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Credentialing Success in Respiratory Therapy Education: Revisiting Bourdieu's Concepts of Field and Capital

Karen Lightbody Shaw
University of Nevada, Las Vegas

CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION:

REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL

by

Karen L. Shaw

Bachelor of Science in Biology
Nebraska Wesleyan University
1976

Master of Liberal Arts
The Johns Hopkins University
1979

A dissertation submitted in partial fulfillment
of the requirements for the

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College of Education
The Graduate College

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Karen Shaw

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Department of Educational Leadership

Howard Gordon, Ed.D., Committee Chair

Clifford McClain, Ph.D., Committee Member

Dale-Elizabeth Pehrsson, Ph.D., Committee Member

Cecilia Maldonado-Daniels, Ph.D., Graduate College Representative

Tom Piechota, Ph.D., Interim Vice President for Research &
Dean of the Graduate College

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Abstract

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by

Karen L. Shaw

Dr. Howard Gordon, Examination Committee Chair
Professor of Career and Post-Secondary Technical Education
University of Nevada, Las Vegas

The field of Respiratory Therapy (RT) is expected to experience a workforce shortfall over the next decade. The numbers of both program applicants and graduates have declined in recent years, necessitating strategies to improve board exam pass rates for future graduates. In response to the pending employment crisis, the Commission on Accreditation for Respiratory Care has published Programmatic Outcomes Data detailing individual program statistics. A theoretical framework adapted from Pierre Bourdieu's Concepts of Field and Capital was proposed to explain a possible re-stratification of RT programs. It states, in part, that a modification of position-takings within the RT educational field may be a consequence of this publication and the resources (capital) of students, clinical sites, faculty, and financial advantage will accompany the newly established positions. A descriptive study utilizing e-mail survey methodology was developed to gather baseline data from RT program directors in the areas of program characteristics, selected demographics, and average board exams scores in 17 curricular content areas. A convenience sample of programs was solicited from the top and bottom thirds of all programs with published programmatic outcomes. Comparison of results between the top and bottom thirds of the sample population was anticipated to discern which types of programs were more successful than others, what resources impacted

credentialing success, and which curricular alignment indicators demonstrated the greatest disparities. Results seemed to indicate that optimal credentialing outcomes are frequently associated with public, not-for-profit programs; resources of entry-limitation, faculty numbers and degrees, utilized pedagogy, low teacher-to-student ratios, laboratory, clinical, and simulation practice hours, and hiring practices were not restricted to either sector of the population; and assessment of curriculum alignment indicators derived from board exam scores may be a vehicle for early recognition of program weaknesses. Results further indicated the need for follow-up studies to evaluate the long-term impact of the programmatic outcomes and how the results of this study may be utilized to focus program curricular remediation for improved outcomes.

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CHAPTER 1

Introduction

Respiratory Therapy is an allied health profession projected to have a staffing deficit within the next decade. According to the Occupational Outlook Handbook, there will be 31,200 more respiratory therapy positions available in 2020 than there were in 2010 (Bureau of Labor Statistics, 2012). Even though 440 respiratory therapy (RT) schools average 25 student enrollees annually, this average number of graduates is only 18 students or 72% of enrollees. Of these graduates, 93% successfully complete the first level of national board exam required for state licensure and employment. In the final calculation, only 16.7 out of 25 students initially enrolled in RT programs annually, or 67%, become eligible for employment (Committee on Accreditation for Respiratory Care, 2011a). The remaining students (33%) do not persist, or graduate, and are therefore unable to attempt the entry-level exam. Students who enter a program and do not successfully complete the entry-level exam waste valuable financial resources and occupy space that may be better utilized by another student. Finding the optimal formulae for enrollment particulars, effective candidate screening, attrition control, improved allocation of program resources, and curricular consistency may boost numbers of successful graduates.

Other variables influencing program output may be a function of the type of educational institution; profit-generating and not-for-profit colleges and universities offer two-year associate through master's-level degrees (Committee on Accreditation for Respiratory Care, 2011e). Each facility is unique in espoused philosophies, employed pedagogies, utilized clinical sites, targeted students, and available finances. These differences contribute to a spectrum of marketing tactics that allow the schools to

strategically posture for optimal student-admission to student-success ratios.

Although marketing tactics involve appealing to the physical, economic, and intellectual needs of a community, the degree of candor in marketing has been historically difficult to assess. Without a tool to sift through the claims, the consumer has been at a disadvantage; in response to consumer demand, the Commission on Accreditation of Respiratory Care (CoARC) has released student-admission to student-success data to the public. Entitled *Programmatic Outcomes Data*, the document contributes meaningful information to consumers and promotes confidence in higher education by making available comparable program information (Committee on Accreditation for Respiratory Care, 2011a).

The published programmatic outcomes reflect credentialing success, attrition, job placement, enrollee numbers, and graduate numbers, averaged over the most recent three-year reporting period (Commission on Accreditation for Respiratory Care, 2011a). Per accreditation standard 5.03, a link to this data must be present on each program's website (Committee on Accreditation for Respiratory Care, 2011b); therefore, when superior outcomes have been documented, the news is broadcast-worthy. For savvy students, the publication of these outcomes facilitates selection of programs with a record of graduation and credentialing success. From the program's vantage, glowing statistics translate into collateral to attract clinical affiliations, financial gifts, low-risk students, and award-winning faculty. Further, the transparency afforded by the publication of programmatic outcomes permits ranking (stratification) of RT programs; then, much like players in a board game, the RT programs may strategically position to attract resources of clinical sites, finances, students, and faculty.

The publication of programmatic outcomes clearly benefits the consumer; however, this data may also benefit the community of educators and lead to identification of factors contributory to program success. To this end, information about existing program resources was gathered through survey solicitation; when compared with rankings generated from the programmatic outcomes data, patterns emerged linking specific resources and high-credentialing success. Curricular alignment indicators, as reported by the National Board for Respiratory Care (NBRC), were also compared with program rankings to identify areas of curricular strengths in high-performing programs. Lastly, survey data was sorted to explicate trends regarding which type of program persistently demonstrates credentialing success.

The release of specific programmatic outcomes has the potential to generate new sentiments of power or insecurity within localized geographic areas. The ability to view the performance of neighboring programs may add leverage to advertising campaigns or be a rude awakening to those feigning a reputation that is now realized to be unearned. This transparency could yield a shift in students attracted to programs, financial gifting, faculty and medical director fidelity, and clinical site allegiances. To better understand the potential paradigm shift, study results have been described through the lens of "fields" and "capital" as described by French sociologist Pierre Bourdieu (Bourdieu, 1993; Bourdieu & Wacquant, 1992). Bourdieu speculated that the possession of capital (alternately referred to as resources) would alter a school's status, creating a rearrangement of players—similar to "castling" in chess, where the king and rook realign.

Background of Study

Diminishing graduation numbers may be attributed to low enrollment (Mathews, Drumheller, & Carlow, 2006), high attrition, inadequate candidate screening, lack of

program resources, or inconsistent curricular content. Or, low outputs may be a function of the respiratory field itself. To clarify, the respiratory therapy niche is poorly understood even within the healthcare community. Historically labeled as "oxygen jockeys," respiratory therapists (RTs) are well-educated medical professionals specializing in oxygen delivery, administration of breathing treatments and associated therapies, and the fine-tuning of life-support equipment used in intensive care units and emergency rooms. RTs are summoned to every "Code Blue" cardiac arrest and juggle emotionally draining life-or-death decisions daily. Unfortunately, RTs receive little celebrity due to the behind-the-scenes nature of the profession: there are no television programs showcasing respiratory therapists; even other allied health professionals, including nurses, rarely grasp the breadth of the respiratory therapists' knowledge or scope of practice (American Association for Respiratory Care, 2009). To compound the declining enrollments resulting from low visibility, there has been public disenchantment with all healthcare professions. Prospective students have raised concerns about ethics, economics, and job stability (Mathews et al., 2006). To make matters worse, educators have battled budget cuts, decreasing access to clinical facilities, poorly-prepared entrants, and increasing requirements for new-graduate employability. In addition to these obstacles, advances in medical technology have necessitated enhanced rigor in RT curricula and correspondingly higher-than-ever critical thinking skills—raising the bar and further restricting the number of board-exam-ready graduates.

Even though students may be resolute in their decision to pursue the field of respiratory therapy, programs still experience high attrition. Documented attrition has been so pervasive that, in 2011, CoARC increased the acceptable program attrition from

30% to 40% (Commission on Accreditation for Respiratory Care, 2011c). In instances of 40% attrition, only 60% of admitted students might graduate and become eligible to take the requisite exam. High attrition may be the logical consequence of the rigor and the surprisingly demanding nature of the profession; regardless, it may theoretically be curbed with appropriate admissions: candidate screening through interview, examination, psychological profiling, orientation, pre-program introductory courses, job shadowing, etc. to eliminate "poor fit."

Upon completion of screening maneuvers, well-suited students begin the arduous training that includes didactic courses, laboratory sessions, and clinical opportunities to practice learned skills on live subjects. The configuration and organization of the learning experience is based on each school's individually developed curriculum. Although prescribed curricula may exist in some other allied health professions (United States Department of Transportation, n.d.), this level of structure is not offered to respiratory schools. In RT education, curricula may be derived from the *Summary Content Outline for Certified Respiratory Therapist and Written Respiratory Therapist Examinations* (see Appendix A) available from the NBRC (National Board for Respiratory Care, 2011b) or the *NBRC Therapist Written RRT Examination Detailed Content Outline Comparison with Proposed Curriculum* available on the CoARC website (Commission on Accreditation for Respiratory Care, 2011g). Both sources offer a detailed listing of 17 content areas within three domains (see Table 1); however, the fact that each school is permitted to individually tailor curricula implies the potential for variation in curricular content. Regardless, educators customize curricula to respond to the accreditation edict: 80% of students attempting the certification-level credentialing exam must achieve

success (credentialing threshold) in order for the program to achieve satisfactory scores on the published programmatic outcomes report.

Table 1

Major Domains in the NBRC Summary Content Outline

I		Patient data evaluation and recommendations
	a	Review data in the patient record
	b	Collect and evaluate additional pertinent clinical information
	c	Recommend procedures to obtain additional data
II		**Equipment manipulation, infection control, and quality control**
	a	Manipulate equipment by order or protocol
	b	Ensure infection control
	c	Perform quality control procedures for listed equipment
III		**Initiation and modification of therapeutic procedures**
	a	Maintain records and communicate information
	b	Maintain a patent airway including the care of artificial airways
	c	Remove broncho-pulmonary secretions
	d	Achieve adequate respiratory support
	e	Evaluate and monitor patient's objective and subjective responses to respiratory care
	f	Independently modify therapeutic procedures based on the patient's response
	g	Recommend modifications in the respiratory care plan based on the patient's response
	h	Determine the appropriateness of the prescribed respiratory care plan and recommend modifications when indicated by data
	i	Initiate, conduct, or modify respiratory care techniques in an emergency setting
	j	Act as an assistant to the physician performing special procedures
	k	Initiate and conduct pulmonary rehabilitation and home care

Note. Adapted from Summary Content Outline for CRT and Written RRT Examinations, published by the National Board for Respiratory Care (National Board for Respiratory Care, 2009).

In an attempt to assist individual schools to overcome obstacles that may not be readily apparent in submitted reports, CoARC site visitors periodically make physical visits to programs. One area of consistent interest is verification of adequate program resources. As specifically outlined in the CoARC *Accreditation Standards,* "The sponsoring institution must ensure that fiscal, academic and physical resources are sufficient to achieve the program's goals and objectives…regardless of location and instructional methodology used" (Commission on Accreditation for Respiratory Care, 2011b, p. 15). These resources encompass budget, clinical resources, physician input and medical direction, faculty, facilities, lab equipment, and clerical support (Commission on Accreditation for Respiratory Care, 2011h). The CoARC position is clear: without

adequate program resources, it is difficult for a program to provide an environment conducive of credentialing success.

Although issues of low enrollment, high attrition, inadequate screening of candidates, insufficient resources, and lack of curricular guidelines are not the bane of every program, it is salient to restate the fact that even students persisting to graduation may not secure the entry-level certification (CRT) credential due to poor performance on the national board exams. Certainly, lack of credentialing success affects schools through wasted student and program resources; additionally, CoARC specifies success thresholds on the CRT exam for continued accreditation (Commission on Accreditation for Respiratory Care, 2011c). Inability to meet thresholds is publicly posted on the CoARC website (Commission on Accreditation for Respiratory Care, 2011a) and may compromise future enrollments due to poor success history.

An additional issue is that few CRTs successfully attain the advanced-level credential to become a *registered* respiratory therapist (RRT). Although it is standard to accept the CRT credential as tender for state licensure, an advanced credential may be preferred by employers. Attainment of this credential may be vital to livelihood of the employed RT in the near future, as the entry-level standard may be changing to the RRT level (Barnes, Kacmarek, Kageler, Morris, & Durbin, 2011). The RRT credential has eluded many practitioners as evidenced by a national pass rate of 61%, averaged over the last three reporting years (Commission on Accreditation for Respiratory Care, 2011a). Although there may be multiple explanations for poor performance on the CRT and RRT exams, the onus is on the schools to adequately prepare students to pass the barrier that lies between graduation and employment—attainment of the CRT and RRT credentials.

Purpose of Study

It is realistic to posit that low program persistence (high attrition) may be related to inadequate candidate screening; it is further reasonable to surmise that lack of program resources and inconsistent curricular content contribute to unpredictable outcomes. Recognizing that some RT schools produce graduates capable of passing the credentialing exams on the first endeavor while others produce graduates requiring multiple attempts to pass before success (or have no credentialing success at all), differences obviously exist between these two types of programs.

Although it is beyond the scope of this paper to tackle issues of program persistence, a focus on program resources and curriculum alignment indicators may yield a linkage to program credentialing outcomes. Variability in resources includes faculty credentials, years of experience, educational background, number of faculty members and support staff, professional development, pedagogy, student-teacher ratios, total credit hours, clinical exposure hours, simulation practice hours, program screening criteria, program budget, incorporation of technology, physician interaction, local medical climate, student demographics, and geographic location. Although attempts have been made to assess program differences (Ari, 2006; Ari, Goodfellow, & Rau, 2005), adequate correlation of exam outcomes with levels of program success has not been feasible due to previous lack of programmatic outcomes transparency.

In conjunction with the recent release of statistics relating to CRT and RRT credentialing success (Commission on Accreditation for Respiratory Care, 2011a), this study provides a timely assessment. The CoARC-released data was utilized to create a stratification of schools from high-credentialing success to low-credentialing success, based on CRT plus RRT pass rate percentages. Survey results from Program Directors

included details of program resources as well as an aggregate summary of new candidate test scores in 17 content areas (curriculum alignment indicators). As program resources and curricular strengths/weaknesses were compared with programs exhibiting high overall credentialing success, patterns have emerged that will inform educators of potential formulae for program success.

Theoretical Framework

Outcomes assessments are standard in career and technical education where field-specific board examinations regulate the supply of candidates into the field. Even though each RT program director may view aggregate outcome score results, the presence of lateral sharing of successes among programs is rare unless solicited by survey for publication. Lateral sharing may inspire a collegial attitude of "learning from each other," or may precipitate competition for resources (capital) of prestige, finances, clinical sites, or students. According to French sociologist Pierre Bourdieu, "…the value of a species of capital…hinges on the existence of a game, of a field in which this competency can be employed: a species of capital is what is efficacious in a given field…that which allows its possessors to wield a power, and influence, and thus to *exist*…instead of being considered a negligible quantity" (Bourdieu & Wacquant, 1992, p. 98, emphasis original). Bourdieu hypothesized that the notions of social field, capital, habitus, and strategy illustrate the inner workings of a process (Naidoo, 2004; Lingard, Taylor, & Rawolle, 2005). He uses the term *field* as analogous to a game replete with rules (Zembylas, 2007), where conflict is ever-present (Naidoo, 2004) and results in vying for power through position and position-taking (Marginson, 2008). The agents in the field struggle (strategize) to optimize their positions (Maton, 2005); the dominant or subordinate positions are determined by possession of capital. Eventually, schools with

accumulated capital may equate the acquisition of capital with the existence of external validation—as armor to resist reform (Brosnan, 2010).

In respiratory therapy education, students pay for their education with loans and government funding that bring income to the school. This income may be used for marketing to attract more students, to purchase tangible resources, or to pay clinical educators. Since income is directly related to number of students, the acquisition of students equates to the acquisition of capital. The presence of capital, in its various forms, may tip the scale in favor of dominance for a particular school. The dominant school, then, may exert local "rights" to set standards for the rules or *regularities* of the "game" (Bourdieu & Wacquant, 1992). Regularities could include which school has clinical privileges at which site or which curricular items deserve more focused attention than others.

A major benefit of acquisition of capital is declaration of *prestige*. Generally, dominance correlates with prestige; therefore, dominance is coveted. In the game of RT education, dominance has been asserted in geographic pockets where rival schools compete for capital. Dominance, however, is not necessarily allocated to the school *most deserving* of prestige. Schools may achieve a superior position as a result of acquisition of capital; continued dominance, then, hinges on *maintenance* of capital. If a transmutation shifts the public opinion regarding which school deserves continued receipt of capital, the dominant position may be reassigned. This paradigm shift is likely to occur as a consequence of the CoARC release of school scores in the areas of CRT/RRT credentialing success, attrition, job placement, and enrollee/graduate ratios; prestige may be redefined, dominance reassigned, and capital renegotiated.

Bourdieu's concepts of field and capital are further explicated by addressing the concepts of habitus, strategy, and reproduction. Each player in the field has an individual identity, or habitus, that gives them a *sense* of how the game should be played (Kloot, 2009). Without conscious thought, the habitus directs the strategies at play (Lingard & Christie, 2003). The habitus permits a particular understanding of methods for procurement of capital; eventually, this leads to an unequal distribution of capital that *reproduces* over time (Brosnan, 2010). In the French school system, Bourdieu observed reproduction of habitus and knowledge (Thomson & Holdsworth, 2003). The unequal distribution of capital and the reproduction of knowledge could explain why some RT schools are flooded with students while others are struggling with low admission rates. It could also explain why some schools are allowed access to clinical sites whereas others are restricted, and why some schools have exemplary credentialing success while others are not meeting the prescribed threshold.

Research Questions

To understand what contributes to success of some schools and not others, the following questions were used to frame the study and guide the use of the data collected from the surveyed resource assessment and exam outcomes:

1. Are certain *types* of schools (public versus private, for-profit versus not-for-profit, Associate's degree-granting versus Bachelor's degree-granting) more successful than others, as measured by ranking in the top third of programs in credentialing success?
2. What resources are most likely to impact high credentialing success? (Resources are defined as program screening criteria, faculty credentials,

educational background, number of faculty members, employed pedagogy, student-teacher ratios, clinical exposure hours, and simulation practice hours.)

3. What alignment indicators are likely to demonstrate disparities between the upper and lower thirds of the sample population?

Significance of the Study

Recent publications by RT educators have focused on identification of optimal pedagogy and the use of technology to enhance application of knowledge (Gonzales, Marshall, Russian, & Stokes, 2010; Lam, Ayas, Griesdale, & Peets, 2010; Mishoe, 2007; Price, Causer, Balon, Helling, & Dumire, 2010). Although validation of these resources is useful, there may be other factors that independently or synergistically affect program success on NBRC exams. There is urgency for the need to improve pass rates and mitigate the apparent demand for more credentialed graduates. Granted, just as trends for the current economy cannot be predicted, the medical community's projected need for more RTs may be equally capricious. Regardless, the government websites are still endorsing the need for more qualified respiratory therapists to fill an anticipated employment gap (Bureau of Labor Statistics, 2012).

The Commission on Accreditation for Respiratory Care, the accrediting agency for RT education, has released a position statement explaining that CRT (not RRT) credentialing success will be the current threshold for accreditation since it is "the most appropriate examination-based outcome measure" (Commission on Accreditation for Respiratory Care, 2011d, p. 1). CoARC continued the justification by stating that some CRTs may prefer to delay or forgo pursuit of registry. Further in the same decree, CoARC acknowledged the RRT credential as "a standard of professional achievement"

and as "a measure of a program's success in inspiring its graduates to achieve their highest educational and professional aspirations" (Commission on Accreditation for Respiratory Care, 2011d, p. 1). The latter statement may substantiate the sentiment of some employers preferring to hire RRTs (Barnes et al., 2011), even though there are no states *requiring* the RRT credential for entry-level employment.

At present, the two-part registry exam may not be attempted until the certification examination has been successfully conquered. The registered respiratory therapy credential is considered the standard of professional achievement because the corresponding exam measures advanced competencies, and is divided into two mandatory components: the written registry exam (WRE) and the clinical simulation exam (CSE). The more difficult of the two exams is the CSE; success is elusive as evidenced by an average passing rate of 58.5% (National Board for Respiratory Care, 2012). More plainly, only 58.5% of eligible CRTs attempting the CSE were able to pass this obstacle during the most recent three-year reporting period. Since all currently accredited schools are mandated to produce registry-eligible graduates, the low CSE pass rate bodes of continued low numbers of RRTs entering the workplace. These statistics are worrisome in an economy fraught with layoffs and increased localized competition for jobs.

As if in response to the pass-rate dilemma, demand for registry-level personnel, and decreased numbers of graduates, the NBRC announced changes in the exam structure that are scheduled to be implemented in January, 2015. The proposed changes include the development of a single multiple choice examination (in lieu of current WRE) with two cuts scores—one awards the CRT credential and the other (higher score) confers

eligibility for the Clinical Simulation Examination (National Board for Respiratory Care, 2012b). Since questions have arisen regarding the ability of existing RT programs to fill the impending employment deficit with only the CRT credential as the goal (Mathews et al., 2006), this new exam format may expedite the flow of graduates from graduation to registry level—or, at least, CSE-eligibility. Having only one exam to potentially gain CSE eligibility will be less of a financial burden on the more successful students, as well.

Programs able to produce graduates capable of expedient transition from school to employment, especially those wielding the RRT credential at entry-level employment, would be programs ultimately in demand and coveted by prospective students. The current study attempts to capsulize the qualities consistently present in high-performing programs, including resources (capital) and particular emphases in any of 17 curricular content areas identified by the NBRC school score reports. The collegial sharing of this knowledge will inform the respiratory community of best practices and, by default, suggest pertinent areas requiring curricular reform. As formulae for success are identified, individual programs may ascertain where improvement efforts are best focused—contributing to program reform and the successful ushering of more exam-ready graduates into the workforce.

Definition of Terms

Accreditation thresholds: Minimums achieved in various accreditation categories, as determined by CoARC. When thresholds are not met, explanation is required as part of the annual reporting mechanism (Commission on Accreditation for Respiratory Care, 2011c).

Allied health professional: Individual delivering health or related services involving identification, evaluation and prevention of diseases and disorders; associated

fields include dietitians, dental hygienists, diagnostic medical sonographers, medical technologists, radiographers, occupational therapists, physical therapists, respiratory therapists, and speech language pathologists (The Association of Schools of Allied Health Professions, 2011).

American Association for Respiratory Care (AARC): The professional organization for respiratory care practitioners.

Attrition: The number of students, as reported to CoARC, who leave the program due to either academic or non-academic reasons. A maximum 40% attrition is considered to meet threshold requirements, as averaged over a three-year reporting period (Commission on Accreditation for Respiratory Care, 2011c).

Bourdieu's concept of capital: That which has acquired a negotiated value among competitors in a given field (Bourdieu & Wacquant, 1992); for the purpose of this study, capital equates with resources (i.e., prestige, finances, clinical sites, or students).

Bourdieu's concept of field: A structured social space with a specified set of rules, much like a field on which a game is played (Zembylas, 2007).

Credentialing success: for the purpose of this study, credentialing success is defined as ranking in the top third of all scores (1-101) when the CRT and RRT pass rates are added.

Clinical simulation examination (CSE): Ten patient-management problems to be completed within four hours; scenarios are designed to simulate reality/relevance to clinical practice (National Board for Respiratory Care, 2011e). Although passage is required for attainment of RRT credential, the results are not scored in a manner similar to the RRT-WRE; therefore, the scores are not utilized as part of this study.

CRT credentialing success (from Programmatic Outcomes Data): total percentage of graduates who obtain CRT credential (independent of number of attempts). This is calculated as total number of CRTs divided by total number of graduates over the reporting period.

CRT examination: A 140-question examination that objectively measures entry level knowledge, skills, and abilities (National Board for Respiratory Care, 2011c); generally required for acquisition of a state license.

