Education Annual from 1996 to 2020. In addition, the journal, *Respiratory Care*, was also searched using the search terms, "preceptor", "clinical instructor", "instructor", and "student" at which point the search results reached saturation. The studies completed on clinical education in respiratory therapy include establishing the need for instructor education as well as role-specific studies including administrators, instructors, and students.

Student Perspective on Clinical Education in Respiratory Therapy

The purpose of clinical education is to help students prepare for success within the field, as such, it makes sense to study the student perspective regarding clinical education experiences. Interpersonal skills, hands-on opportunities, the clinical environment, and clinical instructors' evaluation of students have all been studied in relation to clinical learning. Results show that these factors are important to respiratory therapy students.

Alasmari and Gardenhire (2015) surveyed undergraduate and graduate respiratory therapy students regarding their perceptions of effective clinical instructor characteristics. The undergraduate students ranked, "respect student as an individual" and "be approachable" highest followed by "evaluate students fairly" while graduate students ranked, "be supportive and helpful" and "be approachable" highest (Alasmari & Gardenhire, 2015). This study demonstrates the need for clinical instructors to have well-developed interpersonal skills in order to effectively teach students in the clinical setting. Interpersonal skills were also identified by

Patten (2019) to be impactful. She used a qualitative approach to study student experiences in the clinical learning environment and student perspectives regarding clinical instructors. Students felt hands on experiences were the most rewarding while the most frustrating experiences were when they were not given opportunities to provide hands on care and when they were assigned to a preceptor who did not want to be a preceptor (Patten, 2019). In addition, students found preceptors who asked them questions, were kind, respectful, and friendly to be the most helpful to their learning while preceptors who had a bad attitude, complained, were rude and were lazy to be detrimental to their learning (Patten, 2019). Interpersonal skills are again shown to be important as are hands-on learning opportunities.

The clinical environment is also an important aspect of clinical education. It was studied by Alghamdi et al. (2019) when they surveyed second year undergraduate and graduate students regarding the clinical learning environment, supervision, and teaching. High scores were obtained for both groups in all domains considered: pedagogical atmosphere, leadership style, respiratory care in the ICU, supervision in clinical settings, and role of the clinical preceptor (Alghamdi et al., 2019). A significant difference was found between undergraduates and graduates regarding the pedagogical atmosphere of clinical facilities; graduates scored this domain higher than undergraduates (Alghamdi et al., 2019). Undergraduates seem to be more aware of and sensitive to clinical learning environments that they perceive to be uninviting.

The final major area of study in regard to student perspectives regarding clinical education concerns the impact of clinical instructors' grading practices. Ari et al. (2003) found that consistency and fairness significantly impacted the clinical preceptor evaluations. In addition, regression analysis showed that integrating theory to practice, allowing adequate time for procedures, clarifying questions, motivating student, and demonstrating enthusiasm all

played a role in the quality of clinical instruction (Ari et al., 2003). In 2006 Ari et al. again studied the relationship between clinical preceptors' grading practices and students' evaluations of clinical preceptors. The consistency and fairness of clinical preceptors had a significant impact on students' clinical instructor ratings (Ari et al., 2006). These studies demonstrate the students' need for high quality interpersonal skills, consistency and fairness in regard to their clinical learning.

Clinical Instructor Perspective on Clinical Education in Respiratory Therapy

Clinical instructors typically do not have formal training in teaching and learning and must provide clinical education based on their own prior experiences (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). With this in mind, it is important to know the clinical instructors' perspectives on clinical education. Jones-Boggs Rye et al. (2007) completed a qualitative study aimed at understanding the lived experience of clinical preceptorship. Analysis of their open-ended questionnaire resulted in three major categories: meaning, the lived experience, and introspection (Jones-Boggs Rye et al., 2007). Clinical instructors felt that experiencing student growth, breakthroughs, and gratitude were the most rewarding while unengaged, incompetent, and over-confident students' experiences were the most frustrating (Jones-Boggs Rye et al., 2007). Knowing the clinical instructors' perspective regarding clinical education is key to providing them with support and training to help improve their experiences with clinical learning.

Student and Faculty Perspectives on Clinical Education in Respiratory Therapy

The ability to compare student and faculty perspectives regarding clinical education allows for a deeper understanding of the varying clinical teaching and learning needs. AlRabeeah et al. (2018) performed one such comparison when they compared faculty and

students' perceptions of effective clinical preceptor qualities. They found that faculty most value professional competency and least value interpersonal relationships while students most value interpersonal relationships and least valued personality characteristics (AlRabeeah et al., 2018). Significant differences were demonstrated between faculty and students in the categories of professional competence and interpersonal relationships (AlRabeeah et al., 2018). These findings are consistent with previous findings that show administrators find professional competence to be most important for effective clinical education while students find interpersonal skills to be most important.

Administrator Perspective on Clinical Education in Respiratory Therapy

While many respiratory therapy administrators have obtained graduate degrees, not many of the graduate degrees are in the field of education. As such, one may question the relevance of the respiratory therapy administrator's perspective on education. However, Aldhahir et al. (2020) studied the respiratory therapy administrator's perspective regarding effective teaching characteristics of clinical preceptors. Respiratory therapy administrators, including directors, managers, supervisors, educational coordinators, and assistant managers in the southeast United States completed the Effective Clinical Instructor Characteristic Inventory (ECICI) (Aldhahir et al., 2020). Results showed that respiratory therapy administrators perceived professional competence, role modeling, and showing genuine interest in patient care to be the most effective qualities of a respiratory therapy clinical preceptor (Aldhahir et al., 2020). This information may not be pedagogically sound; however, it does give insight into the clinical instructor teaching qualities valued by respiratory therapy administrators.

Preceptor Training in Respiratory Therapy

As previously stated, respiratory therapists do not receive formal education on teaching and learning strategies (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). With that in mind, it makes sense that respiratory therapy programs and the accrediting agency, the Commission on Accreditation for Respiratory Care (CoARC), stress the importance of providing training for respiratory therapists who serve as clinical instructors. In order to provide meaningful training that has a positive impact on outcomes, it is prudent to understand the educational needs of clinical instructors. To do this, Jones-Boggs Rye and Boone (2009a) completed a needs assessment for clinical preceptor training by surveying respiratory therapy program directors. Their findings demonstrated a need for a standardized clinical preceptor training program in order to enhance the quality of clinical education in respiratory therapy (Jones-Boggs Rye & Boone, 2009a). Bennion and Rose (2019) also reported a need for clinical preceptor training as one of the findings of a conflict resolution study of clinical preceptors and students. In addition, Jones-Boggs Rye and Boone (2009b) studied the need for clinical preceptor training from the perspective of respiratory therapy department directors and found that they also see a need for preceptor training. These managers identified the provision of effective evaluation and feedback, resources for preceptor training, communication skills, roles and responsibilities of the effective preceptor, and principles of adult learning as areas of focus for preceptor training (Jones-Boggs & Boone 2009b). Finally, Mendoza and Barnes (2018) found a positive relationship between clinical preceptor training and inter-rater reliability scores required for respiratory therapy program accreditation through CoARC. These studies show that clinical instructor training is needed, that it is important to identify areas of focus for training, and that programs should be able to demonstrate improved outcomes when preceptor training is utilized.

Summary of Clinical Education in Respiratory Therapy

While there are several studies regarding clinical education in respiratory therapy, they are limited. There are no studies that explore clinical learning from both the students' and clinical instructors' perspectives. In addition, respiratory therapy faculty were included in just one study and are the only group that is required to have an understanding of pedagogy due to their position as educators. The rest of the participants of the studies, respiratory therapy administrators, clinical instructors, and students lack a foundation in teaching and learning methods. While these studies hold value, they were not framed by a learning theory which would have added to their pedagogical credibility. The use of an evidence-based teaching and learning method is paramount to providing high-quality clinical educational experiences.

Learning Theories in Clinical Education

Adult learning theories are, "explanations of what happens when learning takes place" (Merriam & Bierema, 2014, p. 25). Learning theories are used to inform and enhance teaching practices to make them more effective in a given situation (Merriam & Bierema, 2014). Ramis et al. (2019) completed a systematic review of theory-based strategies for teaching undergraduate healthcare students. Theories included in their report include Social Cognitive Theory, Roger's Diffusion of Innovation Theory, Cognitive Apprenticeship Theory, Cognitive Flexibility Theory, and Cognitive Load Theory (Ramis et al., 2019). While the researchers were unable to determine if one theory was better than the others the common theme of the cognitive domain emerged (Ramis et al., 2019). The experiential learning components of experience, reflection, situated cognition, and cognition in general were combined into one theory called the Cognitive Apprenticeship Theory (CAT). The CAT has been utilized in many studies regarding adult learning and clinical education in the healthcare arena. The CAT builds off of the traditional

apprenticeship model by incorporating the cognitive element which "makes thinking visible" to learners and will be the primary learning theory of the current study (Collins et al., 1991, p. 1).

Cognitive Apprenticeship Theory

Development and Definition of Cognitive Apprenticeship Theory

The Cognitive Apprenticeship Theory (CAT) was developed by Collins et al. (1987) for the purpose of teaching reading, writing, and mathematics. They began with the traditional apprenticeship model and identified methods for teaching the thinking and reasoning skills needed for these subject areas (Collins et al., 1987). The three teaching methods that Collins et al. (1987) identified as utilizing portions of within the CAT include Palincsar and Brown's reciprocal teaching of reading (1984), Scardamalia and Berelter's procedural facilitation of writing (1983a; 1983b), and Schoenfeld's method for teaching mathematical problem solving (1983). The authors then outlined the four components: content, methods, sequence, and sociology and their sub-components as outlined in Figure 1 (see chapter 1) (Collins et al., 1987).

Content. The content domain differentiates between domain knowledge, which is specific to the subject of study, and strategic knowledge, which addresses heuristics (Stalmeijer, 2015). Sub-categories of the content domain include domain knowledge, problem-solving strategies and heuristics, control strategies, and learning strategies (Collins et al., 1987). Domain knowledge refers to the, "the conceptual and factual knowledge and procedures explicitly identified with a particular subject matter" (Collins et al., 1987, p. 14). The problem-solving strategies and heuristics sub-category includes approaches and techniques that are specific to the discipline of study (Collins et al., 1987). Control strategies refers to the assessment of a specific situation and the subsequent choice of possible strategies for completing a task (Collins et al., 1987). The learning strategies sub-category is the piece that describes any and all learning

strategies needed and used to achieve the first three sub-categories of the content domain

(Collins et al., 1987).

Method. The method domain includes the teaching strategies utilized within the CAT.

The strategies include modelling, coaching, scaffolding, articulation, reflection, and exploration

(Collins et al., 1987). As described by Collins et al. (1987):

> The first three (modelling, coaching, and scaffolding) are the core of cognitive
>
> apprenticeship, designed to help students acquire an integrated set of cognitive and
>
> metacognitive skills through processes of observation and of guided and supported
>
> practice. The next two (articulation and reflection) are methods designed to help students
>
> both to focus their observations of expert problem solving and to gain conscious access to
>
> (and control of) their own problem-solving strategies. The final method (exploration) is
>
> aimed at encouraging learner autonomy not only in carrying out expert problem-solving
>
> processes, but also in defining or formulating the problems to be solved. (p. 16)

The methods domain of the CAT has been at the core of many research projects in the health

sciences which will be discussed in another section.

Sequence. The sequencing domain of the CAT addresses the order in which the learning

activities should be introduced and carried out in order for learners to have the optimal outcome

(Collins et al., 1987). The sub-category called increasing complexity explains that the technical

and cognitive tasks that students are expected to learn should begin with very simple tasks and

progress to the integration of those tasks in order to achieve a higher order task (Collins et al.,

1987). The increasing diversity sub-category calls for instructors to gradually increase the

variety of skills, cognitive strategies, and applications for students (Collins et al., 1987). Finally,

the global before local skills sub-category requires students to be shown the overall goal of their

learning so they are able to conceptualize the rationale for each step in the learning process (Collins et al., 1987).

Sociology. The sociology domain of the CAT calls for students to, "learn skills in the context of their application to realistic problems, within a culture focused on, and defined by, expert practice" (Collins et al., 1987, p. 20). Situated learning, the first sub-category, explains that students should be able to apply the learned content to the environment of practice for which they are preparing (Collins et al., 1987). The second sub-category, culture of expert practice, is more commonly referred to as community of practice (Collins et al., 1991). A community of practice means that students should be immersed in, "a learning environment in which he participants actively communicate about, and engage in, the skills involved in expertise, where expertise is understood as the practice of solving problems and carrying out tasks in a domain" (Collins et al., 1987, p. 21). The intrinsic motivation sub-category refers to student's thirst for knowledge, not for a grade or some sort of extrinsic motivation, but rather due to an intrinsic desire to know more so they can be successful practitioners in their field (Collins et al., 1987). In subsequent publications regarding the CAT, the fourth sub-category, exploiting cooperation, and the fifth sub-category, exploiting competition, were combined to form the sub-category called exploiting cooperation (Collins et al., 1991). Exploiting cooperation requires students to engage in group work that requires either cooperation, competition, or both for the purposes of learning (Collins et al., 1991).

Cognitive Apprenticeship Theory in Healthcare Education

The Cognitive Apprenticeship Theory (CAT) is well suited for application in healthcare provider education. The theory was first used in nursing education but has quickly been applied to many medical professions (Butler et al., 2019). Lyons et al. (2017) completed a qualitative

review to better understand how the CAT has been applied to education in the health sciences. They identified 26 studies that included and discussed CAT as the major theory underlying the study; in-depth analysis was completed for these studies (Lyons et al., 2017). This review found that the CAT was used in clinical environments, online learning modules, and blended courses in veterinary, nursing, medicine, midwifery, dentistry, pharmacy, and interdisciplinary professions (Lyons et al., 2017).

Medical schools and practices have found evidence of the CAT within clinical learning and have been able to apply the CAT with successful results in learning outcomes. In their ethnographic study, Balmer et al. (2008) found evidence of the CAT within the reported learning experiences of medical residents in pediatrics in the United States of America. Stalmeijer et al. (2009) conducted focus group interviews to determine if the six teaching methods presented in the CAT were experienced by Dutch medical students. The results showed that medical students did experience the CAT teaching methods and that this theory could be used for evaluation, feedback, self-assessment, and faculty development (Stalmeijer et al., 2009).

The CAT has also been purposefully utilized in healthcare education. Stalmeijer et al. (2013) interviewed experienced medical clinical teachers regarding the use of the CAT for structuring clinical teaching and learning experiences. They found that this theory could enhance the experiences (Stalmeijer et al., 2013). In another study, Linnet et al. (2012) found that the use of CAT-based clinical encounters in pediatrics are feasible in terms of the amount of time required and student and instructor availability (Linnett et al., 2012). In addition, the fields of pediatrics and orthopedic surgery also found success in the application of the CAT (Butler et al., 2019; Linnet et al., 2012).

The CAT has been used by several healthcare disciplines to provide training to experts in the field who serve as clinical instructors or preceptors. A study of emergency medicine educators established and articulated the acceptability and wide-spread use of the CAT for both learners and educators (Merritt et al., 2018). In the field of neuroanesthesiology, Algarra et al. (2019) successfully utilized a "collaborative cognitive apprenticeship" to provide training for intraoperative neurophysiologic monitoring (p.1). In addition, Feinstein and Yager (2013) applied the CAT to psychiatric residency training in psychotherapy with great success. They reported that psychiatric residents benefitted so greatly that they now request "Apprenticeship Model" cases whenever possible (Feinstein & Yager, 2013). The CAT has also been studied in the context of nursing education. Barr et al. (2019) studied the use of the CAT as the theoretical foundation for Army nursing students who trained with experienced Army nurse preceptors. They found that the CAT was an appropriate adjunctive training for military nurses (Barr et al., 2019). McSharry and Lathlean (2017) also found the CAT to be an appropriate foundation for nursing preceptor training programs in Ireland.

The nursing profession has transitioned to using the CAT to create educational resources such as learning materials and new nurse orientation programs. Woolley and Jarvis (2007) successfully used the CAT in their creation of DVDs to support skills acquisition in nursing. Key and Wright (2017) found that the use of the CAT in the hospital orientation of new nursing graduates increased the confidence level of the nurses and should be used during instructorship periods.

These studies demonstrate the versatility and success of applying the CAT to healthcare education. The CAT was found to be naturally present in current healthcare education practice which verifies its suitability for use in other healthcare disciplines. The theory has since been

used with success to enhance clinical education for students, train clinical instructors and preceptors, and orient new hires to their respective departments within the hospital. This learning theory, however, has yet to be studied in the field of respiratory therapy.

Cognitive Apprenticeship Theory-Based Instrument

Clinical education is difficult to measure and evaluate which is why it is the subject of many research projects. Stalmeijer et al. (2008) identified this need and developed an instrument for evaluating medical school clinical teachers based on the CAT. This 30-item instrument was evaluated by a group of stakeholders for content validity. The evaluation resulted in the removal of four items, the modification of 13 items, and the addition of one item, safe learning environment, which is not a component of the CAT (Stalmeijer et al., 2008). The result was the Maastricht Clinical Teaching Questionnaire (MCTQ).

The MCTQ was subsequently tested for validity and reliability by Stalmeijer et al. (2010). In this follow-up study, fourth- and fifth-year medical students were asked to complete no more than three MCTQs for any of the clinical instructors with which they spent a large amount of time (Stalmeijer et al., 2010). The MCTQ submissions were analyzed for construct validity and reliability. Confirmatory factor analysis was suboptimal initially, but adjustments were made to the instrument which resulted in the successful validation of a five-factor model with 14 items (Stalmeijer et al., 2010). The five factors included modeling, coaching, articulation, exploration, and the learning environment (Stalmeijer et al., 2010).

In order to obtain acceptable reliability standards, at least seven to 14 evaluations had to be completed on the same clinical instructor (Stalmeijer et al., 2010). Once the appropriate number of evaluations was obtained, the G-coefficient of at least 0.70 was reached (Stalmeijer et

al., 2010). The alpha coefficients were between 0.83 and 0.96 for all factors indicating

satisfactory internal consistency (Stalmeijer et al., 2010).

In another follow-up study Stalmeijer et al. (2013) interviewed 17 experienced clinical

instructors resulting in further verification of the five previously listed factors as well as the

application of the CAT for instructor training. Furthermore, Boreboom et al. (2011) studied the

MCTQ in veterinary education with results supporting the content validity, strong internal

correlation factors, and reliability with 10-12 responses per clinical instructor. The between-

student differences, teacher characteristics, and student characteristics were studied by

Boreboom et al. (2012). Results showed that student and teacher characteristics did not impact

results and that the MCTQ was a reliable tool to use to assess student ratings of clinical teacher

performance (Boreboom et al, 2012). The MCTQ has also been utilized to study clinical

instruction in psychiatry training (Stephan & Cheung, 2017) and a multidisciplinary faculty

development program (Konishi et al., 2020). Research has established the MCTQ as a valid and

reliable tool for assessing clinical instruction. The use of the MCTQ in such a variety of studies

regarding clinical education establishes its credibility. It would follow that the MCTQ can also

be used to study clinical education in respiratory therapy.

Expectations of Clinical Education Experiences

While it is important to create learning experiences rooted in well-established teaching

and learning methods, it is also important to understand what students and clinical instructors

expect during the clinical phase of medical education. To begin, expectations can be defined as,

"a person's beliefs that a certain behavior or outcome will occur as a result of a specific event"

(Golos and Tekuzener, 2019, p. 2). Expectations are a fundamental aspect of learning because

they are based on one's understanding of their past experiences and thus, play an important role

in clinical education (Miller et al., 2005). Miller et al. (2005) explain that unmet student expectations can lead to attrition which is why it is important for universities and their programs to work to meet reasonable student expectations. Research by Brodie et al. (2004) showed that nursing students whose actual experiences did not match their expectations or perceptions of what nursing would be like were more likely to drop out of their nursing program. Similar results were found for general surgery residents regarding their internship experiences (Abelson et al., 2018). In addition, differing expectations can lead to conflict and obstruct the learning process which is why it is important to provide realistic guidelines and goals to be sure that students understand what is expected of them (Andersson & Edberg, 2012; Banta & Palomba, 2015; Kellett, 2007; Wheelan, 2005). Research on clinical learning has explored student expectations, student expectations compared to their actual experiences, and student expectations compared to teacher expectations.

Student Expectations

Several studies have examined student expectations, the results of not meeting their expectations, and solutions for improvement. Students have expectations regarding nearly every aspect of their clinical education. Elcigil and Sari (2006) found that nursing students expect clinical mentors to be able to communicate, give positive feedback, be empathetic, provide guidance in finding reliable information and research, and offer to share their own knowledge with students (Elcigil & Sari, 2006). Cowen et al. (2018) surveyed students entering nursing programs regarding their expectations for their clinical learning experiences and found that students expected to learn hands on nursing skills and to be able to actively communicate with their patients. These studies suggest that the knowledge of student expectations is important for clinical faculty to be aware of so they can dispel unrealistic expectations and work to meet the

learning needs of students (Cowen et al., 2018). To meet expectations, Elcigil and Sari (2006) recommend that clinical instructors be trained to clearly explain what they expect from students as well as how they will evaluate students.

It is also important to note that student expectations change over time. Lovric et al. (2017) studied the expectations of nursing students and how they change throughout the course of the nursing program. They found that meeting student expectations was very important because it has a profound impact on student satisfaction, feelings, motivation, and behavior all of which greatly impact student learning (Lovric et al., 2017). Edberg and Andersson (2015) also explored student expectations over time, specifically, they compared the expectations of students entering a nursing program in 2003 and 2013. They found that student expectations regarding the course of study and the profession in general had shifted from a biomedical orientation to a nursing orientation (Edberg & Andersson, 2015). Both of these studies cite the importance of being able to meet student expectations. Edberg & Andersson (2015) suggest that it is important to know and understand student expectations so programs can make plans to meet expectations and provide appropriate support for student learning. They stress that high quality two-way communication is essential for knowing and understanding student expectations and ensuring the expectations are realistic and mutual (Edberg & Andersson, 2015).

Student Expectations Compared to Actual Experiences

Researchers have also studied student expectations and compared them to actual student experiences and found that student expectations are not being met. Midgley (2006) recommends that faculty work to change the clinical learning environment to better meet the expectations set forth by students. However, in order to meet student expectations, the expectations must be known. Brown et al. (2011) suggest that knowing what students expect and effective two-way

communication are important and necessary in order to create a supportive learning environment. Qi Suen et al. (2016) suggest that student stress levels also be taken into consideration more frequently and support provided to them throughout their clinical experiences. They advise faculty to take student satisfaction into consideration when planning and developing curriculum (Qi Suen et al., 2016). Golos and Tekuzener (2019) recommend expectations of clinical learning experiences be discussed with students in detail prior to students entering the clinical setting in order to prevent student dissatisfaction (Golos and Tekuzener, 2019). The work by Hamshire et al. (2013) supports these findings as their research found that unmet student expectations can decrease student satisfaction and lead to attrition. It is clearly important to know and understand the expectations of students prior to their first clinical learning experiences.

Student Expectations Compared to Teacher Expectations

Knowing student expectations seems to be only part of the solution. Incongruent expectations between students and their teachers have also been found to be detrimental. The struggles of third- and fourth-year medical students were qualitatively studied by O'Brien et al. (2007). Thematic analysis revealed differences between the perceptions of students and their clerkship faculty regarding the clerkship experiences and the stress caused by these experiences (O'Brein et al., 2007). Ambiguous expectations with little consistency in feedback were found to be a major cause of this group of students' stress levels (O'Brien et al., 2007). Hendaus et al. (2016) also studied and found differences between the perceptions and expectations of third year medical students and their attending physicians in pediatric practice. These authors suggest that changes to the pediatric rotation be made to bring the expectations of the two groups closer together (Hendaus et al., 2016). These findings are similar to those reported by Weinrich et al. (2010) who found that significant differences in expectations between students and faculty may

lead to student anxiety and decreased learning experiences (Weinrich et al., 2010). Finally, van Roermund et al., (2014) noted a lack of appropriate communication to be the greatest barrier to aligning student and teacher expectations. These studies suggest that improved communication and clarification of expectations may alleviate student struggles and lead to decreased levels of anxiety and improved student learning in the clinical setting (Hendaus et al., 2016; O'Brein et al., 2007; van Roermund et al., 2014; Weinrich et al., 2010).

The aforementioned research supports the proposed study of exploring student and clinical instructor expectations regarding clinical education in the field of respiratory therapy. Studies show that it is important for healthcare programs to know and understand what students expect from their clinical learning experiences. This knowledge can decrease student stress and anxiety while enhancing clinical learning experiences and retention through informed curricular planning, clinical instructor training, and the student orientation and preparation processes.

Summary

This literature review provided an in-depth background of the respiratory therapy profession which brings to light the present-day debate over program degree level and therapist credential level. While this debate remains unresolved, the provision of effective clinical education continues to be essential yet challenging in the field of respiratory therapy. These controversial components may affect the quality of clinical education provided to respiratory therapy students. Clinical education research has identified the Cognitive Apprenticeship Theory (CAT) as an appropriate learning theory for the study of clinical education in healthcare disciplines. In fact, the use of clinical teaching methods rooted in the CAT have contributed to enhanced clinical education in multiple healthcare disciplines. Additionally, the quality of clinical education has been found to be greatly impacted by expectations. Research shows that

unmet and incongruent expectations can lead to frustrated clinical faculty as well as stressed, dissatisfied students who are at risk of attrition. This study aimed to identify and explore the expectations of both students and clinical instructors regarding clinical education in respiratory therapy as they relate to the teaching methods embedded in the CAT.   The impact of components specific to the growth of the respiratory profession, such as program degree level and type of credential earned were also explored in relation to expectations rooted in the CAT as outlined in Figure 2.

Figure 2

Overview of the Study
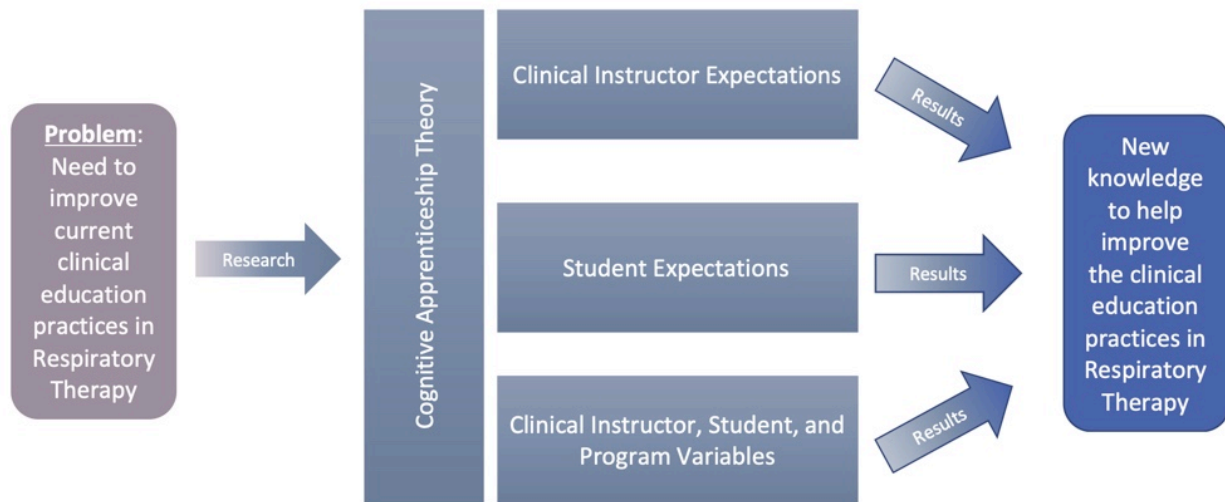
Note. This figure outlines the main components of the study. The study aimed to improve current clinical education practices in the field of respiratory therapy by studying the expectations of clinical instructors and students as they relate to the teaching methods found in the Cognitive Apprenticeship Theory. The results were also explored in relation to clinical

instructor, student, and program variables such as degree level and credential type. Findings may

help to improve clinical education practices in respiratory therapy.

CHAPTER III

METHODS

Respiratory therapy is a healthcare profession that specializes in all components of the cardiopulmonary system for all ages and in all settings. Per accreditation guidelines set forth by the Commission on Accreditation for Respiratory Care (CoARC), the education of a respiratory therapist includes classroom, laboratory, and clinical components (CoARC, December 2019). This study focused on the clinical component through the perspectives of students and those who guide their clinical educational experiences, clinical instructors. Since, in most cases, clinical instructors are staff respiratory therapist and not respiratory therapy program faculty, the clinical instructor's perspective is particularly interesting and not often researched.