Committee on Accreditation for Respiratory Care (CoARC): Accrediting agency for respiratory care education; works with the Commission on Accreditation of Allied Health Programs to assure compliance and accreditation (Commission on Accreditation of Respiratory Care, 2011b).

HESI: an exam administered by Health Education Systems, Inc. and acquired by Elsevier publishing in 2006. Frequently required as an exit examination from nursing programs, it is designed to assess NCLEX licensing exam success.

Job placement: graduate employed in full- or part-time respiratory care within twelve months after graduation or is enrolled in another degree program or is serving in the military (Commission on Accreditation for Respiratory Care, 2011c).

NCLEX: a licensing examination that measures basic nursing competencies; required by the National Council of State Boards of Nursing.

Pierre Bourdieu 1930 – 2002: French sociologist and author of many publications detailing the role of economic capital in social positioning in many fields, including the field of Higher Education.

Program director (PD): Licensed and Registered Respiratory Therapist (RRT), responsible for all aspects of RT program administration; minimum qualifications: baccalaureate degree from an accredited academic institution, four years clinical experience, and two years teaching experience (Commission on Accreditation of Respiratory Care, 2011b).

Program faculty: A faculty member appropriately credentialed for the enacted curriculum, providing instruction in clinical, laboratory, or didactic courses (Commission on Accreditation of Respiratory Care, 2011b).

Programmatic outcomes data: Reported data encompassing a specific 3-year time period regarding CRT credentialing success, RRT credentialing success, attrition, job placement, total number of program enrollees, and total number of program graduates.

Respiratory Care: The official designation given to the profession of respiratory therapy; adopted in 1986 when the American Association for Respiratory Therapy became the American Association for Respiratory Care (Weilacher, 2009).

Respiratory therapist: Member of the healthcare team who delivers respiratory therapy and runs the life support systems; generally a graduate of an accredited respiratory therapy program; licensed professional holding minimum credential of Certified Respiratory Therapist (CRT). The advanced credential of Registered Respiratory Therapist (RRT) is generally preferred by employers (Barnes, et al., 2011).

RRT credentialing success (from Programmatic Outcomes Data): total percentage of graduates who obtain RRT credential (independent of number of attempts); RRT is achieved after successful completion of both the WRE and CSE exams, and may only be

taken after successful completion of the CRT exam. This figure is derived from the total number of RRTs divided by total number of graduates over a specified reporting period.

RRT examination: A two-part examination (WRE and CSE) accessible to CRTs who are graduates of advanced-level programs; developed to measure knowledge, skills and abilities applicable to advanced respiratory therapists.

School score report: Official NBRC report of individual and aggregate test scores for the CRT and WRE examinations, broken down into sections that correspond with content areas on the NBRC exam matrix (see Appendix B).

Summary Content Outline for CRT and Written RRT Examinations: A secure NBRC report that may be accessed by Program Directors for the completion of the annual report. The *average scores* are color-coded for quick interpretation: green= acceptable; red = score falling below the acceptable threshold. It is possible for exemplary programs with documented credentialing success to have individual content areas with average scores in the unacceptable range.

Total program enrollees (from Programmatic Outcomes Data): new enrollees in core respiratory care courses, counted after remaining in program for more than 15 days.

Total program graduates (from Programmatic Outcomes Data): program graduates, both on-time or after their expected graduation dates.

20-20 Analysis: A research methodology that uses comparative technology to evaluate extremes of populations (Reynolds, 1997), described in (Mauch & Park, 2003, p. 132).

Written Registry Examination: Two-hour exam consisting of 100 multiple-choice questions; assessed areas include: recall, application, and analysis of clinical data, equipment and therapeutic procedures.

Delimitations, Limitations, and Assumptions

This study was delimited to Respiratory Program Directors, as gate-keepers of the classified program-specific statistics. Schools solicited offer associate and baccalaureate degree programs; through the annual reporting process, these programs submitted data relating credentialing success, attrition, job placement, enrollee numbers, and graduate numbers. All schools able to generate a three-year aggregate report as of the July 15, 2011, reporting deadline were included; schools that had not been open for the entire three years were not evaluated. Surveying only the schools with a full three-year report enhanced construct validity, but slightly decreased the potential sample size from 443 to 399.

Since CoARC has never before released data that permits comparison between schools, it is assumed that this action could be perceived as a precursor to the formation of a stratification report or *league table*. Although a tool for providing information and inviting choice, league tables potentially function as capital or currency. If the resulting ranking is understood as critical capital, reporting institutions may be tempted to "manage" or falsify data (Naidoo & Jamieson, 2005). As a portion of the information requested on the surveys cannot be verified, there is no way to recognize reported data "management."

Survey response rate has the potential to be a limiting factor, since RT directors have little time to devote to a lengthy survey. For this reason, the survey was designed to be completed in approximately 15 minutes. A variable that posed difficulty in predicting

time outlay was found in the final two survey items. The instructions required a deviation in normal polling methodology by asking the respondent to open a new Internet page. Even though program directors were familiar with the web page to which they were directed, the unpredictability of Internet connections may have added to time expenditures. From the secondary Internet page, there was also an element of cut-and-paste of data into the polling device; depending on the PD's computer proficiency, this could have been a fairly rapid process or one involving transcription of data onto a separate paper prior to entry into reporting boxes on the survey.

Program directors may have hesitated to respond even though assured that anonymity and confidentiality would be maintained, while keeping the researcher blind to named survey results. Once assurances of confidentiality had been imparted, it was optimistically anticipated that directors would be compelled to participate in this study due to the unique opportunity afforded: the prospect of participating in a field-specific assessment of program and curricular demographics compared with exam outcomes.

Summary

This study united program success statistics with national e-mail survey data to evaluate links between high-performing schools and resource allocation. Outcomes assessment data (school score reports) were also examined to highlight areas of curricular strengths and weaknesses that impacted performance. Undergraduate respiratory therapy program directors received a questionnaire specifically designed for this study; the Cannon Survey Center (CSC) assisted with survey dissemination plus data collection and analysis, to ensure objectivity and anonymity.

Program directors wear multiple hats as recruiters, educators, counselors, and administrators. It is a rare PD who has the time to analyze programmatic outcomes and

revamp curricula to optimize content; alternatively, lack of assessment and improvement wastes program resources. It is therefore necessary to find the time to evaluate outcomes and avoid repeating fruitless processes while hoping for alternate outcomes. When the focus shifts to outcome measurement, the measured variable becomes important. Once identified, problems may be rectified. By identifying resource strengths to target and curricular content receiving the most attention, reform may become part of the future landscape.

The field of respiratory therapy education can be likened to a playing field, as suggested by French sociologist Pierre Bourdieu (Bourdieu & Wacquant, 1992). Although players may have previously enjoyed asserting defined positions on that field, the release of previously guarded information (programmatic outcomes) may stimulate competition for new positions. This probable paradigm shift, inspired by CoARC, may or may not be intentional. It has been hypothesized that "when free and autonomous policy agents know what they are doing, they can shift institutional structures and habituated ways of doing and being" (Thompson and Holdsworth, 2003, p. 371). Irrespective of intent, the release of programmatic outcomes data provides a metric to gauge performance. Change is time-consuming and uncomfortable; the data summarized in this study will allow each program to conserve their energies and resources for program improvements most likely to contribute to improved program outcomes.

CHAPTER 2

Review of Related Literature

Respiratory therapy, a unique allied health specialty, is the descendant of the Inhalational Therapy Association chartered in 1947. The formal education process, inaugurated in 1950, was a response to the need for personnel trained to care for pulmonary patients (Weilacher, 2009). Today, although regulated by the Commission on Accreditation for Respiratory Care, the education of these medical professionals continues to adapt to changes in the demands placed on skilled personnel in the marketplace. This enterprise of creating the appropriate supply to meet the current demand has been scrutinized multiple times (Andrews, Byington, Masini, Keene, & Burker, 2008; Ari, 2006 a,b; Ari, 2009; Ari, Goodfellow, & Gardenhire, 2008; Ari, Goodfellow, & Rau, 2003; DeLapp, 1979; Gardner & Vines, 2005; Johnson, 2002; Mishoe, 2007; Shelledy, Dehm, & Padilla, 1999; Vines, LeGrand, & Shelledy, 2000) without the formulation of a recipe to optimize the process.

In 2006, an article entitled "Respiratory Care Manpower Issues" brought to light data from the AARC, CoARC, and NBRC that described an alarming trend in RT education: program applicants and graduates had both declined significantly from 1993 to 2001, while the demand for RTs in the workplace persisted. It was concluded that, with a mean age of 40 for existing RTs, large numbers of these employees would be exiting the workplace in the next 10-20 years. Although changes in the economy may have postponed retirement for many RTs, the potential for a future employment gap remains a serious issue (Mathews et al., 2006; Ari, 2009). The employment gap may not be restricted to the respiratory profession; lessons learned from other allied health

professions could provide valuable insight into the nature of credentialing success before the reported gap widens.

To understand the educational process that ushers board-eligible graduates into the workplace, it is instrumental to describe the evolution of RT candidate to RT graduate. In 1979, DeLapp exposed the skeleton of the educational process when he applied the management theory of *systems* to respiratory programs. He recognized the need for RC educators to adapt to the changing needs of the medical arena, and his application of the elements *inputs, processes*, and *outcomes* remains conceptually relevant today. Inputs include students, educational resources, and output expectations. Processes are the intervening factors that influence the outcome; outcomes are results that are measured in terms of credentialing success, job placement, and employer satisfaction. The intervening factors include program support functions, student services, and environmental relationships; all factors affect the teaching and learning activities of the program.

As an open system, each RT educational program strives to achieve homeostasis through adaptive changes in teaching and learning activities. The ubiquitous focus of the program director is the program-specific board-exam score report. By assessing areas of strengths and weaknesses in specific curricular content areas, PDs are able to make minor adjustments in didactic, motor-skill, or affective teaching areas to maintain homeostasis (DeLapp, 1979). This outcome component is important to the success of every program and is annually monitored by CoARC; the process component is also monitored by CoARC and is the focus of site visits and online training tools (Commission on Accreditation for Respiratory Care, 2011 g). In summary, the systems approach is an

excellent guideline for understanding how program inputs and processes affect outcomes. These inputs and processes, specifically student selection, program resources, programmatic expectations, program support functions, student services, and environmental relationships are then assessed and manipulated by the individual programs.

Other Allied Health Professions

All allied health professions that regulate entrance into the field by requiring passage of a board exam are subject to outcomes influenced by proper inputs and processes. As in the field of respiratory therapy, capturing the essence of the "perfect" input and process has been challenging. A balance between student input and successful student output minimizes waste of contributory resources and has been studied by allied health professionals in the fields of physical therapy, radiation technology, and nursing.

Mohr, Ingram, Hays, & Du (2005) polled 175 physical therapy (PT) programs (with a 75% response rate); regression analysis of 21 independent variables revealed that the most consistent predictors of successful passage of the National Physical Therapy Exam (NPTE) were process-related: accreditation status, number of faculty with advanced degrees, and amount of in-program preparatory coursework. Kosmahl (2005) examined 92 out of 118 alumni records from Master of Physical Therapy programs regarding scores on board exams, comprehensive exams, and the PT Clinical Performance Instrument, as well as professional GPA (PGPA) and age at graduation. He concluded that the process-related academic performance variables correlated with NPTE credentialing success while relevance to age was inconclusive. In 2009, Riddle et al.,

found a positive correlation between in-program (process-related) academic difficulties and exam failure in a retrospective study of 20 physical therapy programs.

In radiation technology, Ludwig, Huck, & Legg (2010) surveyed 99 radiology assistant (RA) students and graduates (with a 60% response rate) as to the perceived nature of program success. The survey questions were designed to gather demographics and attitudes toward preceptor behaviors, site and program characteristics, and perceived influence of students' personal characteristics on their clinical experiences. Although the study had a small sample size and the training of RA students was described as more physician-centered than some other fields, the study suggested a process-related correlation between students' perceived satisfaction and radiology preceptor engagement during training. The demographic component (input-related) was inconclusive.

Additional literature attempting to identify factors contributory to credentialing success may be found in nursing. The field of nursing bears a great similarity to the respiratory profession regarding the inability to produce enough board-eligible graduates to assuage the projected employment gap. As the field of medicine expands, so do opportunities for qualified allied health personnel; nursing is projected to experience a 26% growth in employment from 2010 to 2020 (Bureau of Labor Statistics, 2012b) while respiratory therapy is expected to experience a 28% growth (Bureau of Labor Statistics, 2012a). This growth is well above the average for all occupations; without more graduates, this growth in opportunity could come to represent a gap in employment. It will be difficult to fill the employment gap unless allied health schools have more successful programmatic outcomes.

In response to increasing attrition and decreasing exam success, Higgins (2005) conducted a data review of 213 nursing students to explicate a correlation between NCLEX-RN pass rates and student demographics, prerequisite course grades, preadmission test scores, HESI exit exam test scores, and the nursing skills course. She concluded that there was a positive correlation between the academically related input and process variables and NCLEX-RN success and a negative correlation between testing success and the input-related demographic variables of age, gender, and race (Higgins, 2005).

Brown & Marshall (2008) documented the success of a continuous quality improvement initiative in response to the urgent need for improved program outcomes due to changes in nursing education requirements and decreasing numbers of faculty. Eight variables were ultimately identified as having an impact on program outcomes: environment (educational sub-culture), assessment/evaluation (quality of tools), standards (enhanced transparency of goals and accountability), faculty (numbers, qualifications, philosophies), policies/procedures (mission, expectations), program of study (class size, content, schedule, prerequisites), resources (library, laboratory equipment, tutoring), and students (enrollment statistics, in-program support). These variables, with the exception of educational sub-culture, have also been identified in the field of respiratory therapy as contributory to programmatic success (Commission on Accreditation for Respiratory Care, 2011h); evaluation of these variables is mandated and monitored annually (Commission on Accreditation for Respiratory Care, 2011b).

Respiratory Therapy Profession

Although formal respiratory therapy education has existed since 1950, the paucity of publications indicate that efforts made by individual programs to hone inputs and processes to optimize outcomes have not been abundant. Johnson (2002) surveyed 234 RT programs (with 42.7% response) regarding the effect of program differences (public vs. private, two- or four-year institution), factors (student, faculty, curricular, financial resources), and predictability of credentialing success based on these differences and factors. Johnson stated that two thirds of the accredited programs met or exceeded the 80% CoARC threshold for passage of the CRT (equivalent) exam; he was able to observe a correlation between schools in this 80% or above range and both higher expenditures for program resources and faculty with advanced degrees (Ph.D. and Ed.D).

These findings were supported by Ari in 2007, through survey of 57 RT baccalaureate programs (with 63% response rate). Although she limited her assessment to outcomes on the Written Registry Examination, she observed a positive correlation between WRE success and programs with strong financial and personnel resources. In an earlier study, Ari (2006a) demonstrated that there were programmatic variations in numbers of in-program credit hours, clinical contact hours, and laboratory hours. Credit hours ranged from 42 to 148, clinical contact hours from 200 to 1,440, and laboratory hours from 56 to 360. Labeled as *curricular components*, she inferred that the wide range of offerings contributed to inconsistencies in exam outcomes. Ari (2006a) further noted variations in program resources allocated to personnel, general finances, and maintenance of clinical sites. Resources evaluated included number of part-time versus full-time faculty, faculty advanced degrees, faculty to student ratios, operating budgets, and the

number of clinical sites (ranging from one to 31). She concluded that the establishment of standards in these areas within RT education may augment educational consistency.

As utilized by Johnson (2002) and Ari (2006a, 2007), the survey of the Program Director is a common assessment technique. Although an excellent method to gather program-specific data, data reported by the PD could be subject to transcription or rounding errors and misrepresentation (Shelledy, Dehm, & Padilla, 2001); low response rates may further compromise interpretation of results and external validity. Use of standardized data bases, such as from the NBRC or CoARC could yield more valuable information.

In 2001 Shelledy et al. received a blinded summary of the annual *Report of Current Status* (RCS) from CoARC, submitted from 300 RT programs. Even though self-reported, RCS data (cross-referenced to NBRC scores) is held to high standards. The published meta-analyses yielded the following: programs with increased program length and four-year colleges had the highest pass rates on all exams, and predictors of success for students included entering GPA, PGPA, students' critical thinking ability, number of full-time equivalency faculty, programs where PD held master's or doctorate degree, and programs with historically high attrition (for non-academic reasons). They were unable to document a correlation between programs with high numbers of applicants utilizing stringent screening methods and improved outcomes.

Survey results from Johnson (2002), Ari (2006a, 2007), and the meta-analysis from Shelledy et al. (2001) have contributed to the design of multiple online CoARC resources to improve outcomes. Utilization of these resources is not mandatory; programs have a large degree of autonomy and may continue to educate RT students until there is

documented evidence of persistent inability to meet the CoARC thresholds in CRT/RRT credentialing success. However, as each program is responsible to report some level of viability to their corporate authority, it is in every program's best interest to employ a program design that will optimize outcomes through candidate screening, attrition control, resource allocation, and superior curricular design.

Candidate screening (entry limitation). To help ensure that limited resources are most efficaciously allocated, only the students most likely to be successful should be ushered into RT programs (Ari, Goodfellow, & Gardenhire, 2008). For that reason, candidate screening and selection techniques have been assessed multiple times over recent years (Ari et al., 2008; Gardenhire, 2001; Gardner & Vines, 2005; Johnson, 2002; Shelledy et al., 1999; Shelledy et al, 2001; Standridge, Briggs, & Mugan, 1997; Vines et al., 2000; Wittnebel, Murphy, & Vines, 2008). Some programs have incorporated specialty examinations to improve screening; popular examples include the Health Occupations Aptitude Examination (Standridge et al.,1997) and the Health Occupations Basic Entrance Test (Gardenhire, 2001). Other programs have discovered that the factors best able to predict a positive outcome on board exams were program entrance grade point average (GPA) and program prerequisite GPA (Vines et al., 2000; Shelledy et al, 2001; Ari et al., 2008). Wittnebel et al., (2008) added that the percentage of prerequisites completed prior to selection also correlated with exam success. Regardless of method, the observation of some form of entry (input) limitation is well-documented in the literature.

Attrition. The attrition in RT education has increased over the years, as evidenced by the recent change in the CoARC-allowed rate to 40% maximum (Commission on Accreditation for Respiratory Care, 2011c). Attrition wastes resources

and delays student entry into the workforce, yet programs are obliged to admit the allowable number of students in an attempt to supply graduates to meet the employment demand. High attrition rates have been attributed to academic uncertainty, academic under-preparedness, and transition/adjustment problems. Academic under-preparedness includes academic rigor combined with poor study habits; transition and adjustment problems include difficulty balancing personal and academic demands. Inadequate financial backing was also cited as a confounding issue (Andrews, et al., 2008). Many of these concerns are unavoidable and beyond the scope of the RT administrator's expertise to deflect through entry limitation. It may be concluded that even the best formulae for limiting candidate entry have demonstrated only marginal success with averting attrition issues.

Resource Allocation. Instead of assigning program capital toward improving screening maneuvers, energies may be refocused where there is a high rate of return to the programs. For example, Ari (2009) documented a positive correlation between resources and retention. Resources include money spent per student to ensure a quality learning experience or involving more personnel in student pedagogy. She clarified that, in a study of 36 programs, availability of financial resources was the best predictor of retention. Yet, how a program allocates the operating budget can vary greatly. One school may elect to allocate funds for the addition of technological simulation mannequins to the curriculum. Another school might spend money on facilities, scholarships, recruitment, technology, teaching faculty, or clinical faculty. The decisions surrounding financial allocations cannot be taken lightly. In today's marketplace,

program resource allocation may tip the scale in the consumer's decision-making process of choosing one school over another.

According to Bourdieu, all of the aforementioned resources may be identified as forms of capital--the possession of which may contribute to social inequality; through his development of the concepts of field, capital, and habitus he has been able to expose the inner workings of higher education (Naidoo, 2004). The *field* is a contested space where holders of capital vie for power (Lingard et al., 2005), much like athletes on a playing field. The *habitus* is a disposition (Lingard & Christie, 2003) developed from prevailing abilities and beliefs that moderate the position and position-takings of the players in the field (Marginson, 2008). This habitus, then, offers players a sense of how the "game" should be played (Hurtado, 2010; Bourdieu, 1993). The relationship between field and habitus is best described as a competition, replete with strategy that will determine which habitus is best-suited to access varying kinds of capital (Marginson, 2008; Brosnan, 2010). Within any given field, there may be multiple opinions about which forms of capital are to be valued—especially regarding which should be considered the Gold Standard (Maton, 2005). This capital may be economic, cultural, social, or symbolic (Brosnan, 2010, Williams & Filippakou, 2010; Lingard & Christie, 2003) and will determine who wields power to influence how the game will be played (Kloot, 2009). In the final position-taking, there are dominant as well as subordinate positions that may vary from one timeframe to another (Naidoo, 2004).

Maton (2005) further described capital as having two distinct postures: one looking outward and one looking inward. The outward-looking stance focuses on political and economic concerns; the inward-looking counter position values knowledge

for knowledge's sake. In the field of respiratory therapy, both postures are worthy of discussion. It may be generalized that the outward-looking view emphasizes attainment of facilities, scholarships, recruitment, technology, teaching faculty, or clinical faculty; the inward-looking attitude esteems high exam pass rates. Naturally, programs should revere a mix of various forms of capital since synergy exits between the differing forms.

Prudently speaking, energetic pursuit of the more tangible components of capital may be unrewarding due to budget constraints—stemming from belt-tightening at both the school and the student levels. However, a more conservative endeavor would be to shift energies to a less financially-charged target—improving the exam pass rates. In their 1999 study, Shelledy et al. published exam data that are retrospectively significant: pass rates for the CRT, WRE, and CSE exams ranged from 85.6% to 97.6%, 82.7% to 90.3%, and 78.3% to 87% respectively. This is considerably higher than the current averages of 78.7%, 67.4%, and 58.5% respectively, over the 2009-2011 range reported in Table 2.

Table 2
Board Exam Pass Rates 2009-2011 (Percentage)

				Averages
Category	2009	2010	2011	2009-2011
CRT Exam (Advanced Program Graduates)				
New Candidates	78.4	79.0	78.7	78.7
Repeat Candidates	24.9	29.9	26.8	27.2
CRT Exam (Entry-Level Program Graduates)				
New Candidates	71.1	72.4	72.6	72.0
Repeat Candidates	27.5	25.5	19.7	24.2
RRT Therapist Written Exam				
New Candidates	70.6	64.9	66.6	67.4
Repeat Candidates	38.3	32.1	30.4	33.6
RRT Clinical Simulation Exam				
New Candidates	56.8	57.3	61.4	58.5
Repeat Candidates	47.8	49.2	54.5	50.5

Note. Adapted from NBRC Horizons Newsletter, *2011 Examinations in review*, published by the NBRC.

This shift in board exam scores is representative of a plight that may be more acute than any discussion of program resources; after all, possession of capital is useless if the program is not able to produce graduates who successfully achieve credentialing success.

Curricular design. Standardized curricula are occasionally seen in allied health disciplines such as *Emergency Medical Technician* (United States Department of Transportation, n.d.). Not only are standardized curricula absent in respiratory therapy, curricular guidelines are only loosely defined; per Commission on Accreditation of Respiratory Care (2011b):

> The program must prepare students to meet the recognized competencies for registered respiratory therapists identified in these standards….The curriculum must include content in the following areas: oral and written communication skills, social/behavioral sciences, biomedical/natural sciences, and respiratory care. This content must be integrated to ensure achievement of the curriculum's defined competencies. (p. 23)

The recognized competencies are listed as line-items in the online CRT and RRT exam matrices (National Board for Respiratory Care, 2001b); additional descriptions of competencies may be found in the recent article by Barnes, Gale, Kacmarek, & Kageler (2010). Still, there are no strict rules regarding the creation of the RT curriculum. This is partially explained by the fact that, in 1986, the RT profession shifted its programmatic accreditation basis from process (prescriptive) to outcomes-based (Ward & Helmholtz, 1997). When outcomes are targeted, the goal is to create a curriculum that prepares students for completion of program-based competency testing and culminates in the

passage of the national board exam. Therefore, individual RT educators translate the published board exam content (see Appendix A) into a logically sequenced curriculum. The technique of working backwards from the content of the board exam to the content of the curriculum is called *backwards design*. The concept of backwards design, also described as "purposeful task analysis," is the opposite of traditional curriculum planning, in that the goal (standard) is known (visualized) before the methodology (Wiggins, 2005, p. 18). However, knowing the goal (NBRC exam content) does not simplify the job of the curriculum writer since the NBRC exams assess student knowledge at the levels of recall, application, and analysis (National Board for Respiratory Care, 2011d). The ability to convey content well enough to be recalled, applied, and analyzed requires pedagogical skills beyond the expertise of many RT instructors who lack formal training in educational techniques and curricular development.