The Cognitive Apprenticeship Theory (CAT), first described by Collins et al. (1987), was used to give structure to the study. The CAT consists of four domains: content, methods, sequence, and sociology (Collins et al., 1987). The content domain is addressed by the National Board for Respiratory Care's (NBRC) content matrix which CoARC requires all programs to address. The sequence domain is inherently present in respiratory therapy programs due to the configuration of classroom, laboratory, then clinical learning. The clinical environment in which students experience their clinical learning fulfills the sociology domain of CAT. Since the content, sequence, and sociology domains are accounted for within the curricular structure of respiratory therapy programs they were not included in the study. The methods domain of the CAT, which details teaching methods, was used in the study. The components of the methods domain include modelling, coaching, scaffolding and fading, articulation, reflection, and exploration (Collins et al., 1987). This section will further detail the purpose, research questions, research approach and method, instrumentation, variables, population and sample, participant recruitment and data collection, data analysis, and research positionality of the study.

Purpose

The purpose of this study was to better understand student and clinical instructor expectations regarding clinical education experiences in the field of respiratory therapy. This study utilized the teaching and learning methods of the Cognitive Apprenticeship Theory (CAT) to assess and compare student expectations regarding their clinical learning with clinical instructor expectations regarding their clinical teaching. The impact of gender, program type, student experience, instructor education, instructor credential, and instructor experience on student and clinical instructor expectations was also explored.

Research Questions

The following research questions were addressed by this study:

1. In the respiratory therapy clinical setting, to what extent do clinical instructors expect to use the Cognitive Apprenticeship Theory teaching methods?

2. In the respiratory therapy clinical setting, to what extent do students expect clinical instructors to use the Cognitive Apprenticeship Theory teaching methods?

3. In the respiratory therapy clinical setting, is there a difference between student and clinical instructor expectations of the use of the Cognitive Apprenticeship Theory teaching methods?

4. In the respiratory therapy clinical setting, do student and clinical instructor expectations of clinical education differ due to gender or instructor credentials?

5. In the respiratory therapy clinical setting, is there a relationship between student and clinical instructor expectations of clinical education and program degree level, student experience, instructor education level, or instructor experience?

Research Approach and Method

A quantitative, non-experimental research approach was used to complete the study. Expectations can be difficult to identify and compare. The quantitative nature of this study allowed the expectations of students and clinical instructors to be quantified which allowed for clear identification and statistical analysis.

A survey was used to collect data on student and instructor expectations regarding clinical education in respiratory therapy. Survey studies are used to gather current information or perspectives on a particular subject, in this case, expectations regarding clinical teaching and learning in respiratory therapy (Krathwohl & Smith, 2005). For this particular study, a survey allowed the inclusion of the greatest number of participants across the entire United States of America.

While a survey is an appropriate tool to use for this study, it did not come without the risk of participant bias. Social desirability bias is a common form of bias found in survey studies. Essentially, social desirability bias is the tendency to answer a survey question the way a participant feels is socially acceptable rather than answering truthfully (Warner, 2013). That is to say, clinical instructors may have answered the survey questions in a way that they *felt* they should rather than in a way that reflected what they *actually* do. Students may have provided answers that do not accurately reflect their true expectations, but rather the expectations they *think* their clinical instructors or faculty want them to have. Additionally, both groups of participants may hold Covid-19 pandemic related bias. For example, some facilities disallowed students into the clinical setting, terminating hands-on learning opportunities and ending clinical instructor-student relationships. These situations plus the heightened physical, emotional, and health-related risks of working in healthcare during the pandemic may have caused clinical

instructors and students to respond to the survey differently than they would have prior to the

Covid-19 induced stressors.

Instrumentation

The instrument that was used for this study is a modified version of the Maastricht

Clinical Teaching Questionnaire (MCTQ), originally developed by Stalmeijer et al. (2008) and

revised in 2010 (Stalmeijer et al., 2010). The Cognitive Apprenticeship Theory (CAT) served as

the theoretical underpinning for the MCTQ (Stalmeijer et al., 2008, 2010). The CAT was

created by Collins et al. (1987) as a teaching and learning theory for reading, writing, and

mathematics. It consists of four components: content, methods, sequence, and sociology. Each

component is composed of several sub-components or constructs (Collins et al., 1987). Since the

CAT adds a cognitive approach to the traditional apprenticeship model, it is easily translated for

use in other disciplines, such as healthcare (Collins et al., 1987; Lyons et al., 2017). The survey

used in the 2010 Stalmeijer et al. study, the MCTQ, is the survey that was modified and used for

this study. The survey focuses on the specific teaching and learning strategies that make up the

sub-components or constructs of the methods component of the CAT. These teaching and

learning methods or constructs include modeling, coaching, articulation, exploration, and safe

learning environment (Stalmeijer et al., 2010). This study explored student and clinical instructor

expectations in relation to these constructs.

The MCTQ has been used by several other researchers to assess clinical education

(Konishi et al, 2020; Stephan & Cheung, 2017). Permission to adapt and use the MCTQ was

received from Stalmeijer (personal communication, May 3, 2021). The MCTQ assesses

participants agreement with statements that begin with, "The clinical teacher…" followed by a

past tense, personalized statement (Stalmeijer et al., 2010). For this study, the wording was

changed to assess generalized expectations rather than personal past experiences by using the phrasing, "I expect clinical instructors to…" followed by the same statements written in present perfect tense. When needed, statements were clarified by using the words "the student" in place of the word "my". For example, "The clinical teacher encouraged me to formulate learning goals" became, "I expect clinical instructors to encourage students to formulate learning goals" (Stalmeijer, et al., 2010, p 1738). In order to assess the impact of gender, clinical role (student or instructor), student clinical experience, program type, instructor education, instructor credential, and instructor experience, this information was also collected as part of the demographic section of the survey. Refer to Appendix A for the survey questions.

The survey consisted of 18 questions for students and 20 questions for clinical instructors; the survey was entered in such a way that clinical instructor responses triggered the additional clinical instructor questions while student responses triggered the additional student questions. Questions D1, D2, D3, and D4 were demographic questions for students while questions D1, D2, D5, D6, D7, and D8 were demographic questions for clinical instructors (See Appendix A). As Table 1 details, the constructs were composed of questions Q1 thru Q14, which both students and clinical instructors answered. The *modeling* construct, C1, was composed of questions Q1, Q2, and Q3. The *coaching* construct, C2, was composed of questions Q4, Q5, Q6. The *articulation* construct, C3, was composed of questions Q7, Q8, & Q9. The *exploration* construct, C4, was composed of questions Q10 and Q11. Finally, the *safe learning environment* construct, C5, was composed of questions Q12, Q13, and Q14.

Table 1

Constructs of the Modified Maastricht Clinical Teaching Questionnaire (MCTQ)

Construct Label	Construct Name	Description	Survey Questions Included
C1	Modeling	Student observes the clinical instructor while the clinical instructor explains the thought process behind their actions.	Q1, Q2, Q3
C2	Coaching	The clinical instructor observes the student while verbally directing or coaching the student..	Q4, Q5, Q6
C3	Articulation	Student explains their thought process or reasoning to the clinical instructor	Q7, Q8, Q9
C4	Exploration	Student self-regulates their learning	Q10, Q11
C5	Safe Learning Environment	Clinical instructor creates an environment that makes the student feel supported	Q12, Q13, Q14

Note. Table 1 describes the constructs created from the modified Maastricht Clinical Teaching Questionnaire (MCTQ) (Collins, 1987; Stalmeijer, 2010).

MCTQ Validity and Reliability

The MCTQ was assessed for both content and construct validity. Once the instrument was developed, a content validity study was completed with three groups of stakeholders: doctors, educationalists, and senior medical students (Stalmeijer et al., 2008). The results of this study led to the elimination of four items, the addition of one item, and the modification of 13 items (Stalmeijer et al., 2008). In 2010, Stalmeijer et al. published a study establishing the validity and reliability of the MCTQ. This study used the following fit indices and criteria to determine the construct validity of the five-factor model: x^2 divided by the degrees of freedom (CMIN/df) < 2; the goodness-of-fit index > 0.90; the comparative fit index > 0.90; the root mean square residual < 0.1; and the p of close fit > 0.5 (Stalmeijer et al., 2010). The results demonstrated a good fit: CMIN/df = 1.09; goodness of fit index = 0.92; comparative fit index =

1.0; root mean square residual = 0.03; and p of close fit = 0.85 (Stalmeijer et al., 2010). The correlations between factors were between 0.57 and 0.87 which prompted additional exploration of one-, two-, three-, and four-factor models. It was determined that the five-factor model yielded a better fit (Stalmeijer et al., 2010). The results were confirmed by cross-validation via dividing the dataset into two equal groups, running the previously mentioned tests, and confirming the construct validity of the survey (Stalmeijer et al., 2010). The reliability was determined using generalizability studies, or G-coefficients. It was determined that the modeling, coaching, articulation, and safe learning environment constructs required eight to ten ratings to be determined reliable while the exploration construct required 14 responses to be determined reliable (Stalmeijer et al., 2010). In addition, the alpha coefficients for all factors were between 0.83 and 0.96 which demonstrates an acceptable level of internal consistency (Stalmeijer et al., 2010).

Variables

For the purposes of this study, a student is a person who was enrolled in and at any phase of an entry-level CoARC accredited respiratory therapy program at the time they completed the survey. A clinical instructor is a person who was affiliated with an entry-level CoARC accredited respiratory therapy program and provided educational experiences for students in the hands-on clinical setting at the time they completed the survey. All participants were asked to identify their gender. In addition, both groups were asked to indicate their level of agreement (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree) with 14 items that were adapted, with permission (personal communication, May 3, 2021), from the Maastricht Clinical Teaching Questionnaire (MCTQ) developed by Stalmeijer

et al. (2010). The question numbers and questions that make up the MCTQ are listed in

Appendix A for reference.

Population and Sample

At the time of the study there were 420 *Entry into Respiratory Care Professional*

Practice programs that were accredited by the Commission on Accreditation for Respiratory

Care (CoARC) (2020, May). Since CoARC is the lone accrediting agency for respiratory therapy

in the United States of America, this was an all-inclusive group composed of 345 (82% of total)

programs that conferred the associate degree, 70 (17% of total) programs that conferred the

baccalaureate degree, and five (1% of total) programs that conferred the master's degree

(CoARC, 2020, May). Student survey participants were sought from each of these accredited

programs. Table 2 displays the number of applications, enrollments, and graduates in associate,

baccalaureate, and master's degree programs for 2018, 2017, and 2016. While the total number

of applications has risen in recent years, the total number of graduates has actually decreased.

With this in mind, the maximum number of current students that could have possibly been

invited to participate in this study was approximately 6,000.

There were approximately 135,800 currently employed respiratory therapists in the

United States of America in 2020 (U.S. Bureau of Labor Statistics, 2020). Unfortunately, there

is not a source that organizes data on how many respiratory therapists serve as clinical

instructors. Since this information is not known, and not all respiratory therapists serve as

clinical instructors, the best approximation of the maximum number of active clinical instructors

that could have possibly been invited to take this survey was less than 135,800.

The sample population for this study was $N = 248$. This sample consisted of $n = 85$ clinical instructors and $n = 163$ students. The following section details how these participants were recruited and how their survey results were collected.

Table 2

Respiratory Therapy Program Applications, Enrollments, and Graduates by Degree Type in 2018, 2017, and 2016

		Associate Degree Programs	Baccalaureate Degree Programs	Master's Degree Programs	Total
Applications	2018	14,184	2,039	196	16,419
	2017	13,399	1,910	169	15,478
	2016	12,221	1,796	68	14,085
Enrollments	2018	6,989	992	46	8,027
	2017	6,442	934	51	7,427
	2016	7,089	903	55	8,047
Graduates	2018	5,396	768	55	6,219
	2017	5,457	792	65	6,314
	2016	5,839	815	46	6,700

Note. This table summarizes the total number of applications, enrollments, and graduates from respiratory therapy programs accredited by the Commission on Accreditation for Respiratory Care (CoARC) for the past three years in which data was analyzed and made available to the public. This data was taken from the 2019 Report on Accreditation in Respiratory Care Education, published on May 20, 2020 by the Commission on Accreditation for Respiratory Care.

Participant Recruitment and Data Collection

An informed consent form as well as the survey (See Appendix A) was entered into Qualtrics Survey Software; the same survey was used for both clinical instructor and student participants. The directory of currently accredited respiratory therapy programs is housed by the

CoARC; there is no directory of respiratory therapists who serve as clinical instructors.

However, since both students and clinical instructors could be contacted through their respiratory

therapy program, a letter of explanation of the research project, notice of IRB approval, as well

as a link to the consent form and survey was sent via e-mail to the program directors of all entry

level CoARC accredited programs on June 7, 14, and 21, 2021. The program directors were

asked to forward the survey link to all currently enrolled students at any stage in their respiratory

therapy coursework and all active clinical instructors. If the program director decided to

distribute the survey to their students and clinical instructors, they were asked to notify the

researcher of how many students and clinical instructors were invited to participate in the study.

After three full weeks of being open the survey was closed on June 28, 2021. Distribution of the

survey in this manner should have achieved a student and clinical instructor participant

population that was truly representative of all respiratory therapy students and clinical instructors

in the United States of America at the time of the study which a convenience sample could not

accomplish.

The target sample size was determined by the statistical analyses that were used to

analyze the collected data, namely, independent t-tests and correlation. Using a power of greater

than or equal to 0.8 and a $p < .05$ a sample size of $N = 63$ was needed for the independent t-tests

and a sample size of $N = 85$ was needed for the correlation. This means that the study required a

target sample size of at least $n = 85$ clinical instructors and $n = 85$ students for a total target

sample size of $N = 170$.

While there were 420 accredited entry-level respiratory therapy programs at the time of

the study, some program directors were in charge of more than one program, so a total of 410

program directors were asked to invite all students and clinical instructors affiliated with their

program(s) to participate in the study. Of these programs, 17 (4.1%) had undeliverable e-mail addresses listed, 28 (6.8%) sent automatic out-of-the-office replies, and three (0.7%) sent automatic replies referring to retirement or the Covid-19 pandemic.