Curriculum is made up of various faces or levels. Hameyer (2007) compiled a comprehensive list of these faces of curriculum: codified (prescribed), perceived (interpreted by educator), intended (how author thought curricular components would be used), enacted (what and how curriculum was actually taught), experienced (how it was received by the student), hidden (interpreted through personal or public norms), and tested (assessed). Other authors have grouped these headings into the broader classifications of intended (codified, perceived) and enacted (experienced, hidden, tested) (Blank, 2002; Hume & Coll, 2010).

In RT, even after the curricula have been designed to cover all of the competencies required to prepare the student for the board exam, there may be disparity

between the intended and enacted curricula. According to Bourdieu (Marginson, 2008), these differences may be ascribed to the habitus of the author or the school. Hidden agendas as well as identified strengths of individual programs or educators may influence how the final curriculum is enacted. Additionally, the acquisition of capital or resources could come into play by affecting learning tools available for use.

The current written registry exam is comprised of 350 tasks or line-items, divided into three domains: (a) patient data evaluation and recommendations (3 categories), (b) equipment manipulation, infection control, and quality control (3 categories), and (c) initiation and modification of therapeutic procedures (11 categories), as described in Table 1. The reporting of exam results parallels the formatting of three domains and 17 categories described above; aggregate reports (released from the NBRC to program directors) clarify strengths and weaknesses in the corresponding categories/domains through score intensity (see Appendix B for sample *school score* report). Therefore, a feedback mechanism currently exists for the comparison of individual program outcomes to curricular content. In theory, the intended curriculum is the curriculum that is anticipated to be assessed; in actuality, it is the enacted curriculum that is reflected by exam outcomes and must be evaluated for its role in students' credentialing success.

The creation of a typical RT curriculum is not an easy task. Topics must be introduced, explained, applied, visualized, practiced in the laboratory, and witnessed in clinical practice. After initial concepts are understood, new concepts are introduced. This building-block approach "allows students' knowledge and skills to be progressively deepened and broadened through the program" (DeLapp, 1979, p.517); in this manner, each thought scaffolds the ensuing notion (Bordage & Harris, 2011). The NBRC tests at

the levels of 17% recall, 37% application, and 46% analysis (National Board for Respiratory Care, 2011d). Therefore, as voiced by Cottrell and Jones (2003), students need to move beyond foundational knowledge into application and critical thinking, rather than regurgitation of memorized details, facts, and equations. The astute educator may utilize the available feedback mechanism to self-assess incorporated pedagogy through analysis of the NBRC *school score report*. This analysis may yield insight into curricular components requiring revision; at minimum, assessment of score intensity should accurately reflect which categories have received more nurturing and cultivation in the enacted curriculum.

The Board Exam Process

Access to the RT profession involves meeting the educational requirements and the passage of the entry-level CRT examination. The educational requirement is the attainment of an Associate Degree from a CoARC-accredited RT program or a certificate of completion from a CoARC-accredited baccalaureate program. The CRT exam consists of multiple choice questions designed to assess three major areas: knowledge of equipment, assessment of clinical data, and application of therapeutic procedures (National Board for Respiratory Care, 2011c), and is updated periodically to reflect changes in the profession as indicated in job analysis surveys (Cullen, 2003).

The advanced level RRT credential may be obtained after meeting the educational requirements and successful passage of the CRT exam. Here, the educational requirements include an associate or baccalaureate degree from a CoARC-accredited RT program. Immediately upon passage of the CRT exam, application may be made to attempt either of the two components of the RRT exam: the Written Registry

Examination (WRE) or the Clinical Simulation Examination (CSE). The advanced-level RRT credential, considered the "standard of excellence" (National Board for Respiratory Care, 2011d), is awarded to CRTs after successful completion of the Written Registry (WRE) and the Clinical Simulation (CSE) Examinations; no other allied health professions require the successful completion of two distinct examinations for attainment of a single credential (Cullen & Koss, 1999).

Respiratory Therapy Education and Consumerism

A significant portion of RT education (87%) takes place at community colleges offering an associate-level degree; the balance takes place at universities and proprietary institutions (Barnes et al., 2011). Per the CoARC website (Commission on Accreditation for Respiratory Care, 2011f), only 47 institutions offer a form of baccalaureate degree; most of these Bachelor of Applied Science (BAS), Bachelor of Science (BS), and Bachelor Of Science (BOS) programs are affiliated with universities. This is a niche market, in that these schools offer a distinct product--different from the not-for-profit community college and the for-profit proprietary school that may be focused on terminal degrees. Rather than hastily ushering students into the workforce, these programs have a mechanism for allowing their students to take the certification exam before formal degree completion. After another year, they end their tenure with the registry-level degree program and attempt the registry exam. These bachelor degree programs traditionally have superior outputs and are not included in the discussion of typical RT entry-level educational outcomes. Instead, the focus will be on the programs administering 87% of the workforce education—the associate-level programs.

Proprietary schools and community colleges generally describe RT programs as *vocational* or *career and technical education* (CTE) programs. In these programs designed specifically for the transference of technical knowledge, instructors are esteemed for their field-specific expertise but may lack understanding of alternate pedagogies, educational modalities, and learning styles (Sperling, 2003). Specifically, RT educators must be field experts but are not required to have any formal training in education. Per 2010 CoARC *Accreditation Standards* (Commission on Accreditation for Respiratory Care, 2011b), only the Program Director and Director of Clinical Education (labeled as *key personnel*) are required to have a minimum of a baccalaureate degree from a regionally accredited institution—without a requirement for a particular degree focus. The Commission for Accreditation of Respiratory Care (2011b) states, the instructional faculty "must be appropriately credentialed for the content areas they teach, knowledgeable in subject matter through training and experience, and effective in teaching their assigned subjects" (p.18). The number of RT educators with training in educational modalities in addition to field-specific preparation has not been assessed; however, the correlation between successful program outcomes and a program director with a Master's or doctoral degree has been previously noted (Shelledy et al, 1999; Shelledy et al, 2001; Johnson, 2002).

The demand for more RTs in the workforce has opened the door to consumerism and a teeming proprietary market. Theoretically, bulking up the higher education system in sheer numbers could enhance the number of skilled graduates in a knowledge-based economy. Or, consumerism may have a negative impact. In an effort to hasten entry into the workforce, consumers demand abbreviated pre-packaged courses, where there is

(necessarily) less focus on digesting the enacted curriculum and more focus on regurgitating rote information. In such programs, higher order skills and dispositions toward lifelong learning are not cultivated; student identities are altered and pedagogical relationships are compromised; academic virtues are superseded by market ethics recognizing students as income generators and clients to be satisfied. Competing against this proprietary market could put pressure on traditional academic institutions to redefine curricula, initiate courses more relevant to workplace skills, and become more responsive to the competitive market--or risk losing the "customer" to a proprietary institution. Ultimately, the student-consumer becomes the resource or *capital* that is the focus of the competition between schools since both community colleges and proprietary schools require student capital to keep their doors open (Naidoo & Jamieson, 2005).

The release of the program statistics from CoARC could greatly alter the position-taking on this field by offering a mechanism for consumers to make informed decisions about school choices. The purchaser of the education commodity will no longer be swayed by the maxim that qualifications follow fees assessed (Naidoo & Jamieson, 2005). The newly-unveiled ability to rank a school against the competition will lend legitimacy to the curricula espoused by highly ranked programs (Brosnan, 2010) while exposing the institutions that are a poor risk. This ranking, then, may become a powerful currency (Naidoo & Jamieson, 2005) with which schools may attract superior students, funding, and prestige (Brosnan, 2010). Unfortunately if rankings prove to be as advantageous as predicted, the temptation will be greater for some programs to "manage" or falsify data to enhance their position within the field (Naidoo & Jamieson, 2005).

The Changing Face of the Profession

A task force was formed in 2007 to identify the changes that may be inevitable in the RT profession in the years "2015 and Beyond." Meeting between 2008 and 2010, recommendations were made to the respiratory care community regarding projected changes in the healthcare system, competencies needed to address these changes and secure the RT's role, and changes needed in RT education to fulfill the anticipated roles. Adapted from "Creating a Vision for Respiratory Care in 2015 and Beyond" (Kacmarek, Durbin, Barnes, Kageler, Walton, & O'Neil, 2009), the projected changes in healthcare include:

- Increased diagnostic accuracy; increased complexity of care
- Outpatient management rather than inpatient admission to hospital
- Preventative maintenance rather that illness treatment
- Increased cost of healthcare
- Use of personal electronic medical records
- Patients absorbing greater percentage of healthcare cost
- More sites for acute care delivery, including the home
- Care linked to reimbursements

Changes in the workforce include (Barnes et al., 2010):

- Provider shortages
- Demand surpassing supply of workers
- Faculty shortages limiting program entrants
- Educational investments with guaranteed employment made by care-delivery organizations

Changes in respiratory care practice:

- Data-driven clinical decisions; familiarity with evidence-based medicine, medical literature, statistical analysis
- Common use of algorithms and best-practice protocols coupled with excellent critical-thinking skills
- Care teams: expanded roles/responsibilities; increased productivity and quality
- Enhanced cultural sensitivity and patient advocacy
- Broader knowledge base for graduates; knowledge base of current workforce to match that of new graduates; specifically, "graduates in 2015 must be better prepared to enter the workforce and provide basic and critical respiratory care than graduates of today" (Barnes et al., 2010, p. 606)

Changes impacting RT education (Barnes et al., 2011):

- Effective July 1, 2012: newly accredited programs will offer baccalaureate or graduate degrees; previously accredited programs must transition to granting of baccalaureate or graduate degrees by 2020.
- CRT examination will be retired after 2014
- All multiple choice components of CRT and WRE exams will be combined for the new version of the RRT exam after 2014.
- Begin transition to RRT as state licensure requirement
- Assess workforce competencies in relation to job assignments
- Increase competency through use of clinical simulation

- Develop articulation models between associate and baccalaureate programs; provide budgetary resources to assist transition
- Explore career ladder options to encourage educational development of existing workforce and pursuit of baccalaureate degrees

Steps toward implementation of these recommendations will be appropriately initiated by RT educators engaged in active reform. However, it will be difficult to transform the future when the present educational system is below the anticipated standard. To amend the current problem of sub-prime educational institutions producing graduates unable to successfully enter the workforce, reform may be the only alternative.

Outcomes Assessment and Reform

When assessing accreditation status, CoARC evaluates multiple variables including performance on national credentialing examinations, programmatic retention/attrition, graduate satisfaction, employer satisfaction, job placement, and programmatic summative measures (Committee on Accreditation of Respiratory Care, 2011a). This assessment is derived from each program's annually submitted *Report of Current Status*. After the CoARC review of the RCS, each program receives confirmation that submitted results scored above or below designated thresholds. Each program, then, receives confirmation of personal success. Prior to January 31, 2012, there was no way to cross-reference or identify the performance of other programs. Now a mechanism for detecting successful programs is available; initiation of collegial data-sharing of superior methodologies could bolster overall credentialing rates.

The transparency that may result from the CoARC release of program statistics could contribute to an understanding of the kinds of programs setting the standards for

outcomes excellence. Johnson, 2002, polled 234 programs (with 42.7% return) in 1997 and was able to set up criteria separating high- and low-performing programs. Through survey methodology, he summarized attributes of programs with high pass rates; a positive correlation existed between program success and the areas of low class enrollment, financial expenditures, faculty credentials and scholarly activity, GPA of graduates, number of program prerequisite hours in general education, and clinical contact hours. He did not find a correlation between program success and curricular components. Although his results were not descriptive of a greater population due to the low response rate and the fact that the respondents were not representative of the non-respondents, he surmised that the future identification of characteristics associated with successful programs will become vital to the establishment of a reference point for curriculum development and program improvement.

One method of visualizing differences between high- and low-performers is called a 20/20 Analysis. Introduced by the Laboratory for Student Success at Temple University (Reynolds, 1997), the technique compared students achieving the top 20% and bottom 20% progress in specific subject areas; to distinguish the ranges, assessment results were ranked and converted to percentiles (Figure 1). Although this method was developed to identify under-performing elementary schools, "the procedure [was] grounded in the belief that schools that improve services for students most in need of special help will serve all students well" (p.1). In the same manner, identification of variables that consistently lead to RT program success or failure could "serve all students well." Reynolds continued by describing the importance of assessment of educational outcomes:

> 20/20 Analysis begins with the assumption that schools exist for specific

purposes—most basically to enable pupils to learn in areas that may be regarded as "cultural imperatives," such as learning to read and to think in quantitative terms. When pupils fail to learn in these important areas, there is reason for concern and program alteration. (p.2)

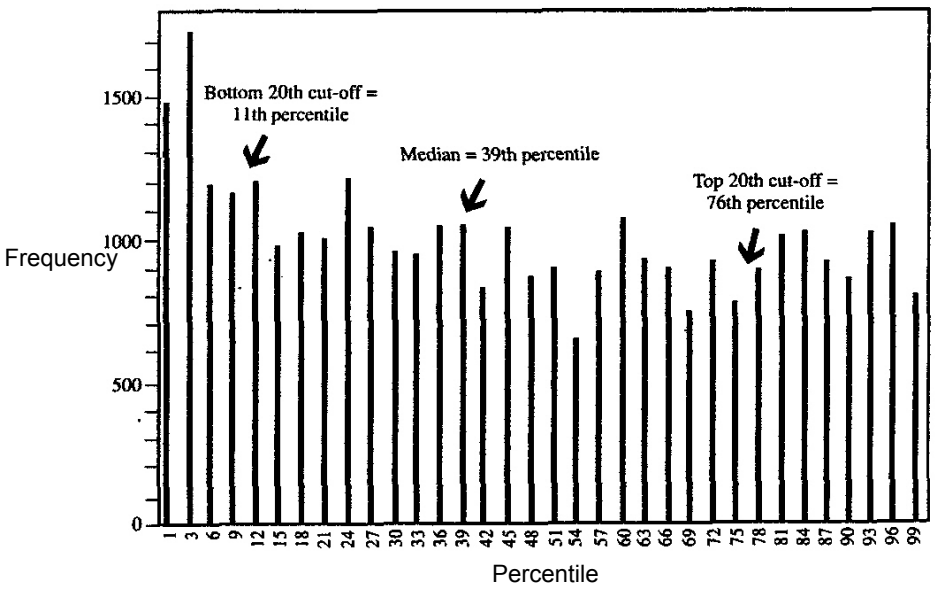

Figure 1. Top and Bottom 20% of Students in a Major Urban School District

From the *20/20 Analysis Manual* (p. 6), by M. C. Reynolds, 1997, Philadelphia: Center for Research in Human Development and Education, Temple University. Copyright 1997, Temple University. Reprinted with permission.

The cultural imperatives in RT schools include learning of competencies and understanding of foundational knowledge to the level of application and analysis. When programs fail their students in these areas, program reform is necessary. Although individual programs know when they have been unsuccessful, they have little documentation to support which improvements will most efficaciously impact outcomes. They look to publications that enumerate correlations between activities and outcomes

for a panacea, but find inconclusive results. Perhaps the answer lies in friendly mentoring between programs—collegial data-sharing. This avenue has been facilitated through the CoARC release of programmatic outcomes that expose the high performers. As a natural consequence of this transparency, networking may lead to collegial sharing of information from the high-performing program to the low-performer.

Collegial data-sharing is well-suited to the allied health and medical professions. In the United Kingdom, the Academy for Medical Educators has been recruiting members interested in enhanced transparency in medical education. They are encouraging educators to engage in the scholarly investigation of routinely-practiced pedagogies (Sandars & McAreavey, 2007). Stateside, the Association of American Medical Colleges has developed a "free online publication service designed to promote collaboration and educational scholarship by helping educators publish and share educational resources" (Reynolds & Candler, 2008, p. 91). Rapid growth since the 2004 inception of the peer-reviewed MedEdPORTAL implies eagerness for medical educators to network with one another for improved scholarship (Reynolds & Candler, 2008). CoARC has taken the first step toward transparency in RT by releasing programmatic outcomes data; to follow the example being set in medical education could lead to a parallel reform in this allied health profession.

The prospect of reform or change is rarely well-received. The time commitment to self-assess can be daunting, not to mention other potentially painful introspective revelations. Dividing the curriculum into the *intended* and *enacted* implies the presence of formative and summative attributes. The formative, as mentioned earlier, includes the building of the curriculum through purposeful task analysis; the summative includes

assessment of the knowledge and competency of the learner. Scrutiny of the NBRC test results available to the program directors for analysis of strengths and weaknesses sheds light on the knowledge base and competency of the student. However, other probing questions should not be overlooked as insight may be gained into the hidden agendas behind institutional values, faculty role-modeling, and school sub-culture (Bordage & Harris, 2011). If Bourdieu's theoretical constructs about field, habitus, and capital are accurate, the release of the CoARC data could have position-altering ramifications for schools in all sectors. Although new players may vie for the capital of students, faculty, and clinical sites, the collegial sharing of curriculum, techniques, and best/worst practices may benefit the entire respiratory care profession—keeping the occupation robust and secure in 2015 and beyond.

At the 2012 Summer Forum of the AARC, William Galvin (Program Director, Gwenedd Mercy College, Pennsylvania) presented *Excellence in Respiratory Care Education: Creating an Exemplary RC Program* (Commission on Accreditation for Respiratory Care, 2011e). He reported on the top 32 out of 450 RT programs as identified in the programmatic outcomes release for the 2009-2011 reporting period (Commission on Accreditation for Respiratory Care, 2011a). He polled all 32 programs (with an 84% response rate) to explicate relationships between polled variables and program success. Variables included program and student profiles, curriculum, key program personnel, laboratory resources, clinical resources, medical direction, advisory committee, budget, and attitude toward participation in the credentialing process.

Although all 32 programs utilized some form of clinical simulation in their curriculum, the overall results appeared to indicate no consistencies between these

successful programs—indicating no observable formula for success. However, the final (qualitative) section describing attitude toward credentialing participation was more revelatory. Twenty-nine out of the 32 programs responded that they encouraged their students, through motivation, reward, or incentive, to pursue excellence through attainment of the RRT credential rather than being satisfied with the CRT credential. This *high expectation* is an example of the input variable identified as *expected output* by DeLapp (1979). In the absence of other programmatic similarities, his findings imply that program cultures espousing high expectations are linked to credentialing success. This finding is congruent with one of the eight core elements identified by the National League for Nursing (2008) that states that "clear program standards and hallmarks that raise expectations" (p. 383) will contribute to excellence.

To date, the programmatic elements responsible for credentialing success have been speculative. The key lies in the broad spectrum of inputs or processes involved in program structure, or in complex synergistic relationships. Certainly allied health educators will benefit from future identification of factors directly linked to success; in the meantime, nurse educators have offered a tentative guide to pre-eminence:

> ….clear program standards and hallmarks that raise expectations; evidence-based programs and teaching/evaluation methods; qualified students; quality and adequate resources; recognition of expertise; student-centered, interactive, innovative programs and curricula; well prepared educational administrators; and well-prepared faculty. (National League for Nursing, 2008, p.383)

CHAPTER 3

Methodology and Data Description

The inception of outcomes-based assessment of programs for accreditation purposes has necessitated modifications to respiratory therapy education. Researcher-educators have attempted to isolate the components of outcomes success to meet the stringent accreditation requirements. Even though employment opportunities have been expanding, fewer graduates have been able to achieve credentialing success and become licensed practitioners. To mitigate the looming employment gap, increasing numbers of for-profit RT programs have materialized; these entrepreneurs have realized that education of future respiratory therapists can be a profitable venture. High tuition rates at these for-profit schools have financed high-visibility marketing efforts on billboards and television commercials. Government prognosticators continue to boast optimism for the job market and income potential in the field of respiratory therapy (Bureau of Labor Statistics, 2012). The easily enticed public, lured to the RT field with the prospect of glamorous jobs and above-average income potential, may be justifiably confused about where to receive RT training. Until recently, it has appeared that that all programs were created equally; selection involved finding the school with the closest location or the best uniform or the most promising television commercial. Now, the public release of the programmatic outcomes data has afforded the public a means to compare programs and it has also provided a unique opportunity for research.

Research Design and Research Questions

In response to the programmatic outcomes release, a descriptive study was designed to assess programs recognized as "successful" and selected demographic variables previously identified as components of outcomes success; demographic

variables were chosen based on literature published over the last decade (Johnson, 2002; Andrews, et al., 2008; Ari, 2006a; Ari, 2006b; Ari, 2009; Ari, et al., 2008). An additional assessment of curricular alignment using NBRC summary reports was selected for the study as this vehicle had not been observed in field-related literature and warranted further investigation.

The term *descriptive research* represents a broad range of activities that have a common purpose of describing situations or phenomena (Mason & Bramble, 1978). These descriptions may be necessary for decision-making or to support broader research questions.

This descriptive baseline study was guided by the following research questions:

1. Are certain *types* of schools (public versus private, for-profit versus not-for-profit, Associate's degree-granting versus Bachelor's degree-granting) more successful than others, as measured by ranking in the top third of programs in credentialing success?
2. What resources are most likely to impact high credentialing success? (Resources are defined as program screening criteria, faculty credentials, educational background, number of faculty members, employed pedagogy, student-teacher ratios, clinical exposure hours, and simulation practice hours.)
3. What alignment indicators are likely to demonstrate disparities between the upper and lower thirds of the sample population?

Population and Sample Selection

In this study, convenience sampling was used to obtain baseline data from RT program directors. Hulley, Cummings, Brower, Grady and Newman (2007), stated that:

A convenience sample can minimize volunteerism and other selection biases by

> consecutively selecting every accessible person who meets the entry criteria. Such a consecutive sample is especially desirable when it amounts to taking the entire accessible population over a long enough period to include seasonal variations or other temporal changes that are important to the research question. (p. 32)

The sample was drawn from a list of 440 accredited respiratory therapy education programs, published in 2012. The specific document, entitled "Programmatic Outcomes Data," was the product of annual program self-reporting averaged over the fiscal years 2009-2011. The unit of study was the accredited advanced-degree respiratory therapy program. Although statistics from 440 programs were reported in the Programmatic Outcomes Data, not all programs qualified for the current study; potential subjects were eliminated from the study population if they had not been accredited for the entire reporting period and did not accrue a three-year average of reported data. This qualification narrowed the probable sample from 440 to 399.

The Programmatic Outcomes Data spreadsheet, made publicly available by CoARC on January 31, 2012 (Commission on Accreditation for Respiratory Care, 2011a), was converted to Excel format for enhanced data manipulation. The program list, with corresponding data, was reordered by assigned score. The score was calculated by adding the posted CRT exam pass rate and the RRT exam pass rate; the maximum score attainable was 200 points which was achieved by programs with 100% pass rates on both exams. The programs were then ranked in order from highest to lowest assigned score. As many programs received the same score, all programs receiving the same score also received the same ranking; out of 399 different programs, 101 scores were identified. The 101 scores were then divided into thirds (Figure 2): rankings 1-33 (n=161) were

identified as top programs; rankings 34-66 (n=160) comprised the middle-level programs; rankings 67-101 (n=78) were identified as low-performers. For the study design, it was imperative to isolate the extremes of the population as modeled in the 20/20 Analysis Manual (Reynolds, 1997), for appropriate interpretation of relationships. Therefore, the study sample was comprised of the top third and bottom third of the eligible programs (n=238).