Twenty-seven (6.6%) programs sent replies stating that their program would participate in the study. Some programs reported the number of students and clinical instructors they invited to participate while others did not. Of the numbers reported, it is known that at least 299 students and 146 clinical instructors were sent invitations to participate. Survey response data was anonymously collected via Qualtrics Survey Software and saved on the researcher's password protected personal computer. The data was then entered into and analyzed with SPSS (Version 26) which is also password protected.

Data Analysis

SPSS (Version 26) was used to complete all analyses for this research project. The total number of responses was counted, and the characteristics of the study participants were determined including gender, clinical role, program type, student clinical experience, level of instructor education, type of license held by the instructor, and years of experience as an instructor.

Descriptive statistics (percentage of some form of agreement, mean, and standard deviation), construct correlation, and Cronbach's alpha were used to answer research questions one and two. The independent *t*-test was used to answer research questions three and four. Research question number five was answered by using Pearson Correlation Coefficient. See Table 3 for a breakdown of the research questions, variables, and analyses.

Table 3

Research Question, Variables, and Analysis

Research Question	Variables	Analysis
1. In the respiratory therapy clinical setting, to what extent do clinical instructors expect to use the Cognitive Apprenticeship Theory teaching methods?	Student responses	Descriptive statistics (% of some form of agreement, mean, standard deviation, skewness, kurtosis), construct correlation, Cronbach's alpha
2. In the respiratory therapy clinical setting, to what extent do students expect clinical instructors to use the Cognitive Apprenticeship Theory teaching methods?	Instructor responses	Descriptive statistics (% of some form of agreement, mean, standard deviation, skewness, kurtosis), construct correlation, Cronbach's alpha
3. In the respiratory therapy clinical setting, is there a difference between student and clinical instructor expectations of the use of the Cognitive Apprenticeship Theory teaching methods?	Student responses Instructor responses	Independent *t*-test
4. In the respiratory therapy clinical setting, do student and clinical instructor expectations of clinical education differ due to gender or instructor credentials?	Dependent Variables: Student responses Instructor responses Independent Variables: Gender Instructor credentials	Independent *t*-test
5. In the respiratory therapy clinical setting, is there a relationship between student and clinical instructor expectations of clinical education and program degree level, student experience, instructor education level, or instructor experience?	Dependent Variables: Student responses Instructor responses Independent Variables: Program degree level Student clinical experience Instructor education level Instructor experience	Correlation

Note. Table 3 lists the research questions addressed by the study as well as the variables and analytical tests that were used to answer the research questions.

Descriptive Statistics

Descriptive statistics were used to summarize the general characteristics of the survey responses including the percentage of some form of agreement, the mean, and the standard deviation. These results were reported for survey questions nine through 22 (see Appendix A) and organized by the survey constructs modeling, coaching, articulation, exploration, and safe learning environment. This information provided a general overview of the collected data. The percentage of some form of agreement with the construct was calculated for students and clinical instructors to assess for alignment with the Cognitive Apprenticeship Theory.

Cronbach's alpha

Cronbach's alpha is used for self-reported items, like a survey, to assess internal consistency reliability (Warner, 2013). While the MCTQ was previously determined to be a valid and reliable instrument, it is important to assess the internal reliability of the instrument with the population of this particular study. A highly reliable instrument will produce consistent results each time it is used giving the researcher higher confidence that any significant results are due to actual changes in the sample population and not due to measurement error (Carmines & Zeller, 1979). The value of the Cronbach's alpha will be between $\alpha = 0$ and $\alpha = 1$ (Goforth, 2015). An acceptable Cronbach's alpha is between 0.65 and 0.8, although the reliability increases as Cronbach's alpha approaches one (Goforth, 2015). The Cronbach's alpha was reported for the constructs modeling, coaching, articulation, and safe learning environment for the collected data for the student responses and the clinical instructor responses. This

information provided an additional assessment of the instrument's previously confirmed internal reliability.

Construct Correlation

Construct correlation identifies the constructs that are paired with one another for the student and instructor responses. The results of the construct correlations determined the constructs of the CAT that have statistically significant associations with one another.

Independent *t*-test

The independent *t*-test is used to test for a difference between two variables (Warner, 2013). Both students and clinical instructors completed the same survey. The results of the independent t-tests were used to determine areas of significant difference between student and instructor expectations of the clinical learning environment as well as differences due to gender and instructor credentials. In this study, independent t-tests were evaluated for significance at the $p < .05$ level.

Pearson Correlation Coefficient

Finally, Pearson Correlation Coefficient assesses for a linear relationship between two variables (Warner, 2013). The value of Pearson *r* will be between $r = -1$ and $r = 1$ where a negative 1 signifies a perfectly linear negative correlation and a positive one signifies a perfectly linear positive correlation (Warner, 2013). Correlations identified whether or not program degree level, student clinical experience, instructor education level, or instructor experience had a meaningful relationship with the clinical instructor or student responses.

Positionality

The primary researcher does serve as the Director of Clinical Education for both a baccalaureate and a master's degree respiratory therapy program which were not included in the

study. In addition, the author supports the position to move the entry-level degree for the

respiratory therapy profession from the associate degree to the baccalaureate degree and the

position to move the minimum licensing credential to the RRT. However, these facts have been

considered and the study design and analysis should not have been impacted by the researcher's

personal ties and biases.

Summary

Clinical learning is paramount to the education of a respiratory therapist which is why

clinical learning must continue to be studied. This study provides information about the

expectations of respiratory therapy students and clinical instructors in regard to clinical learning

and the factors that may impact them. In addition, the knowledge gained from the study may

help determine the applicability of the Cognitive Apprenticeship Theory to clinical learning in

respiratory therapy. This chapter presented the methods used in the study, the results of which

may influence clinical education in respiratory therapy.

CHAPTER IV

RESULTS

This chapter presents the data and analysis relating to questions regarding student and clinical instructor expectations of clinical education. The Cognitive Apprenticeship Theory (CAT), first established by Collins et al. (1987), has been used to evaluate clinical education in many different healthcare disciplines. Guided by the CAT, the Maastricht Clinical Teaching Questionnaire (MCTQ) was developed by Stalmeijer et al. (2010) to further study clinical education. This study used a modified version of the MCTQ to collect data from current students and clinical instructors in the field of respiratory therapy in order to understand their expectations regarding clinical teaching and learning experiences. A description of the demographics of the sample population and the results for each of the five research questions will be addressed.

Sample Demographics

A total of 289 responses were recorded. Of these responses, 29 surveys were incomplete, and 12 surveys were terminated because the participant indicated that they were neither a student nor a clinical instructor. The remaining 248 responses were included in data analysis for a total sample size of $N = 248$.

A breakdown of the 248 response sample can be found in Tables 4, 5, and 6. There were nearly twice as many student responses ($n = 163$) compared to clinical instructor responses ($n = 85$). A large number of clinical instructors (60%) and students (45.4%) were affiliated with associate degree programs rather than baccalaureate (22.4% of clinical instructors, 30.1% of students) or master's (17.6% of clinical instructors, 24.5% of students) degree programs. This composition is similar to the actual composition of accredited respiratory therapy programs in

the United States which consists of 82% associate and 17% baccalaureate degree programs (CoARC, 2020, May). The difference, however, lies in the percentage of master's degree programs. Only one percent of accredited respiratory therapy programs in the United States confer the master's degree (CoARC, 2020, May). This difference could be due to the timing of the study in that associate degree programs may not have had students in session at the time that the survey invitation was distributed. It may also signify a higher interest in research for those in the master's degree programs.

Table 4

Demographics of Sample Population

Demographic	n	%
Gender		
Male	67	27
Female	181	73
Clinical role		
Student	163	65.7
Instructor	85	34.3

Table 5

Demographics of Clinical Instructor Sample

Demographic	*n*	%
Gender		
Male	26	30.6
Female	59	69.4
Program type		
Associate degree	51	60
Baccalaureate degree	19	22.4
Master's degree	15	17.6
Level of education		
Associate degree	11	12.9
Baccalaureate degree	27	31.8
Master's degree	41	48.2
Doctoral degree	6	7.1
Type of license held by clinical instructor		
Certified Respiratory Therapist (CRT)	1	1.2
Registered Respiratory Therapist (RRT)	84	98.8
Years of experience providing clinical education		
0-1 years	5	5.9
2-4 years	18	21.2
5-7 years	16	18.8
8-10 years	10	11.8
10 or more years	36	42.3

Table 6

Demographics of Student Sample

Demographic	*n*	%
Gender		
Male	41	25.2
Female	122	74.8
Program type (Student)		
Associate degree	74	45.4
Baccalaureate degree	49	30.1
Master's degree	40	24.5
Clinical experience (Student)		
0 clinical courses completed	5	3.1
1 clinical course completed	45	27.6
2 clinical courses completed	41	25.2
3 clinical courses completed	17	10.4
4 clinical courses completed or more	55	33.7

Research Question 1

The first research question examined the clinical instructor responses in order to understand to what extent they expect to use the CAT teaching methods in the respiratory therapy clinical setting. Clinical instructors demonstrated a high level of agreement with all questions on the MCTQ with a total average percentage of agreement of 98.8%. The highest level of agreement was 100% which occurred on Q1, Q3, Q8, Q9, Q12, and Q14. The lowest level of agreement was 96.5% which occurred on Q5 (I expect clinical instructors to adjust their teaching activities to the student's level of experience). These results demonstrate that clinical instructors agree with all of the MCTQ statements which means that they expect to use the same teaching strategies described in the MCTQ when they teach respiratory therapy students in the clinical setting. It should be noted that the clinical instructor data set was negatively skewed and that several of the survey questions had nonnormal kurtosis. Normal skewness is between -1 and 1, moderately non-normal skewness is between +/-1 and +/-2.3, and severely non-normal skewness is less than -2.3 or greater than 2.3 while normal kurtosis is less than 7.0 (R. Stupnisky, personal communication, March 29, 2022). Items Q12, Q13, and Q14 had a severely negative skewness while the remaining items had a moderately negative skewness. All items except Q6, Q13, and Q14 had normal kurtosis. The negative skew and non-normal kurtosis are likely attributed to the scale of the survey items. Refer to Table 7 to view the descriptive statistics for clinical instructors.

Table 7

Descriptive Statistics for Clinical Instructors

Question	% of Some form of Agreement	*M*	*SD*	Skewness	Kurtosis
C1 Modeling					
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	100.0	5.67	.585	-1.613	1.609
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	98.8	5.53	.717	-1.991	5.948
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	100.0	5.84	.373	-2.104	4.436
C2 Coaching					
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	98.8	5.68	.621	-2.104	4.436
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	96.5	5.47	.796	-1.499	1.668
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	97.6	5.53	.717	-2.190	7.144
C3 Articulation					
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	97.6	5.54	.700	-1.646	2.790
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	100.0	5.81	.422	-2.098	3.694
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	100.0	5.65	.550	-1.272	0.688
C4 Exploration					
Q10. I expect clinical instructors to encourage students to formulate learning goals.	97.6	5.36	.784	-1.053	0.436
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	98.8	5.56	.645	-1.476	2.212

Question	% of Some form of Agreement	M	SD	Skewness	Kurtosis
C5 Safe Learning Environment					
Q12. I expect clinical instructors to create a safe learning environment.	100.0	5.84	.404	-2.381	5.184
Q13. I expect clinical instructors to be genuinely interested in their student.	97.6	5.64	.721	-2.635	8.626
Q14. I expect clinical instructors to show respect to their student.	100.0	5.86	.383	-2.728	7.261

The clinical instructor data was used to form constructs according to the MCTQ (modeling, coaching, articulation, exploration, and safe learning environment). The individual items within each construct were averaged, with the exception of the exploration construct as it consisted of just two items. The modeling construct had the highest average level of agreement at 99.6%. The construct of coaching had the lowest average level of agreement at 97.6%. This data means that the vast majority of clinical instructors expect to use the CAT teaching methods modeling, coaching, articulation, and safe learning environment when working with respiratory therapy students. While the reliability of the instrument was discussed in Chapter 3, the reliability coefficient and correlations for each construct were found for the clinical instructor population and can be found in Table 8. The coaching construct had the lowest internal consistency ($\alpha = .591$) indicating that this construct has a low level of reliability. The remaining constructs showed high internal consistency and all construct correlations were significant at the $p < .05$ level. With the exception of the coaching construct, this data supports the previous reliability studies, discussed in Chapter 3, that first confirmed the MCTQ as a valid and reliable instrument (Stalmeijer et al., 2008, 2010).

Table 8

Construct Correlation and Reliability for Clinical Instructor Responses

Construct Number	Subscale Constructs	C1.	C2.	C3.	α
C1.	Modeling Q1, Q2, Q3				.757
C2.	Coaching Q4, Q5, Q6	.512*			.591
C3.	Articulation Q7, Q8, Q9	.511*	.537*		.736
C5.	Safe Learning Environment Q12, Q13, Q14	.588*	.593*	.624*	.747

Note. *correlation is significant at the 0.05 level (2-tailed).

Research Question 2

The second research question assessed the student responses to learn more about their expectations regarding the use of the CAT teaching methods in their respiratory therapy clinical education. The student responses showed a high level of agreement with all components of the MCTQ. The student total average percentage of agreement was 95.9%. The highest level of agreement was 96.9% on items Q2, Q4, Q8, Q9, Q11, and Q14. The lowest level of agreement was 90.8% which occurred on item Q5 (I expect clinical instructors to adjust their teaching activities to the student's level of experience). These results show that students are in agreement with all statements in the MCTQ which means that they expect their clinical instructors to use the same teaching strategies described in the MCTQ when they enter their clinical learning rotations. Note that all items in the student data set were severely negatively skewed except for Q5 which was moderately negatively skewed. In addition, all items except Q1, Q5, Q7, and Q10 had non-normal kurtosis. Again, this is likely due to the scale used for the survey. The descriptive statistics for the student responses can be found in Table 9.