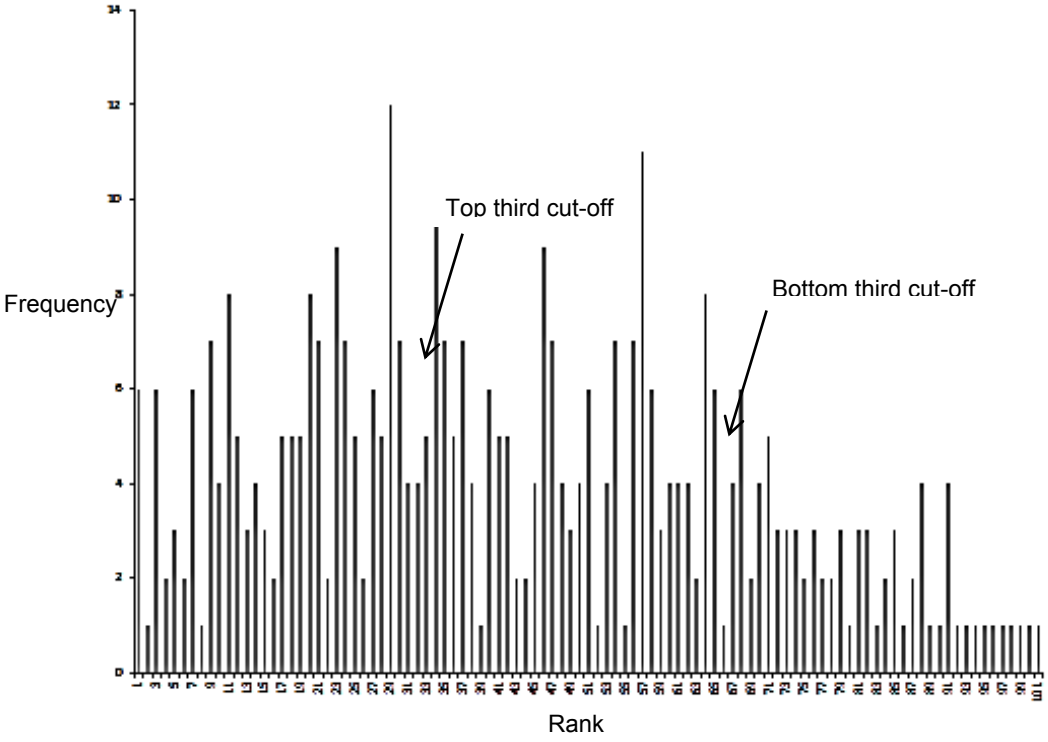

Figure 2. Distribution of Rankings 1-101 in the 399 Qualifying RT Programs

Program directors from the schools were selected to represent each unit of study. Several PDs were responsible for multiple accredited satellite-campus programs. Though these PDs received duplicate requests for survey completion, this did not contribute to data redundancy since each program received a discrete score resulting from discrete data. The PD was the appropriate point of contact for each unit of study; PDs are the gate-keepers of the password-protected school score reports. However, an important

aspect of the study design was to guarantee that the researcher would not have the ability to link the returned survey results to the program; therefore, an outside agency was contracted to handle the data and guarantee anonymity.

The Cannon Survey Center was enlisted to assist with technical aspects of instrument construction, controlled data acquisition, and data processing. The utilization of an outside agency was vital to the success of this study. Even though some of the retrieved data was publicly available on individual school sites or recently released by CoARC, the board exam scores for each school remained closely guarded by the program directors. These scores, in all likelihood, would not have been released to the researcher without a promise of anonymity. The entire list of programs, added e-mail addresses, and survey instrument were submitted to the Cannon Survey Center, 851 E. Tropicana Avenue, Las Vegas, Nevada. There, each qualifying program was identified as top third, middle third, or bottom third and randomly assigned a unique number (Dillman, Smyth, & Christian, 2009).

Ethical, honest, and objective methodology was employed throughout this study. Even though the design dictated amassing largely demographic data, training in the Collaborative Institutional Training Initiative was completed prior to application to the University of Nevada Las Vegas Institutional Review Board. Approval from this board was secured by way of exemption prior to initiation of pilot polling (see Appendix C).

Pilot Population

Three hundred ninety-nine programs, represented by their respective program directors, originally qualified for probable study participation; programs identified for receipt of the pilot were selected from the middle third of the overall population. The

programs selected to pilot the survey instrument were chosen from the middle sector of the population so that there would be no reduction in the data collected from the schools ranked as high and low-performers. A pilot survey questionnaire was constructed by the researcher specifically for this study to establish content validity, clarity, appropriateness, design, and layout of the instrument; the pilot concluded with a comment box for related feedback. The mailing to the pilot population included an introductory e-mail, statement of informed consent, and the pilot survey.

Ten programs were randomly selected from the middle third for pilot-testing of the survey instrument; a return of five surveys (minimum) was desired and a low response rate across the summer months was factored as a possible limitation. The pilot study was designed to garner constructive input regarding the survey instrument and assess the feasibility of sending the instrument to a larger population, since this instrument had not been previously validated (Dillman et al., 2009). Due to lower than expected response rates from the original ten programs, 30 more programs from the middle third of the population were solicited. Ultimately, 40 programs were selected to receive the pilot survey. The e-mail introduction and pilot survey are included in appendices D and E. Three out of ten surveys were returned with qualitative comments; comments did not suggest the need for instrument revision (see Table 3).

Table 3

Comments from Pilot Respondents

It was just fine!
I don't have time to try and figure this last page out. Too much detail...Sorry
RRT results used are 1-1-2010 through 6-30-2011

The introductory e-mail (see Appendix D) was designed to personalize the request for participation by disclosing that the researcher was "cut from the same cloth" as the survey recipients (Dillman et al., 2009). In lieu of a token of appreciation, to further entice a buy-in, and to encourage a generous response, recipients were reminded that collegial sharing of knowledge would benefit the profession. As soon as recipients clicked the link to the survey, a new page unveiled the statement of informed consent; one more click took participants directly to the survey.

The pilot survey was e-mailed in July, 2012, at a time when faculty attendance at the normally-year-round program is unpredictable. However, the slower pace of the summer months was selected for survey release in the anticipation that program directors would be more inclined to find time for viewing of e-mail. Further, the survey release was timed to coincide with the months immediately following the AARC Summer Forum for educators and managers (Dillman et al., 2009). Those attending were encouraged to participate in this research during a presentation on credentialing success (Commission on Accreditation for Respiratory Care, 2011e).

Survey Population and Instrument Development

The finalized survey (see Appendix F) was distributed to 239 programs by e-mail after removal of the pilot comment box. The 239 programs consisted of the top third with rankings 1-33 (n=161) and the bottom third with rankings 67-101 (n=78). These rankings aligned with a score of 174-200 for the top third and a score of 36-130 for the bottom third when the CRT and RRT pass rates calculated as percentages were added together. A brief note of explanation accompanied the e-mailed survey questionnaire to introduce the study, establish the credentials of the researcher, and remind the recipients of the

relevancy of the inquiry (Dillman et al., 2009). A transmittal of informed consent opened as a new web page for participants who chose to participate in the survey. The instrument was composed of two parts: 17 demographic-gathering questions plus two questions requesting aggregate school score results on the CRT and RRT-WRE exams. Basic demographic information solicited included:

- Type of school (public vs. private; not-for-profit vs. for-profit; Federal Government; Associate's degree granting vs. Bachelor's degree granting)
- Type of utilized entry limitation
- Number of full- and part-time faculty members
- Faculty advanced degrees, including degrees in education
- Employed pedagogy
- Student-teacher ratios in didactic and laboratory classes
- Number of clinical exposure, laboratory, and simulation hours per student
- Regional hiring practices

The survey was designed to capture *both* program demographics and data publicly unavailable on typical program websites: the aggregate school scores. Specific instructions were included within the body of the questions to usher the respondent to another webpage for retrieval of board scores (Dillman et al., 2009). Since access to board exam outcomes is a secure process, the NBRC score access is restricted to program directors and surrogates. Each July, the program directors are required to report these scores as a three-year aggregate. The study was designed for simplicity and familiarity by mimicking this recently-utilized reporting method and same three-year reporting period. Finally, only "new" candidate data was solicited to represent a schools' curriculum as

repeat candidate data may be skewed by including the same test population across multiple attempts.

A technical benefit to enlisting the compensated services of the Cannon Survey Center was that survey data could be captured as soon as fields were populated; furthermore, the survey could be closed and reopened with fields remaining populated for completion at a later time, to make survey completion more agreeable to the busy program director. For non-respondents, a second round of surveys was e-mailed two weeks after the first distribution; for persistent non-respondents, a third round of surveys was e-mailed one week later (week four). Also in week four, post-card reminders (see Appendix G) were sent via the United States Postal Service, to contribute to timely response and the greatest possible rate of return (Dillman et al., 2009). The mailing was timed so that the postcard would arrive within days after the receipt of the final email notice. The polling period officially ended at midnight on Monday, October 8, 2012.

Summary

The review of literature revealed that little was known about the formula for credentialing success in health-related programs, especially respiratory therapy. To gather information contributory to the development of this formula, a survey was distributed to 239 RT program directors. The services of the Cannon Survey Center were employed to facilitate survey dissemination and data collection. The survey captured data relating to select program demographics and cumulative exam score results in 17 areas of curricular content. Baseline data were collected and evaluated using frequency and percentage analyses; qualitative data were recorded to supplement quantitative data.

Although several limitations were anticipated, the salient limitation was that of response rate; of the 239 surveys solicited, 111 were submitted (46% response). The low response rate suggests the need for conservative assessment regarding extrapolation of data to a larger population, since the sample population is not necessarily representative of all RT programs. However, there may be some generalizability to other allied health programs that utilize entry-limitation, human simulators, field specialists as instructors, and live-patient exposure as part of their curriculum.

CHAPTER 4

Findings of the Study

This study was designed to gather baseline data to assess variables present in high-performing RT programs and low-performing programs. To make this determination, a survey was developed and distributed to directors of 239 programs; of those programs, 161 were identified as high-performers (top third) and 78 were identified as low-performers (bottom third). One hundred fifty-one responses were received from directors completing all or part of the intended survey; the 46% response was deemed reasonable for data analysis (Ary, Jacobs, & Sorensen, 2010). All electronic surveys were received by the Cannon Survey Center immediately upon completion; data were processed on the day following the survey closure date and emailed to the researcher in SPSS and Excel formats. All responses and participant identifiers were kept secure and confidential, and directly visible only to an assigned agent from the CSC. At the end of the contract period, all survey results were secured, placed in controlled storage, and labeled to be destroyed at the end of three years.

A pilot test was conducted to establish content validity, clarity, appropriateness, design, and layout of the instrument. Since items in the instrument requested factual responses, reliability was not estimated (Borg & Gall, 1983; Gliem & Miller, 1992). Statistical processes were applied using Statistical Package for the Social Sciences (SPSS) [Windows Version 21]. Appropriate statistical procedures for description (frequency counts, percentages, and means) were used to describe the data.

Research Questions

The survey instrument was constructed specifically to gather selected demographic information and assess responses to answer the following research questions:

1. Are certain *types* of schools (public versus private, for-profit versus not-for-profit, Associate's degree-granting versus Bachelor's degree-granting) more successful than others, as measured by ranking in the top third of programs in credentialing success?
2. What resources are most likely to impact high credentialing success? (Resources are defined as program screening criteria, faculty credentials, educational background, number of faculty members, employed pedagogy, student-teacher ratios, clinical exposure hours, and simulation practice hours.)
3. What alignment indicators are likely to demonstrate disparities between the upper and lower thirds of the sample population?

Response Rate

The survey was sent to 239 PDs representing 161 programs ranking in the top third and 78 ranking in the bottom third. Responses received totaled 111, yielding an overall response rate of 46%. This response rate was comparable to the 42.7% response rate reported by Johnson (2002), in a similar study. The 111 returned surveys were separated into groups based on respective rankings as top third (n=82) and bottom third (n=29), as illustrated in Table 4. The response rate for the top third was 161 surveys sent and 82 returned, or 51%. The response rate for the bottom third was 78 surveys solicited and 29 returned, or 37%.

Table 4

Number of Survey Respondents by Ranking (Top Third and Bottom Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	top third	82	73.9	73.9	73.9
	bottom third	29	26.1	26.1	100.0
	Total	111	100.0	100.0	

Research Question One

Question one sought to discern which *types* of schools (public versus private, for-profit versus not-for-profit, Associate's degree-granting vs. Bachelor's degree-granting) were more successful than others, as measured by ranking in the top third of programs in credentialing success. To answer this question the characteristics of the participants were evaluated.

Characteristics of participants. To assess the characteristics of the survey respondents, survey item one was divided into relevant parts to best compare results from the top third of the population with results from the bottom third.

Survey Item 1: Please provide some basic information about your facility. Choose one from each column (or check both items in Column 3 if applicable). Is your program: public, private, or federal government; for-profit or not-for-profit; and does it grant the Associate's degree, Bachelor's degree, or both.

In the top third, although three programs did not respond, 82% of the programs were public, 13% private, and 1% government (Table 5). Additionally, although five programs did not respond to the question regarding for-profit or not-for-profit status, 13% of the responding programs claimed to be for-profit while 87% claimed not-for-profit status (Table 6).

In the bottom third of the population, 52% of the programs were public and 48% were private (Table 7). Additionally, 38% of the responding programs claimed to be for-profit while 62% claimed not-for-profit status (Table 8).

Table 5

Public, Private, and Government Programs in Top Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public	67	81.7	84.8	84.8
	Private	11	13.4	13.9	98.7
	Federal Government	1	1.2	1.3	100.0
	Total	79	96.3	100.0	
Missing	System	3	3.7		
Total		82	100.0		

Table 6

For-Profit and Not-For-Profit Programs in Top Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	For-profit	10	12.2	13.0	13.0
	Not-for-profit	67	81.7	87.0	100.0
	Total	77	93.9	100.0	
Missing	System	5	6.1		
Total		82	100.0		

Table 7

Public, Private, and Government Programs in Bottom Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public	15	51.7	51.7	51.7
	Private	14	48.3	48.3	100.0
	Total	29	100.0	100.0	

Table 8

For-Profit and Not-For-Profit Programs in Bottom Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	For-profit	11	37.9	37.9	37.9
	Not-for-profit	18	62.1	62.1	100.0
	Total	29	100.0	100.0	

When a graph of each third was viewed independently (Figures 3 and 4), it appeared that the not-for-profit schools were well-represented in both the upper and lower thirds of the population, while the contribution of the for-profit sector remained indeterminate. However, when viewed as the cumulative total of private plus public for-profit and not-for-profit programs (Figure 5), it became apparent that the for-profit sector was very similarly represented in both the top and bottom thirds; additionally, the not-for-profit programs were more prevalent in the top third than in the bottom third. The implication was that students attending a for-profit program had an equal chance of success or failure in a for-profit program; not-for-profit programs, either public or private, were three times more likely to be in the upper third than in the bottom third, indicating a track record favoring credentialing success. (Further clarification would be required to understand linkages between the terms *private* and *for-profit;* it is possible that all for-profit institutions are, by definition, private.)

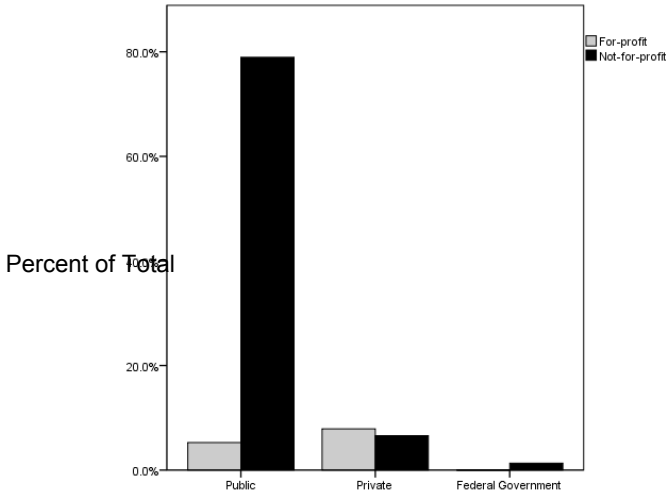

Figure 3. Distribution of Programs in Top Third as Public For-Profit and Not-For-Profit, Private For-Profit and Not-For-Profit, and Federal Government Not-For-Profit

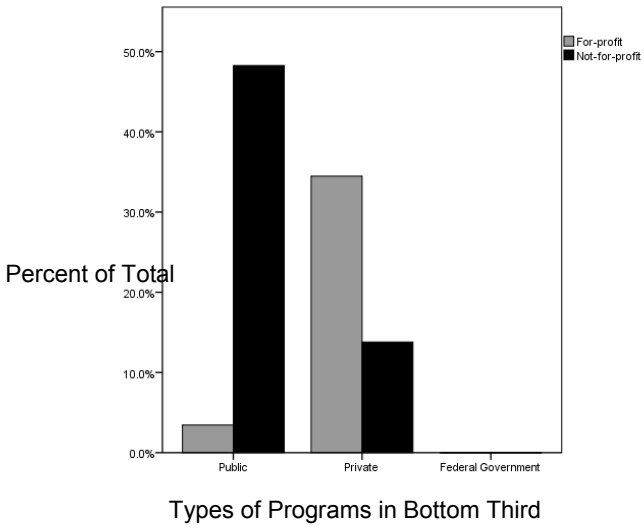

Figure 4. Distribution of Programs in Bottom Third as Public For-Profit and Not-For-Profit, Private For-Profit and Not-For-Profit, and Federal Government Not-For-Profit

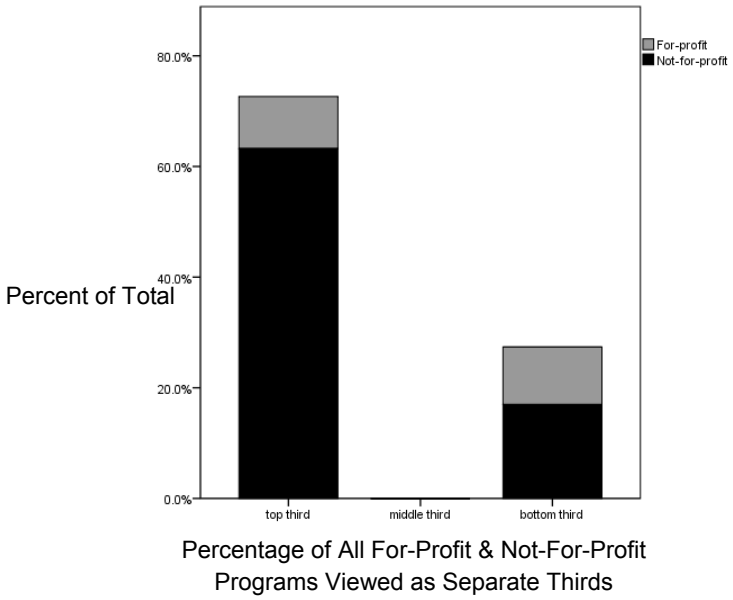

Figure 5. Public and Private Programs Combined and Viewed as Separate Thirds

In the final portion of survey item 1, respondents described their program as offering an Associate's degree or a Bachelor's degree, or both. Out of 82 programs in the top third, 61 (74%) offered an Associate's degree (Table 9) and 22 (27%) offered a Bachelor's degree (Table 10); one program offered both an Associate's and Bachelor's degree, as indicated by an overlap in the frequencies observed in Tables 9 and 10.

Table 9

Programs Offering Associate's Degree (From Top Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	61	74.4	100.0	100.0
Missing	System	21	25.6		
Total		82	100.0		

Table 10

Programs Offering Bachelor's Degree (From Top Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	22	26.8	100.0	100.0
Missing	System	60	73.2		
Total		82	100.0		

Respondents from the bottom third also described their program as offering an Associate's degree or a Bachelor's degree: out of 29 programs, 25 (86%) offered an Associate's degree (Table 11) and 8 (28%) offered a Bachelor's degree (Table 12); the area of overlap indicates that four programs offered both an Associate's and Bachelor's degree.

Table 11

Programs Offering Associate's Degree (From Bottom Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	25	86.2	100.0	100.0
Missing	System	4	13.8		
Total		29	100.0		

Table 12

Programs Offering Bachelor's Degree (From Bottom Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	8	27.6	100.0	100.0
Missing	System	21	72.4		
Total		29	100.0		

Research Question Two

Question two sought to identify program resources utilized to ensure the success of the programs. (Resources are defined as program screening methods, number of faculty members, faculty advanced degrees, use of various pedagogies, low student-teacher ratios, clinical exposure hours, laboratory practice hours, and simulation practice hours.) Items two through 18 address the utilization of these resources.

Survey Item 2: Does your program utilize an entry-limitation (screening) process?

In the top third, 72 programs (88%) claimed to use some form of entry-limitation; seven programs (9%) did not, and two programs (2%) were uncertain (Table 13). In the

bottom third, 23 programs (79%) claimed to use some form of entry-limitation; four programs (14%) did not, and two programs (7%) were uncertain (see Table 14). Results indicated that most programs, whether in the top or bottom third of the population, favored the use of some form of entry limitation. Note: 9% of the top third and 14% of the bottom third did not utilize any form of screening. Of all polled programs, 86% utilized some form of entry limitation (see Table 15).

Table 13
Programs Utilizing Entry-Limitation Methods from Top Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	72	87.8	88.9	88.9
	No	7	8.5	8.6	97.5
	Not sure	2	2.4	2.5	100.0
	Total	81	98.8	100.0	
Missing	System	1	1.2		
Total		82	100.0		

Table 14
Programs Utilizing Entry-Limitation Methods from Bottom Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	79.3	79.3	79.3
	No	4	13.8	13.8	93.1
	Not sure	2	6.9	6.9	100.0
	Total	29	100.0	100.0	

Table 15
Programs Utilizing Entry-Limitation Methods from Both Top and Bottom Thirds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	95	85.6	86.4	86.4
	No	11	9.9	10.0	96.4
	Not sure	4	3.6	3.6	100.0
	Total	110	99.1	100.0	
Missing	System	1	.9		
Total		111	100.0		

Survey Item 3: Which entry-limitation tools do you utilize? (Check all that apply.)

The forms of entry-limitation tools that were selected on the survey are shown in Figure 6 for the top third and Figure 7 for the bottom third of the sample population.

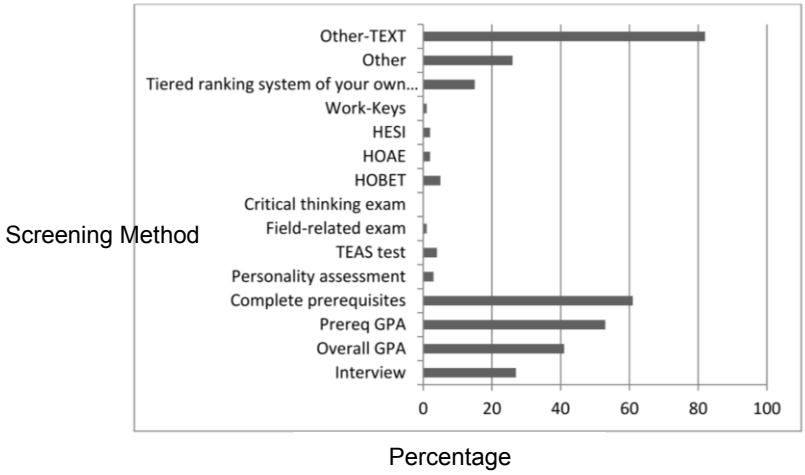

Figure 6. Percentage of Top Third Utilizing Entry-Limitation by Method

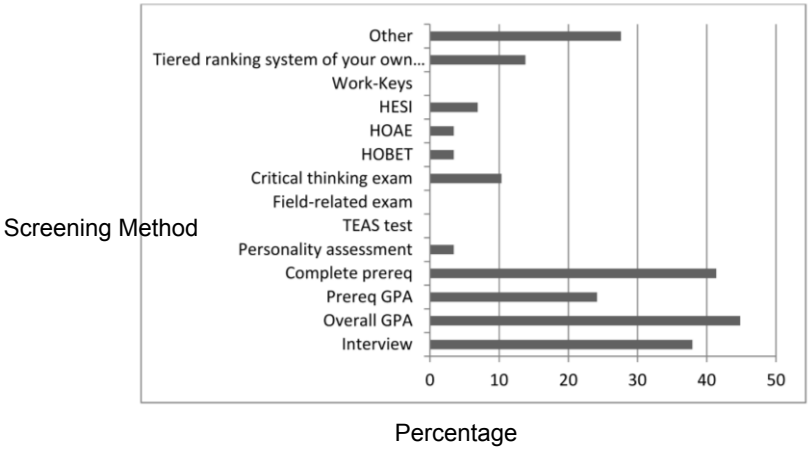

Figure 7. Percentage of Bottom Third Utilizing Entry-Limitation by Method

Additional forms of entry-limitation tools were input as text and are listed in Table 16 (alphabetical order). From the extensive list submitted by programs in the top third, it appears that upper-tier program directors were either more willing to volunteer this information, had more screening options to share, or were more invested in finding methods to select only the most qualified student.

Table 16
Entry-Limitation Options Reported from RT Programs in Top and Bottom Thirds

Tool	Top Third	Bottom Third
Accuplacer	X	
ACT Composite Score	X	X
Anatomy & Physiology Exam	X	
Application Date	X	
Assigned Technical Paper	X	
Attend Orientation	X	
College Math Placement Test	X	
Compass Exam/Placement Test	X	X
Complete Application	X	
Criminal Background Check	X	
Drug Screen	X	
Essay on Day of Interview	X	
Health Exam	X	
Hospital Observation	X	
Hospital Tour/Reflective Essay	X	
Math & English GPA	X	
Number of Course Withdrawals	X	
Observation-Specific Query	X	
Overall GPA	X	X
Point-Based System	X	
Pre-Algebra & Reading Test	X	
Pre-Requisite Course Completion	X	X
Pre-Requisite GPA	X	
PSB Health Occupations Exam	X	
Resume/Essay	X	
Wonderlic Cognitive Ability Test	X	

Survey Item 4: Do you believe that this screening method has been an adequate predictor of program success?

Comparing the results of Tables 17 and 18, the confidence in the utilized methods of entry-limitation, there was no significant difference in opinion between the top and bottom thirds of the population. It should also be noted that, when all results were combined (Table 19), only 52% of all respondents had confidence that there was utility in performing these screening maneuvers.

Table 17

Confidence in Entry-Limitation Procedures (Top Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	44	53.7	61.1	61.1
	No	16	19.5	22.2	83.3
	Not sure	12	14.6	16.7	100.0
	Total	72	87.8	100.0	
Missing	System	10	12.2		
Total		82	100.0		

Table 18

Confidence in Entry-Limitation Procedures (Bottom Third)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	14	48.3	63.6	63.6
	No	4	13.8	18.2	81.8
	Not sure	4	13.8	18.2	100.0
	Total	22	75.9	100.0	
Missing	System	7	24.1		
Total		29	100.0		

Table 19

Confidence in Entry-Limitation Procedures (Top and Bottom Thirds Combined)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	52.3	61.7	61.7
	No	20	18.0	21.3	83.0
	Not sure	16	14.4	17.0	100.0
	Total	94	84.7	100.0	
Missing	System	17	15.3		
Total		111	100.0		

Survey Items 5 and 6: How many full-time faculty members teach in your program? Referring to the full-time faculty counted previously: Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.) In the second column, please indicate number of teachers (if any) with a degree

in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

Programs in the top and bottom thirds registered full-time faculty numbers as well as tallies of advanced degrees and degrees in education (Figure 8). Some programs in both top and bottom thirds reported only one full-time faculty member: 1% in top third and 59% in bottom third. This indicated that these programs were lacking one of the two full-time requisite faculty members.

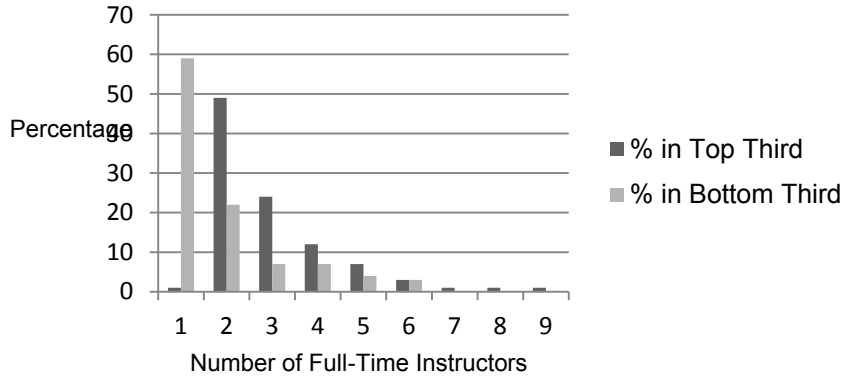

Figure 8. Distribution of Full-Time Faculty (Top and Bottom Thirds)

Evaluation of the full-time faculty degrees demonstrated many similarities between the composition of the top and bottom thirds of the population (Figure 9), demonstrating no compelling contribution to programmatic success or failure.

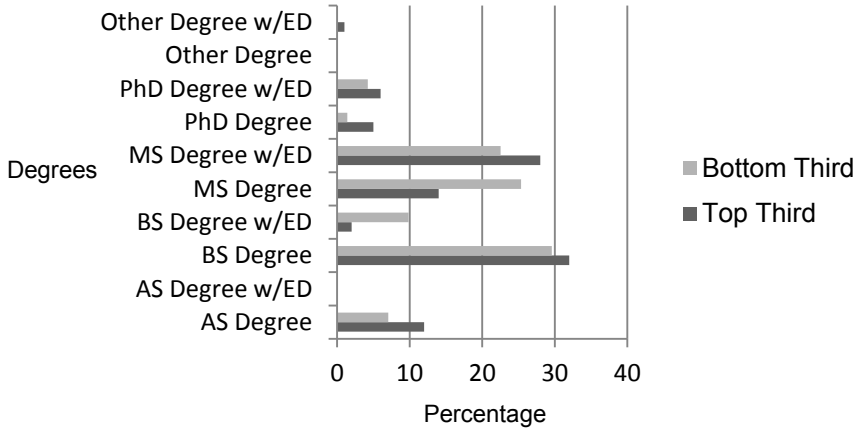

Figure 9. Degrees Held by Faculty in Top and Bottom Thirds by Percent of Total

Survey Items 7 and 8: How many part-time faculty members teach in your program? Referring to the part-time faculty counted previously: Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.) In the second column, please indicate number of teachers (if any) with a degree in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

The numbers of part-time faculty ranged from one to 23 (Figure 10). To comprehend the feasibility of a staff up to 23, it should be noted that some programs have abundant clinical sites; clinical instructors would necessarily be proportional to the number of clinical sites per program. Reports were not strikingly different between the top and bottom thirds; numbers of faculty and composition of part-time faculty degrees were deemed non-contributory to programmatic success or failure.

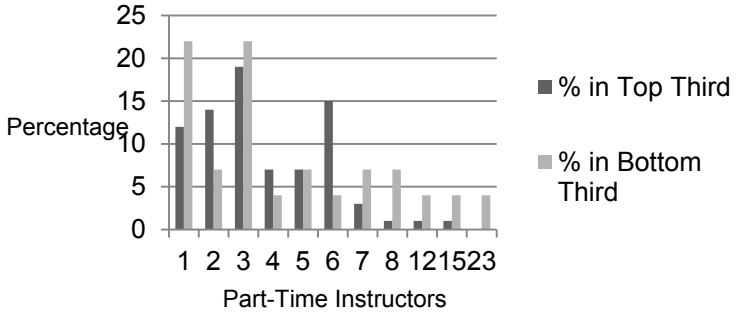

Figure 10. Part-Time Faculty Numbers by Percent of Total (Top Third and Bottom Thirds)

Survey Item 9: Pedagogy: Do you or your educators employ particular teaching methods for your didactic courses? Choose all that apply: (Choices included lecture, Socratic discussion, problem-based learning, debate, practice exam questions, and other.)

Curricular supplementation with one or more of the selected pedagogies was supported by 90% of programs (Table 20); few differences were demonstrated between

the top third and the bottom third of the assessed population (Figure 11) and no particular form of pedagogy was strikingly favored over another.

In response to a request for examples of other employed methodologies, many additional activities were itemized (see Table 21). The extensive list in Table 21 includes both learning activities and tools that extended beyond the intended scope of the question, and are included for interest and for the fact that there were notably more responses from programs in the top third than in the bottom third.

Table 20

RT Programs Employing Pedagogies in Top and Bottom Thirds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Selected	100	90.1	100.0	100.0
Missing	System	11	9.9		
Total		111	100.0		

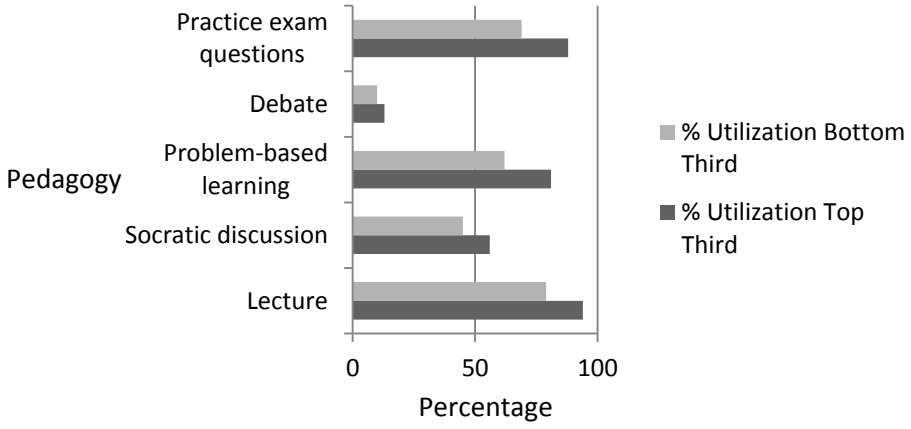

Figure 11. Pedagogies Employed by Programs in the Top and Bottom Thirds

Table 21

Extraneous Pedagogies Employed by RT Programs in Top and Bottom Thirds

Pedagogy	Top Third	Bottom Third
Active learning	X	
Assigned study questions	X	
Case-based reasoning	X	
Case study	X	X
Clicker questions in classroom	X	
Computer simulations		X
Demonstration/participation	X	
Engaged learning	X	
Flipped classroom	X	
Frequent testing	X	
Human mannequin simulation	X	X
Integrated lab/lecture/practice	X	
Interdisciplinary simulations	X	
Patient care scenarios	X	
Peer learning	X	
Standardized patients	X	

Survey Item 10: What is your average teacher-to-student ratio in your didactic courses?

The teacher-to-student ratio in the didactic courses was variable, ranging from 1:7 up to 1:35 (Figure 12). Similarities were present between the top and bottom thirds; the mode was a 1:20 teacher-to-student ratio for both groups.

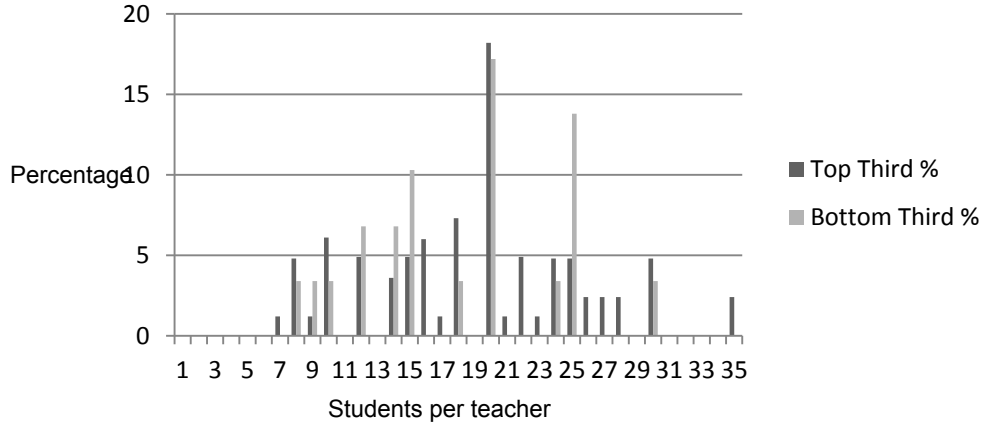

Figure 12. Teacher-to-Student Ratios in Didactic Courses in the Top and Bottom Thirds.

Survey Item 11: What is your average teacher-to-student ratio in your laboratory courses?

The teacher-to-student ratio in the laboratory courses was also highly variable, ranging from 1:2 up to 1:20 (Figure 13). Similarities were present between the top and bottom thirds, including evidence of creative team-teaching (ratios representing two or three teachers per class were reduced for enhanced graphic illustration). The mode was a 1:6 teacher-to-student ratio in both the top and bottom thirds.

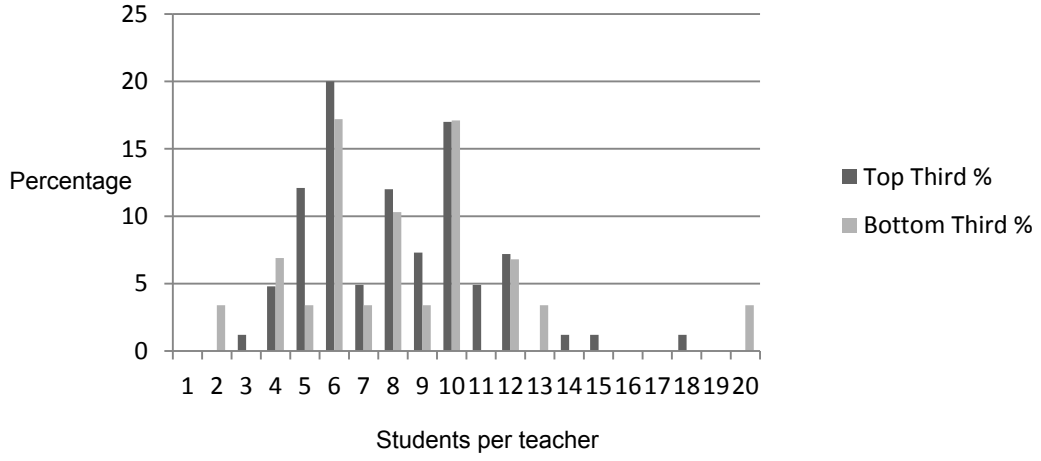

Figure 13. Teacher-to-Student Ratios in Laboratory Courses in the Top and Bottom Thirds

Survey Item 12: What is the minimum number of clock hours that the typical CRT-eligible graduate has accrued…at clinical sites?

The number of clinical hours for CRT-eligible graduates ranged from 200 to 1500 in the top third and from 96 to 1299 in the bottom third (see Figure 14). The mode for the top and bottom thirds was 800-899 and 700-899 respectively, with means of 907 and 764 hours respectively. These figures appeared to indicate a greater emphasis on clinical attendance among programs in the upper third. Note: As only 64 out of 82 programs from the top third and 18 out of 29 from the bottom third responded to this question, the

percentages of the programs in each category were calculated based on the number of respondents.

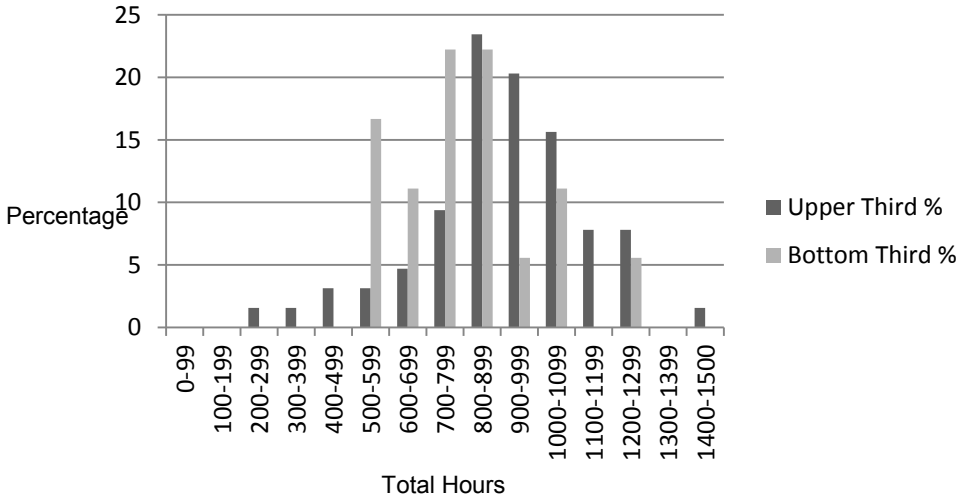

Figure 14. Minimum Clock Hours Accrued at Clinical Sites by CRT-Eligible Graduates (Top and Bottom Thirds)

Survey Item 13: What is the minimum number of clock hours that the typical CRT-eligible graduate has accrued…in the laboratory?

Laboratory hours ranged from zero to 660 in the top third of the programs and from 30 to 520 in the bottom third (Figure 15). This finding indicates no reportable difference between the top and bottom thirds of the sampled population.

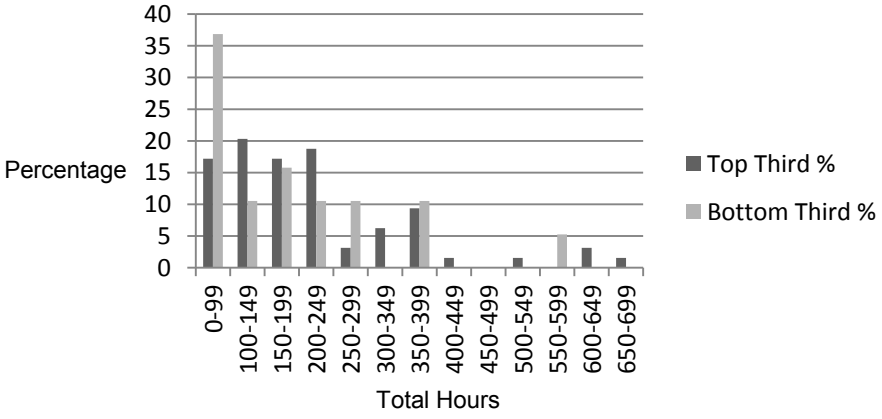

Figure 15. Minimum Clock Hours Accrued in Laboratory by CRT-Eligible Graduates (Top and Bottom Thirds)

Survey Item 14: What is the minimum number of clock hours that the typical CRT-eligible graduate has accrued…practicing with human patient simulators?

The amount of time spent practicing respiratory skills on human patient simulators, although variable, is comparable between the top and bottom thirds of the program populations (Figure 16).

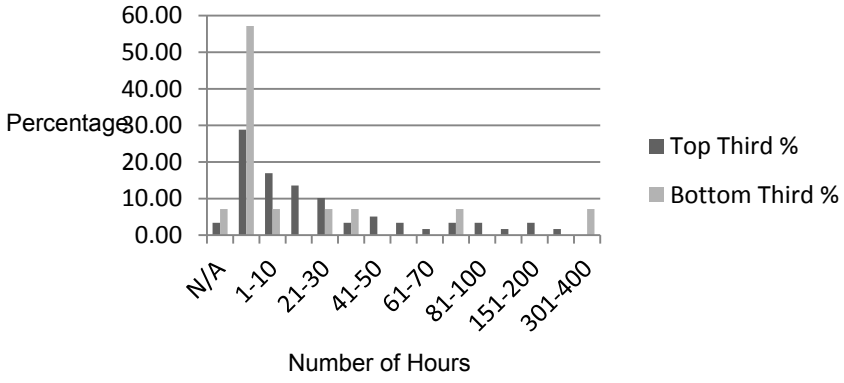

Figure 16. Minimum Clock Hours Accrued with Human Patient Simulators (CRT: Both Top & Bottom Thirds)

Survey Item 15: What is the minimum number of clock hours that the typical RRT-eligible graduate has accrued…at clinical sites?

Comparison of the hours spent at the clinical sites for RRT-eligible graduates showed no substantial differences between the top and bottom thirds (see Figure 17).

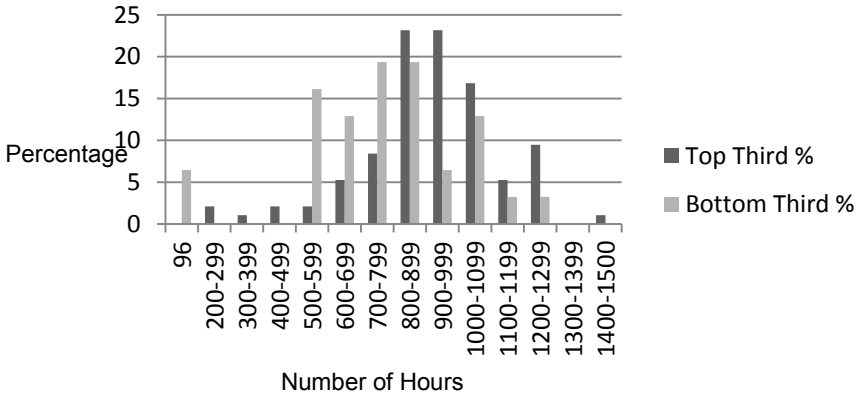

Figure 17. Minimum Clock Hours Accrued at Clinical Sites by RRT-Eligible Graduates (Top & Bottom Thirds)

Survey Item 16: What is the minimum number of clock hours that the typical RRT-eligible graduate has accrued…in the laboratory?

Comparison of the hours spent in the laboratory for RRT-eligible graduates showed no major differences between the top and bottom thirds (see Figure 18).

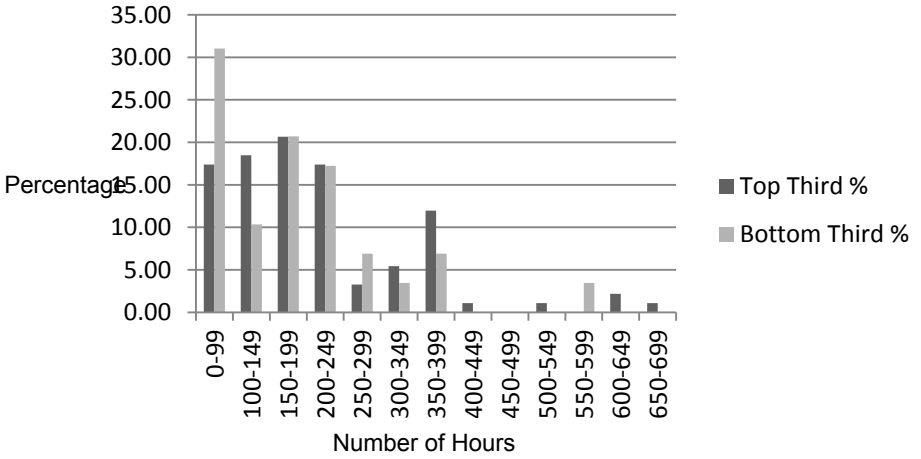

Figure 18. Minimum Clock Hours Accrued in Laboratory by RRT-Eligible Graduates (Top & Bottom Thirds)

Survey Item 17: What is the minimum number of clock hours that the typical RRT-eligible graduate has accrued…practicing with human patient simulators?

Comparison of the hours spent with human patient simulators for RRT-eligible graduates showed no noteworthy differences between top and bottom thirds (Figure 19).

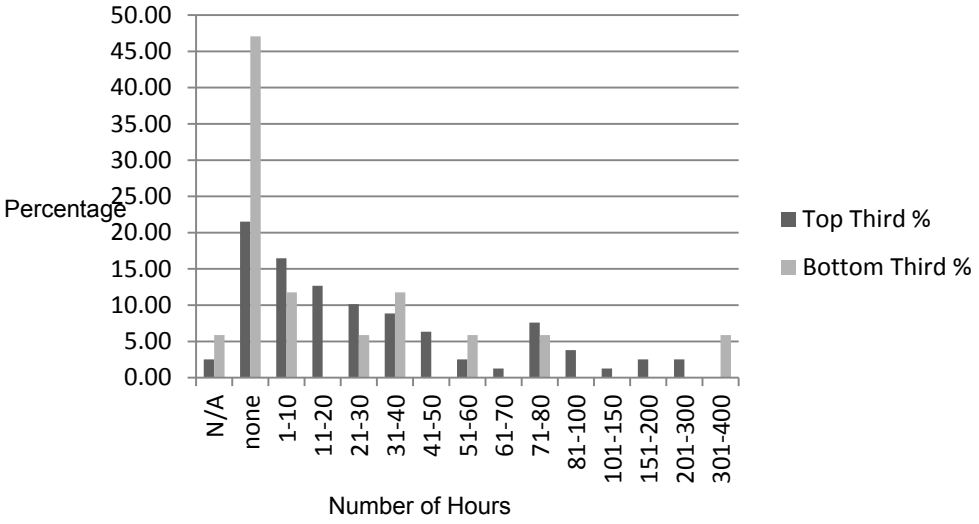

Figure 19. Minimum Clock Hours Accrued with Human Patient Simulators (RRT: Top and Bottom Thirds)

Survey Item 18: In your geographic area, is it customary for the clinical facilities to hire new graduates?

Of the valid responses, 96% of the programs in the top third responded that new graduates could be hired in their geographic area; 83% of the valid responses from the bottom third concurred. Of note, though, were the qualitative comments associated with this question (see Table 22).

Table 22

Comments From PDs Regarding Availability of Jobs for New Graduates

Top Third	Bottom Third
In the past yes but due to oversaturation, it's harder for new grads to get hired	Before 2010, yes; recently there have been few jobs
Varies from clinic to clinic	Dependent upon the facility's needs. If there is a need then yes.
Yes, if they were really good when at the site as a student	It used to be. Now they want experienced RTs.

Note. Adapted from final survey responses.

Research Question Three

The third research question sought to identify the alignment indicators (individual content areas) demonstrating the greatest disparity between the upper and lower thirds of the sample population, as described in the NBRC outcomes report.