Table 9

Descriptive Statistics for Students

Question	% of Some form of Agreement	*M*	*SD*	Skewness	Kurtosis
	C1 Modeling				
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	95.1	5.37	1.105	-2.493	6.872
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	96.9	5.53	.983	-3.213	11.792
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	95.7	5.63	.976	-3.631	13.953
	C2 Coaching				
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	96.9	5.57	.962	-3.467	13.545
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	90.8	4.98	1.237	-1.320	1.616
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	96.3	5.44	1.006	-2.838	9.563
	C3 Articulation				
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	95.1	5.31	1.057	-2.338	6.577
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	96.9	5.50	.971	-3.203	12.045
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	96.9	5.50	.965	-3.229	12.327
	C4 Exploration				
Q10. I expect clinical instructors to encourage students to formulate learning goals.	96.3	5.31	1.038	-2.353	6.968
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	96.9	5.45	.976	-3.018	11.058

Question	% of Some form of Agreement	*M*	*SD*	Skewness	Kurtosis
C5 Safe Learning Environment					
Q12. I expect clinical instructors to create a safe learning environment.	96.3	5.63	.975	-3.616	13.910
Q13. I expect clinical instructors to be genuinely interested in their student.	95.7	5.4	1.052	-2.644	7.965
Q14. I expect clinical instructors to show respect to their student.	96.9	5.69	.926	-4.146	18.123

The same MCTQ constructs used for the clinical instructor data in the first research question were used with the student data for the second research question. The articulation and safe learning environment constructs had the highest average level of agreement at 96.3%. The coaching construct had the lowest average level of agreement at 94.7%. These high levels of agreement indicate that the majority of students expect their clinical instructors to use the CAT teaching methods modeling, coaching, articulation, and safe learning environment when they are receiving their clinical education. The reliability coefficient and correlations for each construct were found using the student responses as seen in Table 10. The constructs showed high internal consistency and all construct correlations were significant at the *p* < .05 level. This data supports the previous reliability studies that first confirmed the MCTQ as a valid and reliable instrument (Stalmeijer et al., 2008, 2010).

Table 10

Construct Correlation and Reliability for Student Responses

Construct Number	Subscale Constructs	C1.	C2.	C3.	α
C1.	Modeling Q1, Q2, Q3				.902
C2.	Coaching Q4, Q5, Q6	.861*			.863
C3.	Articulation Q7, Q8, Q9	.883*	.863*		.941
C5.	Safe Learning Environment Q12, Q13, Q14	.897*	.842*	.867*	.926

Note. *correlation is significant at the 0.05 level (2-tailed)

Research Question 3

The third research question evaluated both clinical instructor and student responses to the MCTQ items in order to find significant differences in their expectations of the use of the CAT teaching methods in the respiratory therapy clinical setting. As Table 11 demonstrates, the overall group, consisting of both clinical instructors and students, shows a high level of agreement with the MCTQ items with a total average of 96.9% agreement. Q8, Q9, and Q14 had the highest level of agreement at 98.0% while Q5 (I expect clinical instructors to adjust their teaching activities to the student's level of experience) had the lowest level of agreement at 92.7%. This data suggests that both groups, clinical instructors and students, share the same high expectations for the use of the MCTQ teaching methods in respiratory therapy clinical education. Again, all items of the combined clinical instructor and student data were severely negatively skewed except for items Q5 and Q10 which were moderately negatively skewed. Similarly, all items except for items Q5 and Q10 had non-normal kurtosis. These findings are likely the result of the scale of the survey items.

Table 11

Overall Descriptive Statistics

Question	% of Some form of Agreement	*M*	*SD*	Skewness	Kurtosis
C1 Modeling					
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	96.8	5.47	.969	-2.735	9.108
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	97.6	5.53	.899	-3.078	11.870
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	97.2	5.70	.826	-4.175	19.907
C2 Coaching					
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	97.6	5.61	.861	-3.489	14.891
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	92.7	5.15	1.129	-1.515	2.394
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	96.8	5.47	.917	-2.841	10.321
C3 Articulation					
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	96.0	5.39	.955	-2.402	7.513
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	98.0	5.61	.837	-3.626	16.525
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	98.0	5.55	.848	-3.331	14.644
C4 Exploration					
Q10. I expect clinical instructors to encourage students to formulate learning goals.	96.8	5.33	.958	-2.173	6.589
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	97.6	5.49	.877	-2.976	11.940

Question	% of Some form of Agreement	*M*	*SD*	Skewness	Kurtosis
C5 Safe Learning Environment					
Q12. I expect clinical instructors to create a safe learning environment.	97.6	5.70	.829	-4.115	19.372
Q13. I expect clinical instructors to be genuinely interested in their student.	96.4	5.48	.956	-2.781	9.232
Q14. I expect clinical instructors to show respect to their student.	98.0	5.75	.787	-4.691	24.807

Independent *t*-tests were completed for the MCTQ constructs of modeling, coaching, articulation, and safe learning environment. Two of these constructs, coaching and articulation, showed statistically significant differences between student and clinical instructor responses. Clinical instructors ($M = 5.56$, $SD = .530$) showed that they have higher expectations than students ($M = 5.33$, $SD = .953$) that they will use coaching as a teaching method, $t(246) = 2.097$, $p = .037$. Clinical instructors ($M = 5.67$, $SD = .460$) showed that they also have higher expectations than students ($M = 5.44$, $SD = .945$) regarding the use of the articulation teaching method, $t(246) = 2.107$, $p = .036$. Refer to Table 12 for the independent *t*-test results for the MCTQ constructs.

Table 12

Independent t-tests Comparing Student and Clinical Instructor Constructs

Question or Construct	Clinical Role	*n*	*M*	*SD*	*t*	*df*	p-value Sig. (2-tailed)
Modeling	Student	163	5.51	.936	1.565	246	.119
	Clinical Instructor	85	5.68	.473			
Coaching	Student	163	5.33	.953	2.097	246	.037*
	Clinical Instructor	85	5.56	.530			
Articulation	Student	163	5.44	.945	2.107	246	.036*
	Clinical Instructor	85	5.67	.460			
Safe Learning Environment	Student	163	5.57	.920	1.915	246	.057
	Clinical Instructor	85	5.78	.428			

*Note. * p < .05*

Independent *t*-tests were also completed between student and clinical instructor responses for each item of the MCTQ. Statistically significant differences were found for three items of the MCTQ. There was a significant difference between clinical instructors' and students' expectations for Q1 (I expect clinical instructors to consistently demonstrate how to perform clinical skills). Clinical instructors (*M* = 5.67, *SD* = .585) reported having higher expectations than students (*M* = 5.37, *SD* = 1.105) that they demonstrate the performance of clinical skills, *t*(246) = 2.355, *p* = .019. The second significant difference was between the two groups for Q5 (I expect clinical instructors to adjust their teaching activities to the student's level of experience). Clinical instructors (*M* = 5.47, *SD* = .796) indicated having higher expectations than students (*M* = 4.98, *SD* = 1.237) that they adjust their teaching activities to match the level of the student, *t*(246) = 3.345, *p* = .001. The last significant difference between the groups was for Q8 (I expect clinical instructors to ask students questions aimed at increasing the student's understanding). Again, clinical instructors (*M* = 5.81, *SD* = .422) demonstrated having higher

expectations than students ($M = 5.50$, $SD = .971$) that they ask questions to help students better understand concepts, $t(246) = 2.794$, $p = .006$. The independent t-test results for the individual MCTQ can be found in Table B1 of Appendix B.

The statistically significant results for Research Question 3 demonstrate, that while clinical instructors and students tend to agree with the items on the MCTQ, they do have some significantly different expectations. The results suggest that the two groups have different expectations regarding coaching and articulation. More specifically, differences in expectations of the clinical instructor's demonstration of skills, adjustment of teaching activities, and question asking exist. Further discussion on these differences can be found in Chapter 5.

Research Question 4

The fourth research question looked for significant differences between gender and instructor credentials on student and clinical instructor expectations of clinical education in respiratory therapy. Independent t-tests were completed for the student responses, clinical instructor responses, and the overall, combined clinical instructor and student responses of the MCTQ, as well as each construct of the MCTQ against gender. Independent t-tests were also completed for the clinical instructor responses of the MCTQ and each construct of the MCTQ by type of clinical instructor credentials.

No significant differences were found for any of these independent t-tests suggesting that gender and clinical instructor credentials do not play a significant role in the expectations of clinical instructors and students in the clinical setting. Results are shown in Appendix C. Table C1 displays the results for student responses and gender, Table C2 displays the results for clinical instructor responses and gender, Table C3 displays the combined responses and gender, and Table C4 displays the results for clinical instructor responses and instructor credential.

Research Question 5

The final research question examined clinical instructor and student responses for a relationship between program degree level, student experience, instructor education level, or instructor experience. Pearson Correlation Coefficient was used to assess for any relationships between the variables. For the instructor responses, there was a statistically significant positive correlation between program degree level and level of education completed by the clinical instructor, $r(83) = .279, p < .05$. The results of the clinical instructor responses correlated with program degree level, level of education, and experience can be found in Table 13.

The statistically significant correlation suggests that programs that grant higher level degrees utilize clinical instructors who have obtained higher level degrees to educate students in the clinical setting. This result may be due to the movement to change from the associate degree to the baccalaureate degree as the minimum degree level for entry into practice in respiratory therapy (Doorley et al., 2019).

Table 13

Clinical Instructor Constructs Correlated with Program Degree Level, Level of Education, and Experience

Variable	Program Degree Level	Level of Education	Experience as a CI
Program degree level			
Level of education	.279*		
Experience as a clinical instructor	-.191	.164	
Modeling	-.029	-.067	-.122
Coaching	-.004	-.080	-.136
Articulation	-.067	-.106	-.164
Safe Learning Environment	-.002	-.044	-.086

*Note. * $p < .05$

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The clinical instructor responses for each individual survey question were also correlated with program degree level, level of education, and experience. These results can be viewed in Table D1 found in Appendix D. The clinical instructor responses displayed a statistically significant negative correlation between experience as a clinical instructor and Q10 (I expect clinical instructors to encourage students to formulate learning goals), $r(83) = -.274, p < .05$. In addition, there was a statistically significant negative correlation between experience as a clinical instructor and Q11 (I expect clinical instructors to encourage students to pursue their learning goals), $r(83) = -.303, p < .05$. The significant negative correlations between clinical instructor experience and the encouragement of students to formulate and pursue learning goals is unexpected. These results suggest that clinical instructors with more experience have decreased expectations for students regarding learning goals. Discussion on these results will be presented in Chapter 5.

For the student responses, there was a statistically significant positive correlation between the program degree level and clinical experience, $r(161) = .171, p < .05$. This result indicates that students enrolled in programs that offer a higher degree level offer more clinical experience to their students, which is expected. The correlations for the student responses can be found in Table 14. No other statistically significant correlations were found. The student response results of each individual survey item correlated with the program degree level and student clinical experience can be found in Table D2 in Appendix D.

Table 14

Student Constructs Correlated with Program Degree Level and Student Clinical Experience

Variable	Program Degree Level	Student Clinical Experience
Program degree level		
Student clinical experience	.171*	
Modeling	-.022	-.014
Coaching	.012	.057
Articulation	-.014	.019
Safe Learning Environment	.062	-.002

Note. $p < .05$

Summary

The results shared in this chapter help to understand the expectations of students and clinical instructors regarding their clinical education experiences in the field of respiratory therapy as they relate to the Cognitive Apprenticeship Theory. There was a high level of agreement among all respondents and the items and constructs of the modified Maastricht Clinical Teaching Questionnaire (MCTQ). Amongst these high levels of agreement, statistically significant differences were found between clinical instructor and student responses on MCTQ items regarding the coaching and articulation constructs of the MCTQ. There were also statistically significant differences found between clinical instructor and student expectations regarding the clinical instructor's demonstration of how to perform skills, their adjustment of teaching activities to meet the student's level of experience, and their question asking to help increase student understanding. No statistically significant differences were found between the student and clinical instructor responses and the variables of gender and instructor credential. Finally, statistically significant relationships were identified between student program level and student clinical experience, clinical instructor program level and clinical instructor level of

education, and clinical instructor experience and the MCTQ items relating to the formation and

pursual of student learning goals. These results will be further discussed in Chapter 5.

CHAPTER V

DISCUSSION

The overall goal of this study was to improve respiratory therapy clinical education by studying the expectations held by clinical instructors and students regarding clinical teaching. The Cognitive Apprenticeship Theory (CAT) has been used in other healthcare disciplines to assess clinical teaching (Lyons et al., 2017) and was used to create the Maastricht Clinical Teaching Questionnaire (MCTQ) (Stalmeijer et al., 2010). By adapting and using the MCTQ to explore student and clinical instructor expectations this study not only evaluates expectations, but it also assesses the applicability of the CAT to clinical education in respiratory therapy. Furthermore, the collected demographic variables allow the impact of professional advancement to be assessed. The results of the study may also be used to inform clinical instructor training, improve student experiences, and decrease attrition by better meeting student expectations. The following discussion reviews the results in more detail and discusses their meaning in relation to meeting student and clinical instructor expectations and the use of the CAT and in order to enhance respiratory therapy clinical education. Study limitations and opportunities for future research are also addressed.

Summary of Results

Results for the first and second research questions demonstrated a high level of agreement among students, clinical instructors, and student and clinical instructors combined for all elements and constructs of the modified MCTQ. They also further established the reliability of the modified MCTQ tool. These results clearly demonstrate that, in respiratory therapy clinical education, both clinical instructors and students expect the CAT teaching methods of modeling, coaching, and articulation to be utilized and a safe learning environment to be created.

The third research question results show that, although both clinical instructors and students expect CAT teaching methods to be used, there can be significant differences between their expectations. In this study, students and clinical instructors had significantly different results regarding the expectation of the clinical instructor to demonstrate how to perform clinical skills, to adjust the teaching activities to the student's current level, and to question the student to increase their understanding of the topic. For each of these topics, the clinical instructor group held a higher level of expectation than the student group. The two groups also differed in their expectations for coaching and articulation teaching methods to be used for clinical education in respiratory therapy. Coaching refers to the practice of clinical instructors observing students and offering them hints, reminders, and feedback in order to enhance their clinical skills (Collins et al., 1987). Articulation is teaching method in which clinical instructors encourage students to explain their knowledge, reasoning, or problem-solving processes in clinical practice (Collins et al., 1987). Again, the clinical instructor group held higher expectations for the use of these two teaching methods.

The findings for the fourth research question were not significant indicating that gender and instructor credential do not influence clinical instructor and student expectations. It should be noted that the results regarding the influence of the clinical instructor credential level are not reliable as there was only one clinical instructor participant that held the certified respiratory therapist (CRT) credential; all others held the higher level credential, the registered respiratory therapist (RRT) credential. This may be attributed to the movement to require the RRT credential as the minimum credential level to practice respiratory therapy (Doorley et al., 2019). Several states, including Arizona, California, Ohio, Oregon, New Jersey, and New Mexico have already amended their state licensure laws to mandate the RRT credential (AARC, 2020b).