The scores for the majority of the alignment indicators on both the CRT and RRT exams are higher from the upper third of the programs than are comparable scores from the lower third (Table 23), as would be anticipated. However, some indicators demonstrate a wider gap in a given content area than do others; these gaps are described as percentage differences in Table 23. The larger gaps between the top and bottom thirds

appear to accentuate the content areas in which the superior programs excel or in which the lesser-ranked programs fall behind. The smaller gaps indicate fewer differences in curricular emphasis for the particular topic between the upper and lower thirds of the population.

When Table 23 is reordered by descending percentage differences and the numbers are reassigned to the descriptors corresponding with the domains and content headings in the NBRC Summary Content Outline (Table 1), Tables 24 and 25 reveal their utility. For example, when viewing the results from the CRT exam, curricular shortcomings are demonstrated to be more acute in areas pertaining to recommendation/ modification of care plan, technique modification, and data review than recommendation of procedures to obtain additional data. When findings from the RRT exam are reviewed, differing deficiencies are revealed: procedure recommendation, infection control techniques, and data review/evaluation/recommendation require more remediation than removal of secretions and manipulation of equipment. This information would be beneficial to programs interested in applying curricular changes where the potential benefit is the greatest.

An optional way to utilize curriculum alignment indicators would be to assess the totals of each domain: *1 TOT, 2 TOT,* and *3 TOT* (see Table 26). Table 26 provides a different perspective: the curricular gaps between the top and bottom thirds are similar in content when comparing the CRT and RRT scores, but different in intensity. This assessment allows visualization of the fact that all content areas demonstrated scoring discrepancies between the upper and lower thirds of the population on the CRT exam; in

contrast, the greatest hurdle on the RRT exam was in the domain of patient data evaluation and recommendations.

Table 23

CRT and RRT Exam Score Summaries Reported by Curriculum Alignment Category (Top & Bottom Thirds)

	CRT Score (Mean)			RRT Score (Mean)		
Curriculum Alignment Indicator	Top Third	Bottom Third	% Difference	Top Third	Bottom Third	% Difference
	(n=47)	(n=12)		(n=47)	(n=12)	
1A	3.12	2.61	16.35	3.15	2.73	13.33
1B	13.77	11.49	16.56	11.03	10.09	8.52
1C	3.03	2.82	6.93	2.9	2.32	20.00
2A	16.79	14.29	14.89	7.92	8.12	-2.53
2B	2.19	1.87	14.61	1.02	0.83	18.63
2C	2.65	2.33	12.08	0.97	0.91	6.19
3A	3.79	3.24	14.51	3.22	3.08	4.35
3B	5.23	4.62	11.66	2.88	2.67	7.29
3C	2.68	2.26	15.67	2.03	2.06	-1.48
3D	5.66	4.65	17.84	3.85	3.21	16.62
3E	10.69	9.13	14.59	6.55	6.41	2.14
3F	13.83	11.7	15.40	7.35	6.73	8.44
3G	12.94	11.31	12.60	9.17	8.36	8.83
3H	3.2	2.6	18.75	3.49	3.18	8.88
3I	2.2	1.84	16.36	2.07	1.87	9.66
3J	1.61	1.42	11.80	1.6	1.57	1.88
3K	1.45	1.24	14.48	1.65	1.58	4.24

Table 24

Percentage Differences Between Top & Bottom Thirds for CRT Alignment Indicators (Descending Order)

CRT Exam	
Curriculum Alignment Indicators from NBRC Domains (Table 1)	% Difference
Determine the appropriateness of the prescribed respiratory care plan and recommend modifications when indicated by data (3H)	18.75
Achieve adequate respiratory support (3D)	17.84
Collect and evaluate additional pertinent clinical information (1B)	16.56
Initiate, conduct, or modify respiratory care techniques in an emergency setting (3I)	16.36
Review data in the patient record (1A)	16.35
Remove broncho-pulmonary secretions (3C)	15.67
Independently modify therapeutic procedures based on the patient's response (3F)	15.4
Manipulate equipment by order or protocol (2A)	14.89
Ensure infection control (2B)	14.61
Evaluate and monitor patient's objective/subjective responses to respiratory care (3E)	14.59
Maintain records and communicate information (3A)	14.51
Initiate and conduct pulmonary rehabilitation and home care (3K)	14.48
Recommend modifications in the respiratory care plan based on the patient's response (3G)	12.6
Perform quality control procedure for listed equipment (2C)	12.08
Act as an assistant to the physician performing special procedures (3J)	11.8
Maintain a patent airway including the care of artificial airways (3B)	11.66
Recommend procedures to obtain additional data (1C)	6.93

Table 25

Percentage Differences Between Top & Bottom Thirds for RRT Alignment Indicators (Descending Order)

RRT Exam	
Curriculum Alignment Indicators from NBRC Domains (Table 1)	% Difference
Recommend procedures to obtain additional data (1C)	20.0
Ensure infection control (2B)	18.63
Achieve adequate respiratory support (3D)	16.62
Review data in the patient record (1A)	13.33
Initiate, conduct, or modify respiratory care techniques in an emergency setting (3I)	9.66
Determine the appropriateness of the prescribed respiratory care plan and recommend modifications when indicated by data (3H)	8.88
Recommend modifications in respiratory care plan based on the patient's response (3G)	8.83
Collect and evaluate additional pertinent clinical information (1B)	8.52
Independently modify therapeutic procedures based on the patient's response (3F)	8.44
Maintain a patent airway including the care of artificial airways (3B)	7.29
Perform quality control procedure for listed equipment (2C)	6.19
Maintain records and communicate information (3A)	4.35
Initiate and conduct pulmonary rehabilitation and home care (3K)	4.24
Evaluate and monitor patient's objective/subjective responses to respiratory care (3E)	2.14
Act as an assistant to the physician performing special procedures (3J)	1.88
Remove broncho-pulmonary secretions (3C)	-1.48
Manipulate equipment by order or protocol (2A)	-2.53

Table 26

Gap in Score Intensities in NBRC Domain Areas On Both CRT and RRT Exams

Curriculum Alignment Totals from NBRC Domains (Table 1)	Exam	
	CRT	RRT
Patient data evaluation and recommendations (1TOT)	15.15	11.05
Initiation and modification of therapeutic procedures (3TOT)	14.8	6.65
Equipment manipulation, infection control, and quality control (2TOT)	14.79	0.61

CHAPTER 5

Discussion, Recommendations, and Conclusions

The Bureau of Labor Statistics (2012a) has identified the field of respiratory therapy as a rapidly growing allied health profession. According to Mathews et al. (2006), the demand for RTs in the marketplace will not be offset by incoming graduates since both program applicants and graduates have declined in recent years. Additionally, the existing workforce will be looking toward retirement within the next two decades. To efficaciously tackle the issues of enhancing supply to meet the workforce demand, scrutiny of the characteristics of highly successful RT programs may lead to the development of a prescription for producing increased numbers of qualified graduates.

With the publication of programmatic outcomes, the relative success rates of all RT programs have been revealed. This listing permitted the separation of high-performing programs from low-performers and enabled a mechanism for comparison. By assessing the differences between the high (top third of population) and low performers (bottom third of population), patterns have emerged that beg further investigation.

To this end, a descriptive study utilizing survey methodology was developed to gather baseline data from 111 out of 239 (46% response rate) respiratory therapy program directors. The e-mail survey focused on collection of select demographic data and retrieval of average board exam scores representing three domains and 17 curricular content areas. The Cannon Survey Center was contracted to assist with survey dissemination, anonymous data collection, and data storage; frequency data were assessed using applications of SPSS software and reported in graphic format for enhanced visualization. The study results addressed three research questions and contributed to assumptions about attributes of successful programs.

Discussion of Results

The results are generalizable only to respondents of this study. With this limitation in mind, the following comments and assumptions are provided:

Research question one. The first research question pursued the basic characteristics of each program: private versus public, for-profit versus not-for-profit, and Associate's degree-granting versus Bachelor's degree-granting. The most revealing assessment compared all for-profit programs to all not-for-profit programs (Figure 5). There, it was demonstrated that for-profit programs were equally distributed in both the upper and lower thirds of the sample population. This finding suggested an equal chance of success or failure at a for-profit institution. Also observed from Figure 5, the large percentage of not-for-profit programs in the upper third suggested that students attending a not-for-profit program had a three-fold greater chance of achieving credentialing success. Astute students evaluating program types for optimal outcomes would, then, have a better chance of success in a not-for-profit program, compared to a 50-50 chance of success in a for-profit program.

Although Shelledy et al. (2001) reported a relationship between high exam pass rates and increased program length (or attendance at a four-year college), the current study was not able to corroborate. The percentage of programs offering Bachelor's degrees in both the top third and bottom third was very similar, indicating that the incorporation of a Bachelor's curriculum did not impact the program's credentialing success.

Research question two. After examining data related to program screening methods, number of faculty members, faculty advanced degrees, use of various

pedagogies, low student-teacher ratios, clinical exposure hours, laboratory practice hours, simulation practice hours, and hiring practices, few patterns emerged.

Entry-limitation. A form of entry-limitation (screening) was reported as being utilized by 86% of all programs, but the findings did not indicate a greater advantage to this incorporation for the upper third. This supports the conclusions drawn by Shelledy et al., (2001). The use of entry-limitation, in theory, should prevent waste of resources and contribute to predictability of net class size and number of clinical placements to procure; this may explain why it was employed by most programs. Entry-limitation is not mandated by CoARC, as every program is allowed to have up to 40% attrition without compromising accreditation status.

The use of entry-limitation was anticipated as a probable standard of practice, since entry-limitation had been supported in the literature for the last two decades (Ari et al., 2008; Gardenhire, 2001; Gardner & Vines, 2005; Johnson, 2002; Shelledy et al., 1999; Shelledy et al, 2001; Standridge et al., 1997; Vines et al., 2000; Wittnebel, Murphy, & Vines, 2008). There are many entry-limitation tools reportedly in use across both the top and bottom thirds of the population. These screening tools may be fee-based or free; presence of fees may restrict use by certain institutions.

Programs in both the top and bottom thirds recounted the use of various creative screening maneuvers not listed on the survey. Due to the amount of input contributed by PDs in the top third, it appeared that multiple and creative efforts to ensure student suitability may have impacted credentialing success.

Only half of the programs in both thirds had confidence that screening techniques were reliable indicators of future programmatic success. Possible explanations included

the fact that board exam success has been historically elusive and difficult to predict at the beginning of a student's tenure in a respiratory program. Also, the need for screening may have fluctuated from year to year and between varying applicant pools, causing PDs to question the utility of efforts to screen incoming students.

Full-time faculty numbers. Shelledy et al. (2001) reported a link between the number of full-time faculty and exam pass rates; the current study also reported more programs in the top third with greater numbers of full-time faculty members than programs in the bottom third. This finding requires further investigation as the number of faculty members may be indicative of the size or stability of the program and not a reliable indicator of credentialing success. Further, some programs in both top and bottom thirds reported only one full-time faculty member. This was an unanticipated finding and may be a symptom of programmatic difficulty or a transitional period for the program.

The numbers of full-time faculty per program are likely to vary with the size of the program and available financial resources. Although a maximum number is not specified by CoARC, there is a minimum. According to CoARC Standard 2.03 for Key Program Personnel, "The sponsoring institution must appoint, at a minimum, a full-time Program Director, a full-time Director of Clinical Education, and a Medical Director" (Commission on Accreditation for Respiratory Care, 2011b, p. 15). The exception to maintaining the requisite minimum of two educators would occur when a program is between key personnel, as CoARC has a provision for temporary part-time personnel to fill the gap (Commission on Accreditation for Respiratory Care, 2011h, p. 41).

Full-time faculty advanced degrees and degrees in education. The composition of the full-time faculty did not demonstrate a difference between the top and bottom thirds. Although Shelledy et al. (2001) described a correlation between successful programs and programs where the PD held a master's or doctoral degree, all key personnel (not specifically the PDs) were evaluated in the current study. With that qualification, there were no compelling differences regarding presence of advanced degrees in education between the top and bottom thirds. An educator who is trained in the art of education may complement the faculty mix, but it is not mandated by CoARC. In fact, according to CoARC Standard 2.16, "instructors must be appropriately credentialed for the content areas they teach, knowledgeable in subject matter through training and experience, and effective in teaching their assigned subjects" (Commission on Accreditation for Respiratory Care, 2011b, p. 18).

Part-time faculty numbers. The numbers of part-time faculty ranged from one to 23; at first glance, this variation may have been attributed to the size of the program, financial resources, or seasonal/annual fluctuations. More likely was the fact that reported numbers of part-time faculty included the sum of both classroom and clinical instructors since there was no mechanism provided for differentiating between teaching faculty and clinical faculty. Overall, results were inconclusive regarding roles of part-time faculty numbers and deemed non-contributory to programmatic success or failure. Composition of part-time faculty degrees was not evaluated.

Pedagogy. Although pedagogical choices offered to program directors via survey instrument were limited, the majority of programs reported enhancing their curricula with alternate scholarly activities. To supplement the researcher-suggested list, PDs supplied

qualitative descriptions of alternate forms of pedagogy. By sheer number of qualitative submissions, it appeared that the programs in the top third were more robust in their efforts to communicate the breadth of these activities. This may reflect higher motivation during survey participation or genuine attempts to express the use of alternate methodologies to help students understand material and relate to content. Further investigation may discern relationships between the incorporation of multiple pedagogies and programmatic outcomes.

Teacher-to-student ratios in didactic and laboratory courses. The large variability reported in the ranges of teacher-to-student ratios in both didactic and laboratory courses supported the findings of Ari (2006a). No patterns emerged suggesting linkages with programmatic outcomes.

Clinical hours, laboratory hours, and simulator hours (CRT and RRT). There was a diminishing response rate by this point in the survey, making patterns more difficult to visualize. The numbers of reported hours in all categories did not demonstrate substantial variation between the top and bottom thirds of the contributing population. Also, there were few variations between hours ascribed to CRT and RRT graduates in all three areas.

One of the problems in asking for survey responses regarding applicable hours is a possible blurring of the boundaries between clinical placements, laboratory practice, and simulation practice. Hours in these categories are not mandated by CoARC, nor are they specifically defined. As some of the programs reported questionably low hours in multiple categories, the lack of definition may have interjected unintentional reporting error.

An example of reporting error may have occurred when relating the time spent practicing with human patient simulators; this reported time component may have overlapped with laboratory hours or may have physically taken place at a clinical facility. Further confusion may have been related to the lack of definition separating mannequins from human actors. It is remarkable that many programs claimed no interaction with human simulators; even among the successful programs in the top third, 20% of respondents reported no exposure. This may be a result of the respondents' assumption that human simulators were strictly defined as mannequins. In the broader sense, a human simulator could be construed as a student-actor; taken from this vantage, more programs may have replied in the affirmative. Further investigation is warranted to assess the contribution of the clinical assignment, laboratory practice, and simulation practice.

Hiring practices. Although the majority of the surveyed programs reported that new graduates could be hired in their locale, the few qualitative statements submitted hinted at a less optimistic attitude. Further investigation is warranted to assess the impact of economic changes on the maintenance and viability of programs in specific geographic pockets.

Overall, few patterns have emerged linking curricular components to outcomes; this finding supported conclusions previously drawn by Johnson (2002). Although standardization of these components may bolster consistency (Ari, 2006a), results of this study demonstrated that inconsistencies do not necessarily predicate failure.

Research question three. Reports of cumulative board exam scores for new candidates have the potential to be particularly telling about strength of programs in

specific scholarly areas. In ideal design, the domains suggested by the NBRC align with curricular content; therefore, the scores are preordained to be revelatory.

In this study, aggregate scores revealed gaps between the performance in the top and bottom thirds of the sampled population. This may have been a consequence of enhanced understanding of the particular content by the programs in the upper third or inferior understanding by the programs in the lower third. In either case, the gap permitted visualization of areas of divergence in the curricular content and a focus for remediation.

This information could be particularly useful to programs planning curricular remediation for improved outcomes. The summative comparison of an individual program's strengths to the strengths of average high-performing programs clearly has the ability to delineate where improvement efforts should be focused. Specifically, the order in which change should be implemented may be discerned by assessing the scores with the greatest disparities. Alternatively, in a broader view, the cumulative scores from domains one (1TOT), two (2TOT), and three (3TOT) may be appraised. From this perspective, conceptual areas with the curriculum may be targeted for reevaluation.

Limitations of the Study

As expressed in Chapter 1, this study had several anticipated limitations: data management, survey response rate, and desire for anonymity. If any data management occurred, it could not be identified. Regarding survey response rate, 111 out of 239 surveys (46%) were returned. Of those 111, not all surveys were 100% complete. Occasional responses were omitted and not all PDs chose to access the NBRC database to complete the final section of the survey that requested alignment indicators (see Tables

27 and 28). The detrimental effects produced by missing data may be particularly challenging in the context of survey research due to the number of responses and respondents involved (Raaijmakers, 1999). However, this limitation did not restrict the purpose of this study or minimize the findings.

In the top third of the survey population, 82 out of 161 programs (51%) returned the survey; 63 out of the 82 (77%) were complete. In the bottom third, 29 out of 78 surveys (37%) were returned; 16 out of 29 were complete (55%). The rate of completion between top and bottom thirds was comparable. The lack of completion may be attributed to the perceived time out-lay to perform the requisite steps, as indicated by the pilot response comment, "I don't have time to try and figure this last page out. Too much detail..." Even though this pilot participant was overwhelmed by the survey instrument, it is likely that many were of another opinion. For example, an anonymous program director from Kansas notified the researcher to compliment the ease with which the survey was completed stating that it took less than the quoted time to finish.

Table 27

Distribution of Survey Completion in Programs Surveyed from Top Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not finished	19	23.2	23.2	23.2
	Finished	63	76.8	76.8	100.0
	Total	82	100.0	100.0	

Table 28

Distribution of Survey Completion in Programs Surveyed from Bottom Third

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not finished	13	44.8	44.8	44.8
	Finished	16	55.2	55.2	100.0
	Total	29	100.0	100.0	

The response rate was more of a limitation than expected. Recognizing the excessive workload of the average program director, it is possible that the survey was left unopened in the e-mail inbox because it had the appearance that it would take longer than 15 minutes. It is also possible that the PD had received other requests for survey completion during the same time period, and had made a conscious decision to allocate time expenditure to priorities or even routine demands rather than this survey.

It is difficult to discern if some PDs did not respond because of a concern about anonymity, as the use of the outside agency likely provided a significant amount of security. The fact that 46% of the recipients submitted the survey implies willingness to assist with this information-gathering endeavor. With only 79 out of 111 (71%) of respondents completing the final two survey items, there is a greater implication that the projected time loss to gather information from the NBRC website may have prevented completion rather than fear of having score totals revealed.

Finally, and unfortunately for the current investigation, the NBRC updated its computer programming between 2009 and 2011; this change created a barrier to utilizing the ideal date range of 2009 through 2011 for data capture. Adjusting for this unforeseen complication, the best dates from which to capture data became July 10, 2009 through June 30, 2011 for the CRT scores and January 1, 2010 through June 30, 2011 for the RRT scores. The scores were reported as totals, subtotals, and within subcategories referenced by numbers and letters (Table 1) corresponding with categories on the *Summary Content Outline for CRT and Written RRT Examinations* (National Board for Respiratory Care, 2011a).

Recommendations for Future Research

It is hoped that the data and information will initiate a framework for future research efforts that will incorporate the following recommendations:

- Data: Use standardized data from NBRC or CoARC to eliminate low response rates, question ambiguity, interpretation errors, and reporting errors.
- Survey format: Design survey with scaled questions. Use of Likert Scales would facilitate grading of questions to tease out results (for example, how much did a particular pedagogy impact your curriculum?) and enable advanced descriptive analyses.
- Design: Mixed-method may be recommended, as the qualitative statements were revelatory.
- Timing: Re-evaluate existing data when a full three-year reporting cycle may be captured on the NBRC website and compare to Programmatic Outcomes Data released after the conclusion of a reporting cycle.
- Perform geographic analysis of program demographics and hiring practices to expose geographic anomalies and/or locations of top-performing programs.
- What is the average ranking of high schools supplying students to the program? What is the degree of impact of those high schools?
- Survey programs to clarify definitions of clinical assignments, laboratory practice, and simulation practice.

- Do simulation centers utilize filming and debriefing as part of the documented simulation practice? To what degree?
- At what point in training do students begin clinical site exposure? At what point are students exposed to concepts of mechanical ventilation or blood gas analysis?
- During laboratory or simulation practice, how many programs utilize the assessment techniques of debriefing or *think-aloud*?
- Are students purposefully taught study techniques as part of program requirements (reading skills, highlighting, self-remediation, or work book practice)?
- What metric or assessment tool is used to determine when taught content has been learned? To what extent are these measurements utilized?
- What are appropriate screening methods for critical thinking abilities? To what extent are these methods utilized?
- How intentional is the instructional methodology? What is the degree to which various pedagogies are incorporated in the curriculum?
- Using Bloom's taxonomy, describe the level of pedagogy. To what degree are students encouraged to take learning to the analysis and synthesis levels?
- What is the extent of the difference between intended and enacted (perceived) curricula at for-profit and not-for-profit schools?

Conclusions

In the field of respiratory therapy education some schools experience more credentialing success than others, as evidenced by the recent publication of Programmatic Outcomes. According to French sociologist, Pierre Bourdieu, as knowledge of this document becomes widespread, a modification of position-takings within the educational hierarchy is likely to occur and prestige will be bestowed on institutions most deserving of preeminence. Accompanying prestige will be the resources (capital) of students, clinical sites, faculty with advanced degrees, and financial advantage.

Bourdieu's theories on social reform in higher education may be extrapolated to the field of respiratory therapy as a playing field where competitors vie for optimal positions. Dominant and subordinate positions have been assumed over many decades within the RT hierarchy, based on presumed possession of resources. As a consequence of pre-established positions, the habitus of each program has reproduced a sub-culture affecting quality of program outputs (Naidoo, 2004) and attitudes of students (Brosnan, 2010).

As with the French universities studied by Bourdieu, some programs have focused on academic successes while others have aligned with the commercial sector (Brosnan, 2010). An aggressive player on the field has been the for-profit RT program. The for-profit programs attract pragmatic and career-oriented students (Maton, 2005); these programs may have priorities and values that contrast with the more traditional institutions (Brosnan, 2010). Especially during times of economic uncertainty, students may select a school touting rapid entry into the workforce rather than one espousing an attitude of knowledge for knowledge's sake and life-long learning (Maton, 2005).

Unfortunately, in a technologically-based field that fosters a high-level of critical thinking, these programs may not produce graduates capable of mastering the rigorous board exams.

The publication of the programmatic outcomes permits a ranking that equates to cultural capital; schools may be publicly identified as producing the correct form of knowledge for field-related success (Brosnan, 2010). The position within the ranking, for example top third versus bottom third of the population, should equate to a position of influence yielding tangible and intangible rewards; there would also be an accompanying responsibility to impart aptitude in exchange for payment and required level of effort (Naidoo & Jamieson, 2005). The programs identified with the cultural capital are burdened with additional field-related responsibilities: they are postured to impose their *doxa* or perceptions of rules of the game, definitions of capital, and boundaries of the field (Kloot, 2009). These programs, then, would be encouraged (if not obligated) to participate in networking and collegial sharing of descriptors of success.

This study attempted to identify characteristics of successful programs with an expectation that programs are *doing* something or are structured in a manner that is conducive of success. However, exemplary traits may be indescribable and related to the program sub-culture (as suggested by Bourdieu). Brosnan (2010) suggested that students are molded by the schools' position and play on the field and model their expectations after the sub-culture. To be successful, the sub-culture must be one of high-quality learning, "based on intrinsic and hard to measure factors such as commitment, professional responsibility, empathy and knowledge and enthusiasm for the subject" (Naidoo & Jamieson, 2005, p. 272). This culture of excellence nurtures an educational

doxa that reproduces over time but may be difficult to insert into a formula for success to pass onto other programs due to the intangible nature.

Appendix A

Exam Matrix

Summary Content Outline for CRT and Written RRT Examinations A "C" code shows tasks and cognitive levels included on the CRT examination. An "R" code shows tasks and cognitive levels included on the Written RRT examination. New tasks are shown in *italics*.	Task #	Cognitive Level			Totals
		Recall	Application	Analysis	
I. PATIENT DATA EVALUATION AND RECOMMENDATIONS		**15**	**21**	**18**	**54**
A. Review Data in the Patient Record		**5**	**4**	**0**	**9**
1. Patient history e.g., • present illness • progress notes • admission notes • diagnoses • respiratory care orders • DNR status • medication history • patient education (previous)	1.	**C**	**R**		
2. Physical examination relative to the cardiopulmonary system e.g., vital signs, physical findings	2.	**C**	**R**		
3. Laboratory data e.g., • CBC • culture and sensitivities • electrolytes • sputum Gram stain • coagulation studies	3.	**C**	**R**		
4. Pulmonary function results	4.	**C**	**R**		
5. Blood gas results	5.	**C**	**R**		
6. Imaging studies e.g., • radiograph • MRI • CT	6.	**C**	**R**		
7. Monitoring data					
a. *fluid balance*	7.	**C**	**R**		
b. pulmonary mechanics e.g., maximum inspiratory pressure, vital capacity	8.	**C**	**R**		
c. respiratory e.g., • rate • I:E • tidal and minute volume	9.	**C**	**R**		
d. pulmonary compliance, airways resistance, work of breathing	10.	**C**	**R**		
e. noninvasive e.g., • pulse oximetry • capnography • V_D/V_T • transcutaneous O_2 / CO_2	11.	**C**	**R**		
8. Cardiac monitoring					
a. *ECG data results e.g., heart rate, rhythm*	12.	**C**	**R**		
b. *hemodynamic monitoring results e.g.,* • *blood pressure* • *PA pressure* • *CVP* • *cardiac output / index*	13.	**C**	**R**		
9. Maternal and perinatal / neonatal history and data • Apgar scores • L / S ratio • gestational age	14.	**C**	**R**		
10. *Sleep study results e.g., diagnosis, treatment*	15.	**R**	**R**		

Summary Content Outline for CRT and Written RRT Examinations

A "C" code shows tasks and cognitive levels included on the CRT examination.
An "R" code shows tasks and cognitive levels included on the Written RRT examination.
New tasks are shown in *italics*.

	Task #	Cognitive Level			Totals
		Recall	Application	Analysis	
B. Collect and Evaluate Additional Pertinent Clinical Information		**8**	**13**	**15**	**36**
1. Assess a patient's overall cardiopulmonary status by **inspection** to determine					
a. general appearance e.g., • venous distention • edema • accessory muscle activity • chest wall movement • diaphoresis • clubbing • cyanosis • breathing pattern	16.	**C**	**C**	**R**	
b. *airway assessment e.g., macroglossia, neck range of motion*	17.	**C**	**C**	**R**	
c. cough, sputum amount and character	18.	**C**	**C**	**R**	
d. Apgar score, gestational age, transillumination of chest	19.	**C**	**R**	**R**	
2. Assess a patient's overall cardiopulmonary status by **palpation** to determine					
a. pulse, rhythm, force	20.	**C**	**C**	**R**	
b. asymmetrical chest movements, tactile fremitus, crepitus, tenderness, secretions in the airway, and tracheal deviation	21.	**C**	**C**	**R**	
3. Assess a patient's overall cardiopulmonary status by **percussion**	22.	**C**	**C**	**R**	
4. Assess a patient's overall cardiopulmonary status by **auscultation** to determine presence of					
a. breath sounds	23.	**C**	**C**	**R**	
b. heart sounds and rhythm	24.	**C**	**C**	**R**	
c. blood pressure	25.	**C**	**C**	**R**	
5. Interview a patient to determine					
a. level of consciousness and orientation, emotional state, and ability to cooperate	26.	**C**	**C**	**R**	
b. level of pain	27.	**C**	**C**	**R**	
c. presence of dyspnea, sputum production, and exercise tolerance	28.	**C**	**C**	**R**	
d. *nutritional status*	29.	**C**			
e. social history e.g., smoking, substance abuse	30.	**C**	**R**		
f. advance directives e.g., DNR status	31.	**C**	**R**	**R**	
6. Assess a patient's learning needs	32.	**C**	**C**	**R**	
7. Review a chest radiograph to determine					
a. quality of imaging e.g., patient positioning, exposure	33.	**R**	**R**	**R**	
b. position of endotracheal or tracheostomy tube	34.	**C**	**C**	**R**	
c. presence of, or change in, cardiopulmonary abnormalities e.g., • pneumothorax • consolidation • pleural fluid • pulmonary edema	35.	**C**	**C**	**C**	
d. position of indwelling tubes and catheters	36.	**C**	**C**	**R**	
e. presence of foreign bodies	37.	**C**	**C**	**R**	
f. position of or change in hemidiaphragms or mediastinum	38.	**C**	**C**	**R**	
8. *Review lateral neck radiographs e.g., epiglottitis, foreign body*	39.	**C**	**C**	**R**	
9. Perform procedures					
a. 12-lead ECG	40.	**C**	**R**	**R**	
b. transcutaneous monitoring	41.	**C**	**R**	**R**	
c. pulse oximetry and capnography	42.	**C**	**R**	**R**	

Summary Content Outline for CRT and Written RRT Examinations

A "C" code shows tasks and cognitive levels included on the CRT examination.
An "R" code shows tasks and cognitive levels included on the Written RRT examination.
New tasks are shown in *italics*.

	Task #	Cognitive Level: Recall	Application	Analysis	Totals
d. tidal volume, minute volume, vital capacity, and peak flow measurements	43.	C	R	R	
e. bedside spirometry e.g., FVC, FEV_1	44.	C	R	R	
f. arterial sampling - percutaneous or line	45.	C	C	R	
g. *arterialized capillary blood sampling*	46.	C	C	R	
h. *timed walk test e.g., 6-minute*	47.	C	R	R	
i. *oxygen titration with exercise*	48.	C	C	R	
j. blood gas / hemoximetry analysis	49.	C	C	R	
k. *exhaled nitric oxide*	50.	R	R		
l. *cardiopulmonary calculations e.g., P(A-a)O_2, V_D / V_T*	51.	C	C		
m. *hemodynamic monitoring e.g., blood pressure, CVP*	52.	C	C	R	
n. lung mechanics e.g., • plateau pressure • airways resistance • MIP • compliance • MEP	53.	C	C	R	
o. ventilator graphics e.g., pressure / volume loop	54.	R	R	R	
p. apnea monitoring	55.	C	C	R	
q. overnight pulse oximetry	56.	C	R	R	
r. tracheal tube cuff pressure and / or volume	57.	C	C	R	
s. *arterial line insertion*	58.	C	C	R	
t. *stress testing e.g., ECG, pulse oximetry*	59.	C	C	R	
u. pulmonary function laboratory studies	60.	C	C	R	
v. *CPAP / BIPAP titration during sleep*	61.	C	C	R	
w. auto-PEEP detection	62.	R	R	R	
10. Interpret procedure results including					
a. *12-lead ECG e.g.,* • *rate* • *artifacts* • *irregular rhythm*	63.	C	C	R	
b. transcutaneous monitoring	64.	C	C	R	
c. pulse oximetry and capnography	65.	C	C	R	
d. tidal volume, minute volume, vital capacity, and peak flow measurements	66.	C	C	R	
e. bedside spirometry e.g., FVC, FEV_1	67.	C	C	R	
f. *arterial sampling - percutaneous or line*	68.	C	C	R	
g. *arterialized capillary blood sampling*	69.	C	C	R	
h. *timed walk test e.g., 6-minute*	70.	C	C	R	
i. *oxygen titration with exercise*	71.	C	C	R	
j. blood gas / hemoximetry analysis	72.	C	C	R	
k. *exhaled nitric oxide*	73.	R	R	R	
l. *cardiopulmonary calculations e.g., P(A-a)O_2, V_D / V_T*	74.	C	C	R	
m. *hemodynamic monitoring e.g., blood pressure, CVP*	75.	C	C	R	
n. lung mechanics e.g., • plateau pressure • MEP • MIP	76.	C	C	R	
o. ventilator graphics e.g., pressure/volume loop	77.	R	R	R	
p. apnea monitoring	78.	C	C	R	

Summary Content Outline for CRT and Written RRT Examinations

A "C" code shows tasks and cognitive levels included on the CRT examination.
An "R" code shows tasks and cognitive levels included on the Written RRT examination.
New tasks are shown in *italics*.

	Task #	Cognitive Level: Recall	Application	Analysis	Totals
q. overnight pulse oximetry	79.	C	C	R	
r. tracheal tube cuff pressure and/or volume	80.	C	C	R	
s. *arterial line insertion*	81.	C	C	R	
t. *stress testing e.g., ECG, pulse oximetry*	82.	C	C	R	
u. pulmonary function laboratory studies	83.	C	C	R	
v. *CPAP / BIPAP titration during sleep*	84.	C	C	R	
w. auto-PEEP detection	85.	R	R	R	
C. Recommend Procedures to Obtain Additional Data		**2**	**4**	**3**	**9**
1. *Blood tests e.g., hemoglobin, potassium*	86.	R	R	R	
2. Radiographic and other imaging studies	87.	C	C	R	
3. *Diagnostic bronchoscopy e.g., evaluate hemoptysis, atelectasis*	88.	C	C	R	
4. *Sputum Gram stain, culture and sensitivities e.g., pneumonia*	89.	C	C	R	
5. *Bronchoalveolar lavage (BAL)*	90.	C	C	R	
6. *Pulmonary function testing*	91.	C	C	R	
7. Lung mechanics e.g., compliance, airways resistance	92.	C	C	R	
8. Blood gas analysis, pulse oximetry, and transcutaneous monitoring	93.	C	C	R	
9. *ECG*	94.	C	C	R	
10. Capnography	95.	C	C	R	
11. *Hemodynamic monitoring e.g., blood pressure, CVP*	96.	C	C	R	
12. *Insertion of monitoring catheters e.g., arterial*	97.	R	R	R	
13. *Sleep studies*	98.	C	C	R	
14. *Thoracentesis e.g., pleural effusion*	99.	R	R	R	
II. EQUIPMENT MANIPULATION, INFECTION CONTROL, AND QUALITY CONTROL		**7**	**17**	**17**	**41**
A. Manipulate Equipment by Order or Protocol		**6**	**12**	**12**	**30**
1. Oxygen administration devices					
a. low-flow devices e.g., nasal cannula	100.	C	C	C	
b. high-flow devices e.g., air entrainment mask	101.	C	C	C	
c. high-flow nasal cannula	102.	C	C	C	
2. CPAP devices – mask, nasal, or bi-level	103.	C	C	R	
3. Humidifiers	104.	C	C	C	
4. Nebulizers	105.	C	C	C	
5. Resuscitation devices e.g., manual resuscitator (bag-valve), mouth-to-valve mask resuscitator	106.	C	C	C	
6. Ventilators					
a. pneumatic, electric, fluidic, and microprocessor	107.	C	C	R	
b. noninvasive positive pressure	108.	C	C	R	
c. high frequency	109.	R	R		
7. Artificial airways					
a. oro- and nasopharyngeal airways	110.	C	C	C	
b. endotracheal tubes	111.	C	C	C	
c. tracheostomy tubes and devices	112.	C	C	C	
d. speaking tubes and valves	113.	C	C	C	
e. intubation equipment	114.	C	C	C	
f. laryngeal mask airway (LMA)	115.	C	C	R	
g. esophageal-tracheal Combitube®	116.	C	C	R	

Summary Content Outline for CRT and Written RRT Examinations

A "C" code shows tasks and cognitive levels included on the CRT examination.
An "R" code shows tasks and cognitive levels included on the Written RRT examination.
New tasks are shown in *italics*.

	Task #	Cognitive Level: Recall	Application	Analysis	Totals
8. Suctioning devices	117.	C	C	C	
9. Gas delivery, metering, and clinical analyzing devices					
a. gas cylinders, regulators, reducing valves, connectors and flowmeters, and air / oxygen blenders	118.	C	C	C	
b. *oxygen conserving devices e.g., reservoir cannula, pulse-dose*	119.	C	C	C	
c. oxygen concentrators,	120.	C	C	R	
d. *portable liquid oxygen systems*	121.	R	R	R	
e. portable oxygen concentrators	122.	R	R	R	
f. air compressors	123.	C	C	R	
10. Point-of-care analyzers e.g., blood gas, electrolytes	124.	C	C	R	
11. Patient breathing circuits					
a. continuous mechanical ventilation	125.	C	C	C	
b. IPPB	126.	C	C	C	
c. CPAP and PEEP valve assemblies	127.	C	C	C	
d. non-invasive ventilation	128.	C	C	C	
12. Environmental devices					
a. incubators	129.	R	R		
b. aerosol (mist) tents	130.	C	C		
c. oxygen hoods	131.	C	C		
13. Incentive breathing devices	132.	C	C	C	
14. Airway clearance devices					
a. percussors and vibrators	133.	C	C	C	
b. high frequency chest wall oscillation	134.	R	R		
c. positive expiratory pressure (PEP) devices	135.	C	C	C	
d. vibratory PEP devices	136.	C	C	C	
15. He / O_2	137.	R	R	R	
16. Manometers e.g., aneroid, digital, water	138.	C	C	C	
17. Respirometers e.g., flow-sensing devices	139.	C	C	C	
18. *ECG monitors*	140.	C	C		
19. ECG machines (12-lead)	141.	C	C		
20. Hemodynamic monitoring devices					
a. *pressure transducers*	142.	R	R	R	
b. *catheters e.g., arterial, pulmonary artery*	143.	R	R	R	
21. Vacuum systems e.g., • pumps • regulators • collection bottles • pleural drainage devices	144.	C	C	C	
22. Oximetry monitoring devices e.g., pulse oximeter, transcutaneous	145.	C	C	C	
23. Metered dose inhalers (MDI) and MDI spacers	146.	C	C	C	
24. Dry powder inhalers	147.	C	C	C	
25. Bedside screening spirometers	148.	C	C	C	
26. CO, He, O_2 and specialty gas analyzers	149.	C	C	R	
27. Bronchoscopes	150.	C	R	R	

Summary Content Outline for CRT and Written RRT Examinations

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New tasks are shown in *italics*.

	Task #	Cognitive Level: Recall	Application	Analysis	Totals
B. Ensure Infection Control		**0**	**2**	**3**	**5**
1. Assure cleanliness of equipment by • selecting or determining appropriate agent and technique for disinfection and/or sterilization • performing procedures for disinfection and/or sterilization • monitoring effectiveness of sterilization procedures	151.		**C**	**C**	
2. Assure proper handling of biohazardous materials	152.		**C**	**R**	
3. *Incorporate ventilator-associated pneumonia protocol*	153.		**C**	**R**	
4. *Implement infectious disease protocols e.g.,* • *avian flu* • *transmission prevention* • *SARS*	154.		**C**	**R**	
5. *Adhere to infection control policies and procedures e.g., Standard Precautions*	155.		**C**	**R**	
C. Perform Quality Control Procedures For		**1**	**3**	**2**	**6**
1. Blood gas analyzers, co-oximeters	156.	**C**	**C**	**R**	
2. Gas analyzers	157.	**C**	**C**	**R**	
3. *Point-of-care analyzers*	158.	**C**	**C**	**R**	
4. Pulmonary function equipment	159.	**C**	**C**	**R**	
5. Mechanical ventilators	160.	**C**	**C**	**R**	
6. Gas metering devices e.g., flowmeter	161.	**C**	**C**	**R**	
7. Noninvasive monitors e.g., transcutaneous	162.	**C**	**C**	**R**	
8. Record and monitor QC data using accepted statistical methods	163.	**C**	**C**	**R**	
III. INITIATION AND MODIFICATION OF THERAPEUTIC PROCEDURES		**19**	**51**	**75**	**145**
A. Maintain Records and Communicate Information		**2**	**4**	**3**	**9**
1. Record therapy and results using conventional terminology as required in the health care setting and/or by regulatory agencies					
a. specify therapy administered, date, time, frequency of therapy, medication, and ventilatory data	164.	**C**	**R**		
b. note and interpret patient's response to therapy					
1) effects of therapy, adverse reactions, patient's subjective and objective response to therapy	165.	**C**	**C**	**R**	
2) verify computations and note erroneous data	166.	**C**	**C**	**R**	
3) auscultatory findings, cough and sputum production and characteristics	167.	**C**	**C**	**R**	
4) vital signs	168.	**C**	**C**	**R**	
5) pulse oximetry, heart rhythm, capnography	169.	**C**	**C**	**R**	
2. Communicate information					
a. regarding patient's clinical status to appropriate members of the health care team	170.	**C**	**C**	**R**	
b. relevant to coordinating patient care and discharge planning	171.	**C**	**C**	**R**	
3. *Accept and verify patient care orders*	172.	**C**	**R**	**R**	
4. Apply computer technology to					
a. document patient management	173.	**C**	**C**		
b. monitor workload assignments	174.	**C**	**C**		
c. *patient safety initiatives e.g., drug dispensing, order entry*	175.	**C**	**C**	**R**	

Summary Content Outline for CRT and Written RRT Examinations

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	Task #	Cognitive Level			Totals
		Recall	Application	Analysis	
5. Communicate results of therapy and alter therapy by protocol(s)	176.	C	C	R	
6. Explain planned therapy and goals to a patient in understandable terms to achieve optimal therapeutic outcome	177.	C	C	R	
7. Educate a patient and family concerning smoking cessation and health management	178.	C	C	R	
B. Maintain a Patent Airway Including the Care of Artificial Airways		**2**	**2**	**6**	**10**
1. Properly position a patient	179.	C	C	R	
2. Insert oro- and nasopharyngeal airways	180.	C	C	C	
3. Perform endotracheal intubation	181.	C	C	R	
4. Maintain position in the airway and appropriate cuff inflation of					
a. LMA	182.	C	C	R	
b. esophageal-tracheal Combitube®	183.	C	C	R	
c. endotracheal tube	184.	C	C	R	
d. tracheostomy tube	185.	C	C	R	
5. Assess tube placement	186.	C	C	C	
6. *Perform tracheostomy care*	187.	C	C	C	
7. *Change tracheostomy tubes*	188.	C	C	C	
8. Maintain adequate humidification	189.	C	C	C	
9. Perform extubation	190.	C	C	R	
C. Remove Bronchopulmonary Secretions		**1**	**3**	**3**	**7**
1. Perform					
a. postural drainage, percussion, or vibration	191.	C	C	R	
b. nasotracheal suctioning	192.	C	C	R	
c. oropharyngeal suctioning	193.	C	C	R	
d. *airway clearance using mechanical devices e.g., high frequency chest wall oscillation, vibratory PEP*	194.	C	C	R	
2. Suction artificial airways	195.	C	C	R	
3. Administer aerosol therapy with prescribed drugs	196.	C	C	R	
4. Instruct and encourage bronchopulmonary hygiene techniques	197.	C	C	R	
D. Achieve Adequate Respiratory Support		**2**	**5**	**6**	**13**
1. Instruct a patient in					
a. deep breathing and incentive spirometry techniques	198.	C	C	R	
b. inspiratory muscle training techniques	199.	C	C		
2. Initiate and adjust					
a. IPPB therapy	200.	C	C	R	
b. continuous mechanical ventilation settings	201.	C	C	R	
c. noninvasive ventilation	202.	C	C	R	
d. elevated baseline pressure e.g., CPAP, PEEP	203.	C	C	R	
3. Select ventilator graphics e.g., waveforms, scales	204.	C	C	R	
4. *Initiate and select appropriate settings for high frequency ventilation*	205.	C	C	R	
5. Administer medications					
a. aerosolized	206.	C	C	R	
b. dry powder preparations	207.	C	C	R	
c. *endotracheal instillation*	208.	C	C	R	
6. Administer oxygen	209.	C	C	C	
7. Initiate and modify weaning procedures	210.	C	C	R	

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	Task #	Cognitive Level: Recall	Application	Analysis	Totals
8. Position patient to minimize hypoxemia	211.	C	C	R	
9. Prevent procedure-associated hypoxemia e.g., oxygenate before and after suctioning and equipment changes	212.	C	C	C	
10. *Apply disease-specific ventilator protocols (e.g. ARDS-Net protocol)*	213.	C	C	R	
E. Evaluate and Monitor Patient's Objective and Subjective Responses to Respiratory Care		**3**	**7**	**14**	**24**
1. Recommend and review a chest radiograph	214.	C	C	R	
2. Obtain a blood gas sample					
a. by puncture	215.	C	C	R	
b. from an arterial or pulmonary artery catheter	216.	C	C	R	
c. from arterialized capillary blood	217.	C	C	R	
3. Perform					
a. *transcutaneous monitoring*	218.	C	C	R	
b. pulse oximetry	219.	C	C	C	
c. blood gas and hemoximetry analyses	220.	C	C	R	
d. capnography	221.	C	C	R	
e. *hemodynamic assessment*	222.	C	C	R	
4. Interpret results of					
a. blood gases	223.	C	C	C	
b. hemoximetry e.g., carboxyhemoglobin	224.	C	C	C	
c. *hemodynamics*	225.	C	C	R	
d. pulse oximetry	226.	C	C	C	
e. capnography	227.	C	C	R	
5. Observe for					
a. changes in sputum characteristics	228.	C	C	C	
b. signs of patient-ventilator dysynchrony	229.	C	C	R	
6. Measure and record vital signs, monitor cardiac rhythm, and evaluate fluid balance - intake and output	230.	C	C	R	
7. Perform and interpret results of pulmonary function testing					
a. spirometry	231.	C	C	R	
b. compliance and airways resistance	232.	C	C	R	
c. lung volumes	233.	C	C	R	
d. DLco	234.	C	C	R	
e. exercise	235.	C	C	R	
f. bronchoprovocation studies	236.	C	C	R	
8. *Recommend blood tests e.g., hemoglobin, potassium*	237.	C	C	R	
9. Monitor airway pressures, and adjust and check alarm systems	238.	C	C	C	
10. Measure F_IO_2 and/or oxygen flow	239.	C	C	C	
11. Auscultate the chest and interpret changes in breath sounds	240.	C	C	R	
F. INDEPENDENTLY MODIFY Therapeutic Procedures Based on the Patient's Response		**2**	**9**	**16**	**27**
1. Terminate treatment based on patient's response to therapy	241.	C	C	R	
2. Modify treatment techniques					
a. IPPB	242.	C	C	R	
b. incentive breathing devices	243.	C	C	R	

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	Task #	Cognitive Level: Recall	Application	Analysis	Totals
c. aerosol therapy					
1) modify patient breathing patterns	244.	C	C	C	
2) change type of equipment and change aerosol output	245.	C	C	C	
3) change dilution of medication	246.	C	C	C	
4) adjust temperature of the aerosol	247.	C	C	C	
d. oxygen therapy					
1) change mode of administration, flow, and F_IO_2	248.	C	C	C	
2) set up or change an O_2 blender	249.	C	C	C	
3) set up an O_2 concentrator or liquid O_2 system	250.	C	C		
e. specialty gas therapy e.g., He / O_2, NO					
1) change mode of administration	251.	C	C	R	
2) adjust flow or gas concentration	252.	C	C	R	
f. bronchial hygiene therapy					
1) alter patient position and duration of treatment and techniques	253.	C	C	C	
2) coordinate sequence of therapies e.g., • chest percussion • PEP • postural drainage	254.	C	C	C	
g. management of artificial airways					
1) reposition or change endotracheal or tracheostomy tube	255.	C	C	R	
2) change type of humidification equipment	256.	C	C	C	
3) initiate suctioning	257.	C	C	C	
4) inflate and / or deflate the cuff	258.	C	C	C	
5) perform tracheostomy care	259.	C	C	R	
h. suctioning					
1) alter frequency and duration of suctioning	260.	C	C	C	
2) change size and type of catheter	261.	C	C	C	
3) alter negative pressure	262.	C	C	C	
4) instill irrigating solutions	263.	C	C	C	
i. mechanical ventilation					
1) improve patient synchrony	264.	C	C	R	
2) enhance oxygenation	265.	C	C	R	
3) improve alveolar ventilation	266.	C	C	R	
4) adjust I : E settings	267.	C	C	R	
5) modify ventilator techniques	268.	C	C	R	
6) adjust noninvasive positive pressure ventilation	269.	C	C	R	
7) monitor and adjust alarm settings	270.	C	C	C	
8) adjust ventilator settings based on ventilator graphics	271.	C	C	R	
9) change type of ventilator	272.	C	C	R	
10) change patient breathing circuitry	273.	C	C	C	
11) alter mechanical dead space	274.	C	C	R	
12) initiate procedures for weaning	275.	C	C	R	