Finally, the fifth research question showed a statistically significant positive correlation between the level of degree granted by the program and the clinical instructor's level of education. While significant, the result that clinical instructors with higher levels of education are utilized by programs that grant higher level degrees is not surprising due to efforts to increase the minimum level of education to practice respiratory therapy from the associate degree to the baccalaureate degree (Doorley et al., 2019). In addition, the fifth research question identified statistically significant negative correlations between the experience level of clinical instructors and their encouragement of students to create and pursue learning goals. That is, as clinical instructors gained experience their expectations regarding the creation and pursual of learning goals decreased. Finally, the student responses for the fifth research question showed a positive correlation between the program degree level and clinical experience. This result is also not surprising in that it makes sense for programs that offer a higher degree level to offer more clinical experiences.

<div align="center">**Interpretation of Results**</div>

Cognitive Apprenticeship Teaching Methods

The purpose of this study was to learn more about clinical education in respiratory therapy by assessing the expectations of both students and clinical instructors. The participants of this study, both clinical instructors and students, indicated that they expect the teaching methods of the Cognitive Apprenticeship Theory (CAT) to be used in respiratory therapy clinical education. While the CAT hasn't been studied in respiratory therapy before, current literature indicates that other healthcare professions have applied and utilized the CAT and the Maastricht Clinical Teaching Questionnaire (MCTQ) in clinical education. In addition, the literature adds

depth to the meaning of these findings by demonstrating several ways the CAT may potentially be used in respiratory therapy clinical education.

The CAT was developed by Collins et al. in 1987 as a new theory or technique to teach reading, writing, and mathematics. Many healthcare disciplines have begun to use the CAT in their education programs. Specifically, the fields of nursing, emergency medicine, neurophysiology, psychotherapy, pharmacy, orthopedic surgery, pediatric residency, and medical school have incorporated the CAT teaching methods into their faculty development programs, clinical instructor training and evaluation, and student training (Algarra et al., 2019; Balmer et al., 2008; Barr et al., 2019, Butler et al., 2019; Feinstein & Yager, 2013; Key & Wright, 2017; Linnett et al., 2012; Lyons et al., 2017; McSharry & Lathlean, 2017; Merritt et al., 2018; Pinelli et al., 2018; Rodino and Wolcott, 2019; Stalmeijer et al., 2009; Stalmeijer et al., 2013; Woolley & Jarvis, 2007). The main difference between the current literature and this study is that this study used the CAT teaching methods to assess *expectations* rather than what was actually done in clinical education. That is to say, the MCTQ was created to evaluate clinical teachers by assessing to what level the clinical teacher *actually* performed or carried out CAT-based teaching methods. For this study, the MCTQ was modified, with permission from Stalmeijer (personal communication, May 3, 2021), to assess the level of *expectation* that clinical instructors would perform or carry out CAT-based teaching methods. Because of this, the findings of the current study open the door for the teaching methods of the CAT to be used in a new and different way to provide student education and clinical instructor evaluation and training. The interpretation of *expectations* regarding the CAT is further discussed in the next section.

The findings of this study also showed that, as clinical instructors gain experience, their level of agreement with the expectations regarding the exploration construct on the modified

MCTQ decrease. This construct assessed the expectations for clinical instructors to encourage students to explore by formulating and pursuing learning goals. Studies by Rodino and Wolcott (2019) and Konishi et al. (2020) also found the exploration construct to be least relevant and to have received the lowest scores on the MCTQ. To remedy this, Konishi et al. (2020) were able to demonstrate the effectiveness of CAT-based faculty development that included follow-up assessments at three and six months. The follow-up assessment showed continued improvement in the exploration and articulation constructs of the MCTQ (Konishi et al., 2020). These two studies not only verify this specific finding, but also indicate that MCTQ scores for the exploration construct can be improved by providing CAT-based training. Furthermore, the literature suggests that long-term training and education with ample opportunities for follow-up may be necessary in order to create lasting change.

The results of this study indicate that CAT-based teaching methods are appropriate to use in respiratory therapy clinical education. The literature supports these findings and suggests that the CAT should be used in clinical education for student and faculty training and development. The design of this study pushes the use of the CAT teaching methods beyond current practices into the realm of assessment and adjustment of expectations.

Expectations

Since expectations are based on one's understanding of past experiences, they may vary substantially and as such, are an essential element to consider in the discussion of teaching and learning in the respiratory therapy clinical setting (Miller et al., 2005). The results of this study showed that, despite agreement, there can still be significant differences between clinical instructor and student expectations regarding certain components of the CAT. They also showed that clinical instructors had statistically significant higher expectations than students in regard to

expecting clinical instructors to demonstrate skills, to adjust teaching activities to the level of the student's experience, and to ask students questions to increase student understanding. Clinical instructors also reported having higher expectations than students for the coaching and articulation constructs. Current literature explains that unmet student expectations can lead to dissatisfaction (Biles et al., 2022) and attrition (Miller et al., 2005). The results of this study put the respiratory therapy profession in a unique position to increase its sustainability by improving respiratory therapy program outcomes, increasing student satisfaction, and decreasing student attrition by knowing and addressing expectations related to clinical education. These potential outcomes may enhance accreditation efforts, support the work of respiratory therapy program directors, and appeal to students from a marketing standpoint.

The United States of America is currently facing a severe shortage of respiratory therapists with projections estimating the need for 10,100 new openings, for respiratory therapists each year between 2020 and 2030 (National Board for Respiratory Care, American Association for Respiratory Care, & Commission on Accreditation for Respiratory Care, 2022; U.S. Bureau of Labor Statistics, 2022). The information from this study can be used to help the profession by increasing the number of respiratory therapy graduates by increasing student retention in respiratory therapy programs. This study revealed the similarities and differences in the expectations clinical instructors and students hold for clinical education. Research shows the need to provide students with realistic guidelines and goals in order to prevent the conflict that can arise out of them not meeting the expectations of their instructors and/or program (Andersson & Edberg, 2012; Banta & Palomba, 2015; Biles, et al., 2022; Kellett, 2007; Wheelan, 2005). The literature has also demonstrated that when students' actual experiences do not meet their expected experiences they are more likely to drop out of their program of study

(Abelson et al., 2018; Brodie et al., 2004). This study utilized a modified version of the MCTQ to successfully assess student and clinical instructor expectations so they can be known and addressed by respiratory therapy programs. This being said, individual respiratory therapy programs may benefit from using the modified version of the MCTQ to assess the expectations held by their own students and clinical instructors. The knowledge of these expectations will allow for the provision of education aimed at aligning clinical instructor and student expectations for clinical education with one another and the CAT teaching methods. This helps to not only fulfill the purpose of this study, but it may also help to retain students enrolled in respiratory therapy programs which will contribute to the profession by addressing the current shortage of respiratory therapists.

The results of this study also indicated that clinical instructors have significantly higher expectations than students to demonstrate skills for students. A study by Patten et al. (2021) may help explain why these differences were identified. Patten at al. (2021) surveyed respiratory therapy students and found that students felt observation and downtime, or time not treating patients, was the most boring part of clinical education. In relation to this study, it appears that while clinical instructors feel their demonstration and student observation of skills is expected, students actually find it boring which may account for the significant difference between the expectations of the two groups regarding the demonstration of skills.

When it comes to the expectation for clinical instructors to ask students questions in order to increase the student's understanding, this study found that clinical instructors had significantly higher expectations than students. This topic was also assessed by Patten et al. (2021) in their survey of respiratory therapy students. Patten et al. (2021) reported that respiratory therapy students found preceptors who asked them questions and allowed students to ask questions in

return were the most helpful. While these results may appear to be in conflict with one another, it is important to note that in the current study, both clinical instructors and students had high levels of agreement on this question. It appears that both groups expect clinical instructors to ask questions, although students may not fully realize the benefit of question asking until the experience is over. In fact, it may actually be beneficial for clinical instructors to have higher expectations than students regarding this topic, because when asked about it retrospectively, this is what students found to be the most helpful (Patten et al, 2021).

Support for the result that clinical instructors have higher expectations than students for adjusting teaching activities to the student's level was published by Chen et al. (2015). They found that medical school clinical teachers change their expectations and choose learning experiences for learners depending on the student's progress in the curriculum (Chen et al., 2015). Furthermore, Zante & Klasen (2021) found that intensive care unit residents' learning behavior and amount of skill repetition impacted faculty teaching style. These studies reinforce the finding that clinical teachers will adjust their teaching methods based on where the student is with their education. Unfortunately, these studies only took the actual practices of clinical instructors into consideration, they did not involve students or expectations. With this in mind, it is difficult to interpret the finding of the current study. One possible explanation for students holding lower expectations for this particular teaching method is that students may simply not be aware of the adjustments that their clinical instructors make for them.

The results also show that clinical instructors hold higher expectations compared to students for the coaching and articulation constructs. The coaching construct consisted of expectations that the clinical instructor would give feedback during or immediately after direct observation of a student, that the clinical instructor would adjust their teaching activities to the

student's level of experience, and that the clinical instructor would offer students an adequate amount of opportunities to perform activities independently. Current literature helps explain this finding. Chen et al. (2015) studied excellent medical school clinical teachers and found that they use the practice of coaching to help fill gaps in student learning by sequencing clinical learning and choosing specific learning opportunities for students based on the student's developmental needs and expected curricular competencies. Likewise, Sezer and Sahin (2021) found a need for clinical faculty in nursing to develop coaching skills in order to help student nurses learn necessary psychomotor skills. In order to fill the need for coaching in clinical education they created a faculty development program for coaching (Sezer & Sahin, 2021). This literature does not address the students' views regarding coaching skills; however, it supports the finding that clinical instructors have higher expectations for the use of coaching in clinical teaching in respiratory therapy and gives direction on how to increase clinical instructors' coaching skills.

The articulation construct consisted of expectations for clinical instructors to ask students to provide a rational for their actions, to ask students questions aimed at increasing the student's understanding, and to stimulate students to explore their strengths and weaknesses. Recently the topic of articulation as an educational tool has emerged in the literature. Van Zuilen et al. proposed a revision to medical school curriculum based on their belief that self-directed learning, articulation of basic science, and team-based activities will prepare physicians who can more effectively critically think their way through complicated medical cases (2020). Furthermore, Blitz et al. (2019) found that medical students' education would benefit from students developing personal agency. The development of personal agency would increase the students' ability to articulate their learning through self-assessment and exploration of their own strengths and weaknesses. These authors suggest that faculty development could focus on teaching clinical

instructors how to help students understand the importance of and develop their own personal

agency (Blitz et al., 2019). Again, students may not be aware of articulation teaching methods

and the benefits they offer which may explain why students held lower expectations than clinical

instructors regarding articulation. Nevertheless, the literature corroborates the results of this

study and highlights the fact that those in higher education are becoming more aware of the

benefits of and need for articulation.

The findings of this study are important because they allow the expectations of both

clinical instructors and students to be known; many studies do not include both groups. The areas

in which the two groups have significant differences in their expectations have been highlighted.

The identification of differences creates the potential for interventions that will align

expectations between both clinical instructors and students creating improved experiences and

decreased attrition.

Implications and Recommendations for Practice

This study fulfilled its purpose by providing evidence for the use of theory-based

teaching methods that may improve clinical education in respiratory therapy. Both clinical

instructors and students indicated that they expect the teaching methods of the Cognitive

Apprenticeship Theory (CAT) to be used in clinical education. As such, implications and

recommendations include providing training and education for both groups based on the CAT

teaching methods. Furthermore, recommendations include utilization of the original MCTQ to

evaluate clinical teaching and utilization of the modified MCTQ instrument to assess and address

clinical instructor and student expectations in respiratory therapy clinical education at the

programmatic level. Such theory-based training and education may align and articulate the

expectations that clinical instructors and students have for clinical education. The alignment and

articulation of expectations may lead to enhanced experiences, improved outcomes, and decreased attrition which are goals for every respiratory therapy program during a time when the nation needs more respiratory therapists (Abelson et al., 2018; Biles et al., 2022; Brodie et al., 2004; Golos & Tekuzener, 2019; Hamshire et al., 2013; Midgley, 2006; National Board for Respiratory Care, American Association for Respiratory Care, & Commission on Accreditation for Respiratory Care, 2022; U.S. Bureau of Labor Statistics, 2022).

Assessment of Expectations

The findings of this study support the use of the CAT teaching methods in the field of respiratory therapy clinical education. However, even though both clinical instructors and students demonstrated high levels of agreement with the CAT teaching methods through the modified MCTQ instrument, there were statistically significant differences. Clinical instructors had higher expectations than students regarding the expectations for clinical instructors to demonstrate skills, to adjust teaching activities to better suit the student, and to ask questions to increase the student's understanding of the topic. Current literature supports these findings suggesting they need to be addressed.

The identification of specific points of diversion that are supported by current literature indicates that the differences between clinical instructor and student expectations become a priority. Each group, clinical instructors and students, should receive education that is tailored to their role in clinical education in order to align the expectations of both groups and improve the clinical education experience in respiratory therapy. This study suggests that student education not only focus on the teaching methods of the CAT, modeling, coaching, articulation, exploration, and creating safe learning environments, but it should also include information regarding the areas of divergence between the two groups. In this case, students should receive

education about the purpose of modeling or demonstration by the clinical instructor and the benefit of answering and asking questions to solidify their understanding of clinical concepts prior to engaging in hands-on experiences. Information about accepting guidance and support from clinical instructors through coaching and the importance of engaging in reflection on clinical experiences in order to enhance their critical thinking and problem solving should also be included. Since students may not be aware that their clinical instructors adjust teaching activities to meet their needs, it may not be necessary to provide them with much additional information on this topic. Education for clinical instructors could focus on the purpose of demonstration or modeling, the importance of adjusting teaching activities to meet the students where they are in their learning, and the significance of asking and answering student questions in the clinical setting. In addition, clinical instructors may benefit from learning more about the practices of coaching and articulation to improve student technical and critical thinking competence.

The original MCTQ instrument was created to assess clinical teaching (Stalmeijer et al., 2010). It has been used not only to assess clinical preceptors, (Boreboom et. al., 2012; Rodino & Wolcott, 2019; Stephan & Cheung, 2017) but also to assess faculty development programs (Konishi et al., 2020). This study supports the use of a modified MCTQ instrument for the assessment of expectations in respiratory therapy clinical education which indicates that this instrument may also be used within individual respiratory therapy programs.   The use of the modified MCTQ at the program level has the potential to benefit Directors of Clinical Education (DCEs) as it could serve as a needs assessment tool for planning and providing consistent training and education for both clinical instructors and students. The resulting information could shed light on problematic areas as well as outline educational needs that could be addressed in future training sessions. Essentially, the use of the modified MCTQ and CAT at the program

level could help programs that struggle with providing clinical instructor training, meeting outcomes, and decreasing student attrition.

Theory-based training is important in the field of respiratory therapy as it may help to define and improve teaching practices for clinical instructors, most of which have had no formal pedagogical training (Bastable et al., 2011; Jones-Boggs Rye & Boone, 2009b). Respiratory therapy programs can utilize this CAT-based training to fulfill CoARC accreditation standards while improving the teaching practices of clinical instructors. The results of this study can also be used by DCEs to help both students and clinical instructors set and adjust their expectations of the clinical learning experiences in respiratory therapy. Again, the alignment of these expectations may deter conflict, alleviate struggles and frustrations, decrease student anxiety, decrease attrition, and improve student learning (Hendaus et al., 2016; Miller et al., 2005; O'Brein et al., 2007; van Roermund et al., 2014; Weinrich et al., 2010). The educational concepts of the CAT teaching methods could be taught in a variety of ways including, but not limited to simulation, role playing, recorded examples, or lecture.

Clinical Instructor Education

The applicability of the CAT for respiratory therapy clinical instructors has long-reaching implications. To begin, most clinical instructors do not receive pedagogical training in their respiratory therapy training and thus require additional training to become effective clinical instructors (Bastable et al, 2011; Jones-Bogs Rye and Boone, 2009b). This lack of training has resulted in the identification of the need for clinical instructor training programs in the field of respiratory therapy (Bennion & Rose, 2019; Jones-Boggs Rye & Boone, 2009a, 2009b; Mendoza & Barnes, 2018). Additional training my impact the student-clinical instructor relationship as studies have shown that consistency and fairness of the clinical instructor impacted student

ratings of clinical instructors (Ari et al., 2003, 2006). In addition, the Commission on

Accreditation in Respiratory Therapy (CoARC) Standard 2.13 requires all programs to have,

"documentation that program personnel have provided them with orientation regarding their

roles and responsibilities of preceptors, the clinical policies and procedures of the program, and

inter-rater reliability training" (CoARC, 2019, December). It is clear that there is a need for a

theory-based education model for clinical instruction in respiratory therapy. Since this study has

demonstrated that the CAT can be successfully used in respiratory therapy clinical education, the

CAT teaching methods can be used as a framework to provide training for clinical instructors.

Clinical instructor training should focus on the five main teaching methods assessed with

the MCTQ tool including, modeling, coaching, articulation, exploration, and providing a safe

learning environment. Since clinical instructors are very busy and may not have the time to

attend in-person training, it may be most beneficial to create online training modules for each

element of the MCTQ. Each module should focus on defining the teaching method, providing

rationale for using the method, and giving examples of how to employ the teaching method.

Access to these modules can then be given to all clinical instructors regardless of their work

schedules and locations. Initial clinical instructor training should include these basic elements,

but this study demonstrated the need for continuing education as well.

The findings showed that as clinical instructors gain more experience, the expectations

that they will encourage students to formulate and pursue learning goals diminishes. Continuing

education modules should also be developed to address this finding. For example, continuing

education modules may address the importance of goal setting, feedback, and reflection in

supporting self-directed learning (Konishi et al., 2020). In addition to providing education based

on the CAT, Jones-Boggs Rye and Boone (2009b) suggest that clinical instructor training in

respiratory therapy also focus on evaluation, feedback, resources for training, communication skills, roles and responsibilities, and principles of adult learning. By providing initial and continuing clinical instructor training, clinical instructors can set expectations and goals for themselves and use these teaching methods as anchors to help explain what students can expect from them. As an added benefit, clinical instructors may also be able to earn continuing education credits upon completion of the training modules, which would assist them in fulfilling their licensure requirements.

The original MCTQ created by Stalmeijer et al. (2010) was used to assess clinical teaching in medical school. Since this study utilized a modified version of the MCTQ to demonstrate that the CAT may be applied to respiratory therapy clinical education it is also reasonable to use the MCTQ for its intended purpose, evaluation of clinical instructors. In order to provide clinical instructors with feedback on their clinical teaching practices, students may complete the original MCTQ for each of their clinical instructors. The results of the MCTQ will allow clinical instructors to evaluate their teaching practices and it will allow DCEs to evaluate the effectiveness of any training programs as well as the adoption of CAT-based teaching methods.

Student Education

As previously mentioned, if unmet, the expectations students hold for their clinical experiences can lead to poor outcomes and attrition (Abelson et al., 2018; Brodie et al., 2004; Miller et al., 2005). This study has demonstrated that the CAT is applicable to respiratory therapy clinical education, not just for clinical instructors, but for students as well. Utilizing the CAT for educating students about clinical education and what they should and should not expect may lead to better outcomes and decreased attrition.

The student clinical education experience and learning may be enhanced by outlining what is expected of students in the clinical setting. This may also put students at ease and decrease their levels of stress and anxiety (Hendaus et al., 2016; O'Brein et al., 2007; van Roermund et al., 2014; Weinrich et al., 2010). Directors of clinical education may use the results of this study to address specific elements of clinical education with students and to adjust student expectations throughout the course of the program, if needed. The curriculum of most respiratory therapy programs is arranged in a scaffolded manner which allows for the introduction of CAT teaching methods at various points throughout the students' education. Initially, students are allowed into the clinical setting for observation. Prior to these observation rotations DCEs could provide education on modeling and the role it plays in teaching and learning. This will help students make the most out of their observational experiences. Students should also be reassured of and experience a safe learning environment when they are in the clinical setting with their clinical instructors. A safe learning environment is imperative to successful student learning (Young et al., 2016).

When students progress to being able to provide hands on patient care, DCEs could provide training on coaching and what to expect from their clinical instructors in this regard. Students may be more willing to step outside of their zone of proximal development and try new skills in the clinical setting if they know that their clinical instructor will be by their side, coaching them through new experiences (Doyle, 2011; Merriam & Bierema, 2014). Education on articulation teaching and learning methods should also be provided at this time. Articulation of clinical practices, critical thinking, and decision making will help students explain their thought processes to their clinical instructors. In return, clinical instructors can confirm and improve the cognitive process in regard to respiratory clinical practices. When students and

clinical instructors are able to, "make their thinking visible" by reflecting on and discussing the why of a specific clinical scenario, students are better able to understand and in return apply the cognitive aspects to other areas of clinical practice (Collins et al., 1991; Woolley & Jarvis, 2007).

As students enter the later stages of the clinical learning opportunities, DCEs should provide education and encouragement regarding exploration. At this point in their education, students should have adjusted to the clinical environment and their confidence levels regarding their clinical performance should be increasing. Encouraging students to explore further by setting goals, pursuing goals, and pushing themselves to spend time in reflection will help students establish a mastery goal orientation through which they will utilize more deep-learning strategies (Leenknecht et al., 2019). Students who embrace self-directed exploration will not only complete their clinical education at the mastery level but will also establish an attitude that embraces life-long learning and growth.

The aforementioned education could be provided in multiple ways including, lecture, video, role modeling, and simulation. No matter the method, the communication of these teaching methods and expectations of clinical education will help students adjust their own expectations, decrease their anxiety, and improve their learning (Hendaus et al., 2016; O'Brein et al., 2007; van Roermund et al., 2014; Weinrich et al., 2010). Respiratory therapy programs may also experience improved student outcomes and increased student retention (Miller et al, 2005).

Research on clinical education in respiratory therapy is minimal compared to other healthcare professions. This study is important because it assessed expectations regarding clinical learning experiences in respiratory therapy, specifically, by evaluating the expectations of both students and clinical instructors at the same time. As a result, this study confirmed that

the Cognitive Apprenticeship Theory teaching methods are applicable to the field of respiratory therapy because both clinical instructors and students expect them to be used in clinical education. This finding establishes a foundation for theory-based clinical training for both clinical instructors and students as well as for the assessment and eventual alignment of expectations regarding clinical education. Finally, this study invited the entire population of entry-level programs accredited by the Commission on Accreditation for Respiratory Care (CoARC) to participate which enhances the generalizability of these findings.

Limitations

The main limitation of this study is that the sample population does not accurately represent the actual population which may limit the generalizability of this study. The CoARC reported that of all entry-level respiratory therapy programs in the United States of America 82% were at the associate degree level, 17% were at the baccalaureate degree level, and 1% was at the master's degree level (CoARC, 2020, May). Figure 3 shows how the study participants compared to these values. There are a greater number of participants from baccalaureate and master's degree programs compared to the national distribution of respiratory therapy programs. This could be due to multiple factors including timing of the study, availability of program directors, interest in participating in research, and the Covid-19 pandemic. In addition, only one clinical instructor who holds the certified respiratory therapist (CRT) license responded which limits the comparability between the two types of respiratory therapy licenses, CRT and registered respiratory therapist (RRT).

Figure 3

Percentage of Entry-level Associate, Baccalaureate, and Master's Degree Programs and Study Participants
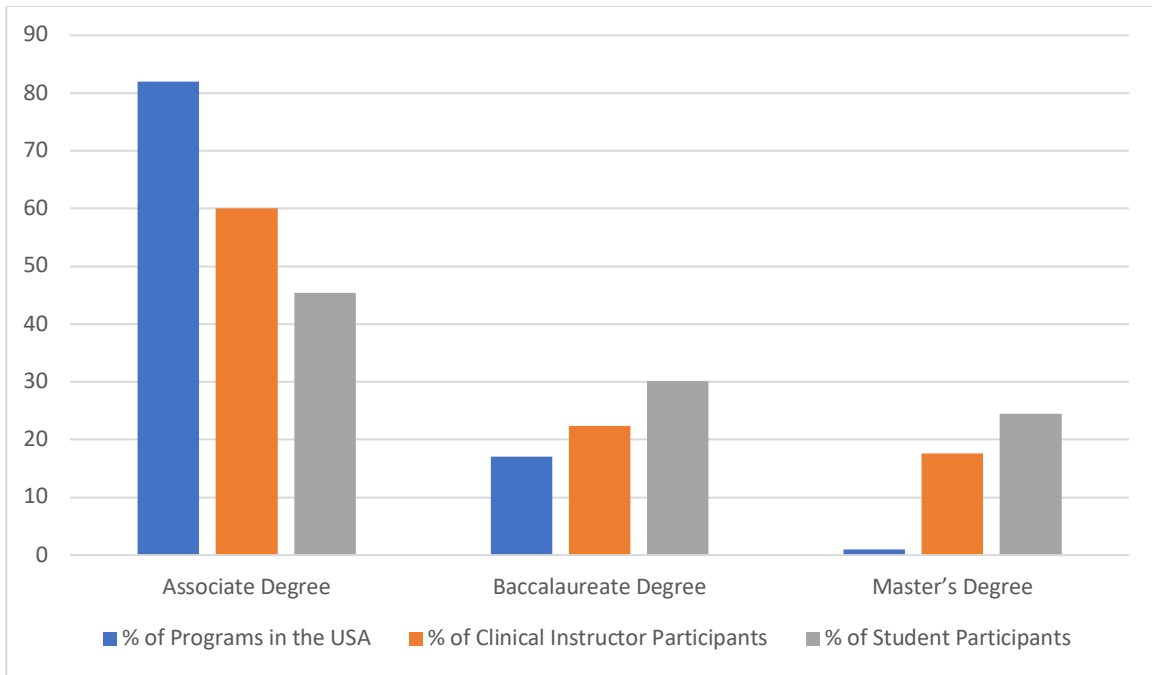
This study may also have been limited by the Covid-19 pandemic. COVID-19 has greatly affected the respiratory therapy profession and the clinical education opportunities available to students. It is not known what the actual impact the pandemic had on this particular study. However, the study may have been impacted by the timing of the waves of increased Covid-19 meaning that some participants may have been experiencing more constraints compared to others because of varying locations throughout the country. In addition, some hospitals did not allow students during the initial height of the pandemic which may have impacted student responses due to limited clinical time and experiences. There may have been a change in the clinical instructor's attitude toward students due to staffing shortages, increased workloads, burnout, secondary traumatic stress, and decreased opportunities to receive training

and education *(*Nishimura, et al., 2021; Orru et al., 2021*).* The pandemic could have also

impacted survey distribution and response rate.

Measurement

The MCTQ was written in such a way that it received high levels of agreement with all

items which explains the negatively skewed data and poor kurtosis. Such negatively skewed

data is not likely to produce significant findings. In addition, the low reliability of the coaching

construct for the clinical instructor data set may also decrease the likelihood of finding

significant results. Furthermore, each construct consisted of just three items hindering the

reliability and validity of the instrument. The inclusion of more items per construct may increase

the validity and reliability of the measurement tool. In addition, redevelopment of the scale may

help to normalize the distribution of collected data.

Recommendations for Future Research

Future research should focus on the application and impact of the Cognitive

Apprenticeship Theory (CAT) teaching methods in respiratory therapy clinical education. In

order to continually assess and improve clinical education at the program level, the

implementation of the original and modified MCTQ at the program level may be worthwhile. In

fact, the original MCTQ created by Stalmeijer et al. (2010) could be used as a pre/post-test to

study the effectiveness of CAT-based training for both clinical instructors and students (Konishi

et al., 2020). As the respiratory therapy profession continues to evolve and advance, research

could also explore the impact of such advancement on clinical education, clinical instructors,

students, and the need for advancement in clinical education alongside the advancement of the

profession. The impact of the clinical instructor's credential on clinical education could also be

an area of focus. Finally, it may be beneficial to repeat components of this study when the

Covid-19 pandemic eases, and students and clinical instructors are able to return to near normal conditions. This may increase the response rate and draw a population that is more representative of the actual population of respiratory therapists and students in the United States.

Summary

The aim of this study was to improve clinical teaching and learning in the field of respiratory therapy by exploring the expectations of clinical instructors and students using a modified version of the MCTQ (Stalmeijer et al., 2010) which is based on the teaching methods of the Cognitive Apprenticeship Theory (CAT). Both clinical instructors and students expressed a high level of agreement with all items and constructs of the modified MCTQ indicating that the teaching methods of the CAT are applicable in the field of respiratory therapy. These results extend the reach of the CAT in healthcare education and highlight the respiratory therapy profession as a member to be included in future healthcare education research. Analysis also revealed several statistically significant differences between clinical instructor and student expectations as well as a negative correlation between clinical instructor experience and the encouragement of students to formulate and pursue clinical goals. It is essential to provide additional training in these areas in order to improve outcomes and decrease attrition. The results of this study did not significantly impact the advancement of the respiratory therapy profession. However, due to the limitations, it also did not necessarily rule out the impact of program type, clinical experience, level of education, or respiratory therapy license may have on clinical education expectations. The results did achieve the overall purpose of this study which was to identify teaching and learning methods that may improve clinical learning in the field of respiratory therapy. The importance of these findings was discussed and suggestions for further research were provided.

Question Number	Question	Possible Responses
D1	What is your gender	Male Female
D2	What is your role in clinical education?	Student Instructor Neither
D3	For students: In what type of program are you enrolled?	Associate degree Baccalaureate degree Master's degree
D4	For students: How many courses with a clinical component have you completed?	0 1 2 3 4 or more
D5	For instructors: For what type of respiratory therapy program are you currently an instructor? (If you instruct for more than one program, select the highest degree level for which you serve as an instructor.)	Associate degree Baccalaureate degree Master's degree
D6	For instructors: What is the highest level of education you have completed?	Associate degree Baccalaureate degree Master's degree Doctoral degree
D7	For instructors: What type of clinical license do you currently hold?	Certified Respiratory Therapist (CRT) Registered Respiratory Therapist (RRT)
D8	For instructors: How many years of experience do you have as a clinical instructor?	0-1 years 2-4 years 5-7 years 8-10 years 10 or more years

Question Number	Question	Possible Responses
Q1	I expect clinical instructors to consistently demonstrate how to perform clinical skills.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q2	I expect clinical instructors to create sufficient opportunities for students to observe them.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q3	I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q4	I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q5	I expect clinical instructors to adjust their teaching activities to the student's level of experience.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q6	I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree

Question Number	Question	Possible Responses
Q7	I expect clinical instructors to ask students to provide a rationale for their actions.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q8	I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q9	I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q10	I expect clinical instructors to encourage students to formulate learning goals.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q11	I expect clinical instructors to encourage students to pursue their learning goals.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q12	I expect clinical instructors to create a safe learning environment.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree

Question Number	Question	Possible Responses
Q13	I expect clinical instructors to be genuinely interested in their student.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree
Q14	I expect clinical instructors to show respect to their student.	1 Strongly Disagree 2 Disagree 3 Somewhat Disagree 4 Somewhat Agree 5 Agree 6 Strongly Agree

Note. Appendix A displays the questions that were included on the survey for this study. The

questions are adaptations of the Maastricht Clinical Teaching Questionnaire as developed by

Stalmeijer et al. (2010)

RESULT TABLE FOR RESEARCH QUESTION 3

Table B1

Independent t-tests Comparing Student and Clinical Instructor Responses

Question or Construct	Clinical Role	*n*	*M*	*SD*	*t*	*df*	p-value Sig. (2-tailed)
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	Student	163	5.37	1.105	2.355	246	.019*
	Clinical Instructor	85	5.67	.585			
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	Student	163	5.53	.983	-.036	246	.971
	Clinical Instructor	85	5.53	.717			
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	Student	163	5.63	.976	1.907	246	.058
	Clinical Instructor	85	5.84	.373			
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	Student	163	5.57	.962	.971	246	.333
	Clinical Instructor	85	5.68	.621			
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	Student	163	4.98	1.237	3.345	246	.001*
	Clinical Instructor	85	5.47	.796			
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	Student	163	5.44	1.006	.764	246	.446
	Clinical Instructor	85	5.53	.717			
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	Student	163	5.31	1.057	1.796	246	.074
	Clinical Instructor	85	5.54	.700			
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	Student	163	5.50	.971	2.794	246	.006*
	Clinical Instructor	85	5.81	.422			
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	Student	163	5.50	.965	1.326	246	.186
	Clinical Instructor	85	5.65	.550			
Q10. I expect clinical instructors to encourage students to formulate learning goals.	Student	163	5.31	1.038	.452	246	.652
	Clinical Instructor	85	5.36	.784			

Question or Construct	Clinical Role	n	M	SD	t	df	p-value Sig. (2-tailed)
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	Student	163	5.45	.976			
	Clinical Instructor	85	5.58	.645	.996	246	.320
Q12. I expect clinical instructors to create a safe learning environment.	Student	163	5.63	.975			
	Clinical Instructor	85	5.84	.404	1.842	246	.067
Q13. I expect clinical instructors to be genuinely interested in their student.	Student	163	5.40	1.052			
	Clinical Instructor	85	5.64	.721	1.809	246	.072
Q14. I expect clinical instructors to show respect to their student.	Student	163	5.69	.926			
	Clinical Instructor	85	5.86	.383	1.636	246	.103

Note. *$p < .05$

APPENDIX C

RESULT TABLES FOR RESEARCH QUESTION 4

Table C1

Independent t-tests Comparing Gender for Student Responses

Question or Construct	Gender	*n*	*M*	*SD*	*t*	*df*	p-value Sig. (2-tailed)
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	Male	41	5.10	1.200	1.825	161	.070
	Female	122	5.46	1.061			
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	Male	41	5.44	.950	.712	161	.477
	Female	122	5.57	.996			
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	Male	41	5.49	1.003	1.047	161	.297
	Female	122	5.67	.966			
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	Male	41	5.51	.925	.448	161	.655
	Female	122	5.59	.977			
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	Male	41	5.10	1.281	-.729	161	.467
	Female	122	4.93	1.225			
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	Male	41	5.34	.990	.691	161	.491
	Female	122	5.47	1.014			
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	Male	41	5.39	.997	-.540	161	.590
	Female	122	5.29	1.079			
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	Male	41	5.44	.950	.487	161	.627
	Female	122	5.52	.981			
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	Male	41	5.46	8.97	.256	161	.798
	Female	122	5.51	.990			
Q10. I expect clinical instructors to encourage students to formulate learning goals.	Male	41	5.29	.955	.100	161	.921
	Female	122	5.31	1.069			

Question or Construct	Gender	n	M	SD	t	df	p-value Sig. (2-tailed)
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	Male	41	5.34	.883			
	Female	122	5.48	1.006	.806	161	.421
Q12. I expect clinical instructors to create a safe learning environment.	Male	41	5.44	1.026	1.470	161	.144
	Female	122	5.70	.953			
Q13. I expect clinical instructors to be genuinely interested in their student.	Male	41	5.39	1.093			
	Female	122	5.41	1.043	.103	161	.918
Q14. I expect clinical instructors to show respect to their student.	Male	41	5.63	.888			
	Female	122	5.70	.942	.422	161	.674

Table C2

Independent t-tests Comparing Gender for Clinical Instructor Responses

Question	Gender	*N*	*M*	*SD*	*t*	*df*	p-value Sig. (2-tailed)
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	Male	26	5.69	.471			
	Female	59	5.66	.633	-.226	83	.822
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	Male	26	5.35	.629			
	Female	59	5.61	.743	1.578	83	.118
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	Male	26	5.85	.368			
	Female	59	5.83	.378	-.177	83	.860
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	Male	26	5.73	.533			
	Female	59	5.66	.659	-.475	83	.636
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	Male	26	5.27	1.002			
	Female	59	5.56	.676	1.562	83	.122
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	Male	26	5.35	.562			
	Female	59	5.61	.766	1.578	83	.118
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	Male	26	5.54	.761			
	Female	59	5.54	.678	.024	83	.981
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	Male	26	5.81	.402			
	Female	59	5.81	.434	.059	83	.953
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	Male	26	5.65	.562			
	Female	59	5.64	.550	-.075	83	.940
Q10. I expect clinical instructors to encourage students to formulate learning goals.	Male	26	5.15	.925			
	Female	59	5.46	.703	1.662	83	.100
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	Male	26	5.46	.706			
	Female	59	5.61	.616	.979	83	.330

Question	Gender	N	M	SD	t	df	p-value Sig. (2-tailed)
Q12. I expect clinical instructors to create a safe learning environment.	Male	26	5.81	.402	.416	83	.678
	Female	59	5.85	.407			
Q13. I expect clinical instructors to be genuinely interested in their student.	Male	26	5.58	.643	.493	83	.623
	Female	59	5.66	.757			
Q14. I expect clinical instructors to show respect to their student.	Male	26	5.85	.368	.201	83	.841
	Female	59	5.86	.392			

Table C3

Independent t-tests Comparing Gender for All Responses

Question	Gender	*n*	*M*	*SD*	*t*	*df*	p-value Sig. (2-tailed)
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	Male Female	67 181	5.33 5.52	1.021 .946	1.421	246	.156
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	Male Female	67 181	5.40 5.58	.836 .919	1.380	246	.169
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	Male Female	67 181	5.63 5.72	.832 .824	.820	246	.413
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	Male Female	67 181	5.60 5.61	.799 .885	.132	246	.895
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	Male Female	67 181	5.16 5.14	1.175 1.114	-.161	246	.872
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	Male Female	67 181	5.34 5.51	.845 .940	1.302	246	.194
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	Male Female	67 181	5.45 5.37	.909 .972	-.568	246	.571
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	Male Female	67 181	5.58 5.62	.801 .852	.306	246	.760
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	Male Female	67 181	5.54 5.55	.785 .872	.125	246	.901
Q10. I expect clinical instructors to encourage students to formulate learning goals.	Male Female	67 181	5.24 5.36	.939 .965	.878	246	.381
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	Male Female	67 181	5.39 5.52	.816 .898	1.091	246	.276

Question	Gender	n	M	SD	t	df	p-value Sig. (2-tailed)
Q12. I expect clinical instructors to create a safe learning environment.	Male	67	5.58	.855	1.383	246	.168
	Female	181	5.75	.818			
Q13. I expect clinical instructors to be genuinely interested in their student.	Male	67	5.46	.943	.212	246	.832
	Female	181	5.49	.964			
Q14. I expect clinical instructors to show respect to their student.	Male	67	5.72	.735	.359	246	.720
	Female	181	5.76	.807			

Table C4

Independent t-tests Comparing Type of License for Clinical Instructor Responses

Question	Type of License	n	M	SD	t	df	p-value Sig. (2-tailed)
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	CRT	1	6.00	.	.564	83	.574
	RRT	84	5.67	.588			
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	CRT	1	6.00	.	.658	83	.512
	RRT	84	5.52	.719			
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	CRT	1	6.00	.	.442	83	.660
	RRT	84	5.83	.375			
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	CRT	1	6.00	.	.512	83	.610
	RRT	84	5.68	.624			
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	CRT	1	6.00	.	.667	83	.507
	RRT	84	5.46	.798			
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	CRT	1	6.00	.	.658	83	.512
	RRT	84	5.52	.719			
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	CRT	1	6.00	.	.658	83	.513
	RRT	84	5.54	.702			
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	CRT	1	6.00	.	.446	83	.657
	RRT	84	5.81	.424			
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	CRT	1	6.00	.	.643	83	.522
	RRT	84	5.64	.552			
Q10. I expect clinical instructors to encourage students to formulate learning goals.	CRT	1	6.00	.	.813	83	.419
	RRT	84	5.36	.786			
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	CRT	1	6.00	.	.677	83	.500
	RRT	84	5.56	.647			

Question	Type of License	n	M	SD	t	df	p-value Sig. (2-tailed)
Q12. I expect clinical instructors to create a safe learning environment.	CRT	1	6.00	.	.408	83	.684
	RRT	84	5.83	.406			
Q13. I expect clinical instructors to be genuinely interested in their student.	CRT	1	6.00	.	.506	83	.614
	RRT	84	5.63	.724			
Q14. I expect clinical instructors to show respect to their student.	CRT	1	6.00	.	.369	83	.713
	RRT	84	5.86	.385			

RESULT TABLES FOR RESEARCH QUESTION 5

Table D1

Clinical Instructor Responses Correlated with Program Degree Level, Level of Education, and

Experience

Variable	Program Degree Level	Level of Education	Experience as a CI
Program degree level			
Level of education	.279*		
Experience as a clinical instructor	-.191	.164	
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	-.101	-.079	-.092
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	.044	-.066	-.177
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	-.038	-.003	.021
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	.039	.055	-.040
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	.037	-.106	-.146
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	-.084	-.107	-.104
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	-.186	-.099	-.139
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	.008	-.108	-.099
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	.064	-.058	-.157
Q10. I expect clinical instructors to encourage students to formulate learning goals.	-.056	-.174	-.274*
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	.008	-.107	-.303*
Q12. I expect clinical instructors to create a safe learning environment.	-.035	-.039	-.174
Q13. I expect clinical instructors to be genuinely interested in their student.	-.003	-.075	-.028

Variable	Program Degree Level	Level of Education	Experience as a CI
Q14. I expect clinical instructors to show respect to their student.	.037	.036	-.054

Note. * *p* < .05

Table D2

Student Responses Correlated with Program Degree Level and Student Clinical Experience

Variable	Program Degree Level	Student Clinical Experience
Program degree level		
Student clinical experience	.171*	
Q1. I expect clinical instructors to consistently demonstrate how to perform clinical skills.	-.045	-.015
Q2. I expect clinical instructors to create sufficient opportunities for students to observe them.	-.014	-.026
Q3. I expect clinical instructors to serve as role models as to the kind of respiratory therapist students would like to become.	.002	.005
Q4. I expect clinical instructors to give useful feedback during or immediately after direct observation of student-patient encounters.	-.036	-.030
Q5. I expect clinical instructors to adjust their teaching activities to the student's level of experience.	.007	.080
Q6. I expect clinical instructors to offer students sufficient opportunities to perform activities independently.	.059	.093
Q7. I expect clinical instructors to ask students to provide a rationale for their actions.	-.074	.074
Q8. I expect clinical instructors to ask students questions aimed at increasing the student's understanding.	.016	-.045
Q9. I expect clinical instructors to stimulate students to explore their strengths and weaknesses.	.023	.021
Q10. I expect clinical instructors to encourage students to formulate learning goals.	.018	.013
Q11. I expect clinical instructors to encourage students to pursue their learning goals.	.041	.018
Q12. I expect clinical instructors to create a safe learning environment.	.082	-.066
Q13. I expect clinical instructors to be genuinely interested in their student.	.027	.036
Q14. I expect clinical instructors to show respect to their student.	.069	.023

Note. p < .05

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