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	Task #	Cognitive Level: Recall	Application	Analysis	Totals
G. RECOMMEND Modifications in the Respiratory Care Plan Based on the Patient's Response		**3**	**11**	**17**	**31**
1. Recommend					
a. institution of bronchopulmonary hygiene procedures	276.	C	C	R	
b. *treatment of pneumothorax*	277.	C	C	R	
c. sedation and/or use of muscle relaxant(s)	278.	C	C	R	
d. *adjustment of fluid balance*	279.	C	C	R	
e. *adjustment of electrolyte therapy*	280.	C	C	R	
f. insertion or change of artificial airway	281.	C	C	R	
g. weaning from mechanical ventilation	282.	C	C	R	
h. extubation	283.	C	C	R	
i. discontinuing treatment based on patient response	284.	C	C	R	
2. Recommend changes in					
a. patient position	285.	C	C	R	
b. inhaled drug dosage or concentration	286.	C	C	R	
c. F_IO_2 and oxygen flow	287.	C	C	C	
3. Recommend changes in mechanical ventilation to					
a. improve patient synchrony	288.	C	C	R	
b. enhance oxygenation	289.	C	C	R	
c. improve alveolar ventilation	290.	C	C	R	
d. adjust I : E settings	291.	C	C	R	
e. modify ventilator techniques	292.	C	C	R	
f. adjust noninvasive positive pressure ventilation	293.	C	C	R	
g. monitor and adjust alarm settings	294.	C	C	C	
h. adjust ventilator settings based on ventilator graphics	295.	C	C	R	
i. change type of ventilator	296.	C	C	R	
j. change patient breathing circuitry	297.	C	C	C	
k. alter mechanical dead space	298.		R	R	
l. reduce auto-PEEP	299.	C	C	R	
m. reduce plateau pressure	300.	C	C	R	
4. Recommend pharmacologic interventions including use of					
a. bronchodilators	301.	C	C	C	
b. antiinflammatory drugs e.g., • leukotriene modifiers • cromolyn sodium • corticosteroids	302.	C	C	C	
c. mucolytics and proteolytics e.g., • acetylcysteine • hypertonic saline • RhDNAse	303.	C	C	C	
d. *cardiovascular drugs e.g., ACLS protocol agents*	304.	C	C	R	
e. *antimicrobials e.g., antibiotics*	305.	C	C	R	
f. sedatives	306.	C	C	R	
g. analgesics	307.	C	C	R	
h. *paralytic agents*	308.	C	C	R	
i. diuretics	309.	C	C	R	
j. surfactants	310.	C	C	R	
k. *vaccines e.g., pneumovax, influenza*	311.	C	R		

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	Task #	Cognitive Level: Recall	Application	Analysis	Totals
H. Determine the Appropriateness of the Prescribed Respiratory Care Plan and Recommend Modifications When Indicated by Data		**1**	**5**	**4**	**10**
1. Analyze available information to determine the pathophysiological state	312.	C	C	R	
2. Review					
a. planned therapy to establish therapeutic plan	313.	C	C	R	
b. interdisciplinary patient and family plan	314.	C	C	R	
3. Determine appropriateness of prescribed therapy and goals for identified pathophysiological state	315.	C	C	R	
4. Recommend changes in therapeutic plan when indicated	316.	C	C	R	
5. Perform respiratory care quality assurance	317.	C	C	R	
6. Develop					
a. quality improvement program	318.	C	R	R	
b. respiratory care protocols	319.	C	R	R	
7. Monitor outcomes of					
a. quality improvement programs	320.	C	R	R	
b. respiratory care protocols	321.	C	R	R	
8. Apply respiratory care protocols	322.	C	C	R	
9. Conduct health management education	323.		R	R	
I. Initiate, Conduct, or Modify Respiratory Care Techniques in an Emergency Setting		**1**	**2**	**3**	**6**
1. Treat cardiopulmonary emergencies according to					
a. BCLS	324.	C	C	C	
b. ACLS	325.	C	C	R	
c. Pediatric Advanced Life Support (PALS)	326.	C	C	R	
d. Neonatal Resuscitation Program (NRP)	327.	C	C	R	
2. Treat a tension pneumothorax	328.	C	C	R	
3. Participate in					
a. land / air patient transport	329.	C	R	R	
b. intra-hospital patient transport	330.	C	C	R	
c. disaster management	331.	C	R	R	
d. *medical emergency team (MET) e.g., rapid response team*	332.	C	R	R	
J. Act as an Assistant to the Physician Performing Special Procedures		**1**	**1**	**2**	**4**
1. *Intubation*	333.	C	C	R	
2. Bronchoscopy	334.	C	C	R	
3. *Thoracentesis*	335.	C	C	R	
4. Tracheostomy	336.	C	C	R	
5. *Chest tube insertion*	337.	C	C	R	
6. *Insertion of venous or arterial catheters*	338.			R	
7. *Moderate (conscious) sedation*	339.	C	C	R	
8. Cardioversion	340.	C	C	R	
9. *Ultrasound*	341.	C			

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	Task #	Cognitive Level			Totals
		Recall	Application	Analysis	
K. Initiate and Conduct Pulmonary Rehabilitation and Home Care		**1**	**2**	**1**	**4**
1. *Monitor and maintain home respiratory care equipment*	342.	**C**	**C**		
2. *Initiate and adjust apnea monitors*	343.		**R**		
3. Explain planned therapy and goals to a patient in understandable terms to achieve optimal therapeutic outcome	344.	**C**	**C**	**R**	
4. Educate a patient and family in health management	345.	**C**	**C**	**R**	
5. *Interact with a case manager*	346.	**C**	**C**	**R**	
6. Counsel a patient and family concerning smoking cessation	347.	**C**	**C**	**R**	
7. Instruct patient and family to assure safety and infection control	348.	**C**	**C**	**R**	
8. *Modify respiratory care procedures for use in home*	349.	**C**	**C**	**R**	
9. *Initiate treatment for sleep disorders e.g., CPAP*	350.		**R**	**R**	
TOTALS		**41**	**89**	**110**	**240**

Appendix B

Sample Report Available to Program Directors

PROGRAM NUMBER
Date Range: 08/01/2011 through 10/31/2011
Sample CRT School Score Report

Between 8/01/2011 and 10/31/2011

				1A	1B	1C	1TOT	2A	2B	2C	2TOT	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3TOT
				4.00	18.00	4.00	26.00	22.00	3.00	4.00	29.00	5.00	7.00	4.00	8.00	15.00	18.00	17.00	4.00	3.00	2.00	2.00	85.00
	Max. Possible Score:	99.00	140.00																				
	Min. Possible Score:	75.00	86.00																				
All Candidate Summary																							
	Average Score	81.86	101.43	2.71	14.29	3.14	20.14	16.43	2.00	2.29	20.71	4.29	4.86	2.43	5.43	10.71	12.86	12.43	2.86	2.00	1.14	1.57	60.57
	National Mean	76.76	89.95	2.60	11.63	2.72	16.95	14.33	1.86	2.37	18.57	3.28	4.47	2.32	4.80	9.26	11.80	11.32	2.65	1.87	1.41	1.26	54.43
	% of National Mean	107%	113%	104%	123%	115%	119%	115%	108%	97%	112%	131%	109%	105%	113%	116%	109%	110%	108%	107%	81%	125%	111%
Total 7 / Passing 7 / Failing 0	EL Program Mean	74.02	85.02	2.41	10.96	2.51	15.88	13.71	1.72	2.27	17.71	3.05	4.19	2.22	4.64	8.70	11.19	10.83	2.43	1.74	1.24	1.19	51.43
	% of EL Program Mean	111%	119%	112%	130%	125%	127%	120%	116%	101%	117%	141%	116%	109%	117%	123%	115%	115%	118%	115%	92%	132%	118%
	Adv. Program Mean	76.90	90.27	2.62	11.70	2.74	17.06	14.35	1.87	2.37	18.60	3.30	4.47	2.32	4.80	9.31	11.84	11.34	2.67	1.87	1.42	1.26	54.61
	% of Adv. Program Mean	106%	112%	103%	122%	115%	118%	114%	107%	97%	111%	130%	109%	105%	113%	115%	109%	110%	107%	107%	80%	125%	111%
New Candidate Summary																							
	Average Score	81.86	101.43	2.71	14.29	3.14	20.14	16.43	2.00	2.29	20.71	4.29	4.86	2.43	5.43	10.71	12.86	12.43	2.86	2.00	1.14	1.57	60.57
	National Mean	80.41	98.18	2.88	12.76	2.93	18.57	15.66	2.05	2.55	20.26	3.54	4.87	2.57	5.32	10.11	12.83	12.28	2.93	2.03	1.52	1.36	59.34
	% of National Mean	102%	103%	94%	112%	107%	108%	105%	98%	90%	102%	121%	100%	95%	102%	106%	100%	101%	98%	99%	75%	115%	102%
Total 7 / Passing 7 / Failing 0	EL Program Mean	78.69	94.31	2.70	12.19	2.70	17.59	15.23	1.96	2.49	19.69	3.37	4.66	2.53	5.23	9.65	12.36	11.90	2.74	1.92	1.37	1.30	57.03
	% of EL Program Mean	104%	108%	100%	117%	116%	114%	108%	102%	92%	105%	127%	104%	96%	104%	111%	104%	104%	104%	104%	83%	121%	106%
	Adv. Program Mean	80.53	98.44	2.90	12.80	2.95	18.64	15.69	2.05	2.55	20.29	3.55	4.88	2.57	5.33	10.14	12.86	12.30	2.95	2.03	1.53	1.37	59.50
	% of Adv. Program Mean	102%	103%	93%	112%	106%	108%	105%	98%	90%	102%	121%	100%	95%	102%	106%	100%	101%	97%	99%	75%	115%	102%
Repeat Candidate Summary																							
	Average Score	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	National Mean	66.91	76.85	2.16	9.90	2.39	14.45	12.17	1.57	2.08	15.83	2.89	3.80	1.91	3.96	7.94	10.15	9.77	2.21	1.61	1.23	1.10	46.58
	% of National Mean	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total 0 / Passing 0 / Failing 0	EL Program Mean	66.36	76.22	2.13	9.80	2.33	14.27	12.28	1.50	2.07	15.84	2.74	3.75	1.93	4.08	7.81	10.08	9.82	2.14	1.57	1.12	1.09	46.11
	% of EL Program Mean	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Adv. Program Mean	66.97	76.93	2.16	9.92	2.40	14.47	12.16	1.58	2.09	15.82	2.91	3.80	1.91	3.95	7.96	10.16	9.76	2.22	1.62	1.24	1.10	46.63
	% of Adv. Program Mean	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix C

Informed Consent

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

INFORMED CONSENT

Department of Teaching and Learning

TITLE OF STUDY: CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION: REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL

INVESTIGATOR(S): Dr. Howard R. D. Gordon, Principal Investigator

Karen L. Shaw, Assistant Investigator

CONTACT PHONE NUMBERS: 702-895-2729 or 702-327-7429

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to capsulize qualities of high-performing respiratory therapy programs through examination of individual curricular components and NBRC reported outcomes.

Participants
You are being asked to participate in the study because you are a Program Director of a CoARC Accredited Respiratory Therapy Program, open longer than years.

Procedures
If you volunteer to participate in this study, you will be asked to respond to survey questions and submit a transcription of the average scores that you have received from the NBRC on the CRT and WRE examinations, for a designated time period. This should take approximately 15 minutes.

Benefits of Participation
There are no direct benefits to you as a participant in this study. However, your input will contribute to knowledge about programmatic strengths as an indicator of credentialing success.

Risks of Participation
There are risks involved in all research studies; participation in this study may include only minimal or no risk beyond the outlay of time. However, if you feel uncomfortable with a question, you can skip that question or withdraw from the study altogether.

Cost /Compensation
There is no financial cost to you to participate in this study. The study will take approximately 15 minutes of your time; you will not be compensated for your time.

Participant Initials _____

Deemed exempt by the ORI-HS and/or the UNLV IRB. Protocol #1202-4072M
Exempt Date: 04-26-12

TITLE OF STUDY: **CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION: REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL**

Contact Information

If you have any questions or concerns about the study, you may contact Karen Shaw at702-327-7429**.** For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. We will NOT know your IP address when you respond to the Internet survey. Your program number will be coded by the Cannon Survey Center; your responses will be linked to the coded number to protect the confidentiality of your responses. Data will be summarized and reported in general categories; program-specific data will not be reported. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be shredded.

Participant Consent:

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

_____ _____

Signature of Participant Date

_____

Participant Name (Please Print)

Participant Initials _____

Deemed exempt by the ORI-HS and/or the UNLV IRB. Protocol #1202-4072M
Exempt Date: 04-26-12

Appendix D

Invitation E-Mails Sent By Cannon Survey Center

Invitation 1

Fellow Program Director,
As part of my doctoral dissertation in workforce education at the University of Nevada, I am asking you to complete the attached survey. By assessing program characteristics, I am hoping to capsulize attributes of the various respiratory therapy programs.
This valuable information may give insight into which programmatic attributes have the greatest impact on credentialing success. It is my goal to elucidate the most consistent formulae for credentialing success while maintaining anonymity of sensitive program data.
Because you have been randomly selected to pilot this survey, the final question asks for your input pertaining to comprehensibility of questions/ answer selection, ease of use, and time required for completion of the survey.
The full informed consent will be provided upon initiation of the survey. Please respond by Thursday, July 19th. Thank you for your participation.
Follow this link to take the survey:
Or copy and paste the URL below into your internet browser:
Thanks,
Karen Shaw
Program Director and Doctoral Candidate

Invitation 2

Fellow Program Director,
As part of my doctoral dissertation in workforce education at the University of Nevada, I am asking you to complete the attached survey. By assessing program characteristics, I am hoping to capsulize attributes of the various respiratory therapy programs.
This valuable information may give insight into which programmatic attributes have the greatest impact on credentialing success. It is my goal to elucidate the most consistent formulae for credentialing success while maintaining anonymity of sensitive program data.
Because you have been randomly selected to pilot this survey, the final question asks for your input pertaining to comprehensibility of questions/ answer selection, ease of use, and time required for completion of the survey.
The full informed consent will be provided upon initiation of the survey. Please respond by Thursday, July 19th. Thank you for your participation.
Follow this link to take the survey:
Or copy and paste the URL below into your internet browser:
Thanks,
Karen Shaw
Program Director and Doctoral Candidate

Invitation 3

Fellow Program Directors,

This is the anticipated survey that was discussed at the Summer Forum, regarding CRT/RRT credentialing success. Please take a few minutes out of your busy day to respond as quickly as possible; it will take a few extra minutes but the insight gained could help us, as a profession, understand why some programs are more successful than others!

If you are a director of more than one program or location, please note that you will receive this email more than once with unique links for you to reply on behalf of each program separately. Program names as an identifier will be removed from the data prior to analysis to maintain confidentiality. To access the survey for {INSTITUTION}, please click on the link below.
Follow this link to take the survey:
Or copy and paste the URL below into your internet browser:
Thanks,
Karen Shaw
Program Director and Doctoral Candidate

Reminder 1

Fellow Program Director,
As part of my doctoral dissertation in workforce education at the University of Nevada, I am asking you to complete the attached survey. By assessing program characteristics, I am hoping to capsulize attributes of the various respiratory therapy programs.
This valuable information may give insight into which programmatic attributes have the greatest impact on credentialing success. It is my goal to elucidate the most consistent formulae for credentialing success while maintaining anonymity of sensitive program data.
Because you have been randomly selected to pilot this survey, the final question asks for your input pertaining to comprehensibility of questions/ answer selection, ease of use, and time required for completion of the survey.
The full informed consent will be provided upon initiation of the survey. **The deadline for responses has been extended to next Thursday, July 26th, for those who may have attended the AARC Summer Forum in Santa Fe.** Thank you for your participation.
Follow this link to take the survey:
Or copy and paste the URL below into your internet browser:
Thanks,
Karen Shaw
Program Director and Doctoral Candidate

Reminder 2

Fellow Program Directors,

This is a gentle reminder to take this very important survey on CRT/RRT credentialing success before the quickly approaching deadline of Friday, September 28. If you have already opened this survey, you may reopen and pick up where you left off or start from the beginning. Please take a few minutes out of your busy day to respond as quickly as possible; it will take a few extra minutes but the insight gained could help us, as a profession, understand why some programs are more successful than others!

If you are a director of more than one program or location, please note that you will receive this email more than once with unique links for you to reply on behalf of each program separately. Program names as an identifier will be removed from the data prior to analysis to maintain confidentiality. To access the survey for {INSTITUTION}, please click on the link below.

Follow this link to take the survey:
Or copy and paste the URL below into your internet browser:
Thanks,
Karen Shaw
Program Director and Doctoral Candidate

Appendix E

Pilot Survey

INFORMED CONSENT
Department of Teaching and Learning
TITLE OF STUDY: CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION: REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL

INVESTIGATOR(S): Dr. Howard R. D. Gordon, Principal Investigator; Karen L. Shaw, Assistant Investigator
CONTACT PHONE NUMBERS: 702-895-2729 or 702-327-7429

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to capsulize qualities of high-performing respiratory therapy programs through examination of individual curricular components and NBRC reported outcomes.

Participants
You are being asked to participate in the study because you are a Program Director of a CoARC Accredited Respiratory Therapy Program, open longer than three years.

Procedures

If you volunteer to participate in this study, you will be asked to respond to survey questions and submit a transcription of the average scores that you have received from the NBRC on the CRT and WRE examinations, for a designated time period. This should take approximately 15 minutes.

Benefits of Participation
There are no direct benefits to you as a participant in this study. However, your input will contribute to knowledge about programmatic strengths as an indicator of credentialing success.

Risks of Participation
There are risks involved in all research studies; participation in this study may include only minimal or no risk beyond the outlay of time. However, if you feel uncomfortable with a question, you can skip that question or withdraw from the study altogether.

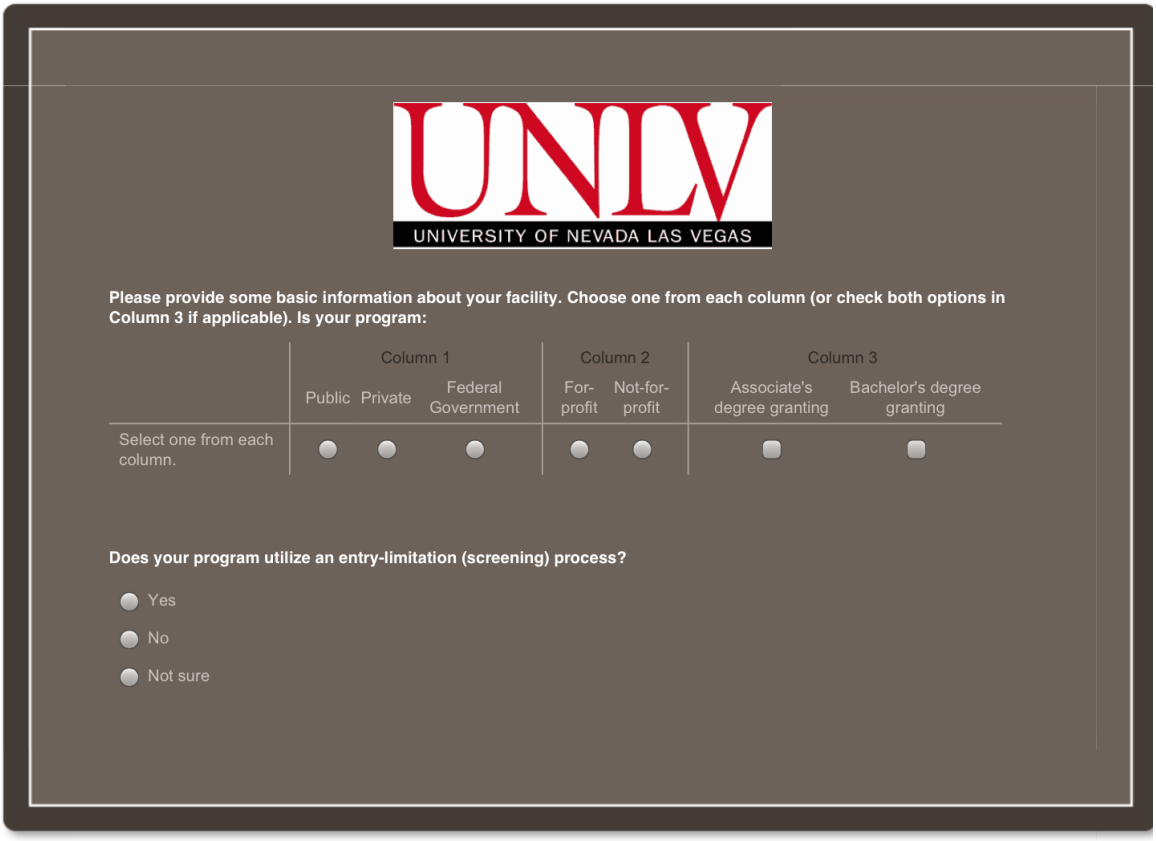
Cost /Compensation
There is no financial cost to you to participate in this study. The study will take approximately 15 minutes of your time; you will not be compensated for your time.

Contact Information
If you have any questions or concerns about the study, you may contact Karen Shaw at 702-327-7429. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. We will NOT know your IP address when you respond to the Internet survey. Your program number will be coded by the Cannon Survey Center; your responses will be linked to the coded number to protect the confidentiality of your responses. Data will be summarized and reported in general categories; program-specific data will not be reported. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be shredded.

Participant Consent:
By beginning the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.


UNLV
UNIVERSITY OF NEVADA LAS VEGAS
Please provide some basic information about your facility. Choose one from each column (or check both options in Column 3 if applicable). Is your program:
Column 1
Column 2
Column 3
Public
Private
Federal Government
For-profit
Not-for-profit
Associate's degree granting
Bachelor's degree granting
Select one from each column.
Does your program utilize an entry-limitation (screening) process?
Yes
No
Not sure
Survey Powered By Qualtrics
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UNIVERSITY OF NEVADA LAS VEGAS

In the following questions, please provide information about your respiratory educators. There are separate questions for full-time and part-time faculty.

How many full-time faculty members teach in your program?

Referring to the full-time faculty counted previously:
Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.)
In the second column, please indicate number of teachers (if any) with a degree in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

	Number with this degree	Number with degree focus in Education
AS/AAS or equivalent or Associate's level equivalent	0	0
BS/BAS/BA or Bachelor's level equivalent	0	0
MA/MS or Master's level equivalent	0	0
Ph.D./Ed.D or Doctoral equivalent	0	0
Other	0	0
Total	0	0

How many part-time (adjunct) faculty members teach in your program?

Referring to the part-time faculty previously counted:
Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.)
In the second column, please indicate number of teachers (if any) with a degree in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

	Number with this degree	Number with degree focus in Education
AS/AAS or equivalent or Associate's level equivalent	0	0
BS/BAS/BA or Bachelor's level equivalent	0	0
MA/MS or Master's level equivalent	0	0
Ph.D./Ed.D or Doctoral equivalent	0	0
Other	0	0
Total	0	0

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

Pedagogy: Do you or your educators employ particular teaching methods for your didactic courses? Choose all that apply:

- [ ] Lecture
- [ ] Socratic discussion
- [ ] Problem-based learning
- [ ] Debate
- [ ] Practice exam questions
- [ ] Other

What is your average teacher-to-student ratio in your didactic courses?

What is your average teacher-to-student ratio in your laboratory courses?

What is the minimum number of clock hours that the typical CRT-eligible graduate has accrued:

	Minimum number of clock hours accrued
At clinical sites?	
In the laboratory?	
Practicing with human patient simulators?	

What is the minimum number of clock hours that the typical RRT-eligible graduate has accrued (including CRT hours):

	Minimum number of clock hours accrued
Same as previous question (CRT and RRT eligibility occur at the same time)	
At clinical sites?	
In the laboratory?	
Practicing with human patient simulators?	

In your geographic area, is it customary for the clinical facilities to hire new graduates?

- ○ Yes
- ○ No
- ○ Not sure
- ○ Other

<< >>

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UNIVERSITY OF NEVADA LAS VEGAS

In this final section, please follow the step-by-step instructions to report the average cumulative test scores over the designated reporting period in each of the 20 NBRC curricular content areas:

CRT results:

a. Log in as usual to the NBRC school portal (www.NBRC.org....Educators....School Login)
b. Go to reports
c. Click "School Score Report"
d. Exam type: CRT
e. Enter dates to be captured: 7/10/2009-6/30/2011
f. Click "View Report" (this may take a few minutes to load)
g. Scroll down to detailed view of "New Candidate Summary"
h. Copy numbers to the right of "Average Score" into spaces below (2 decimal places)

	1A	1B	1C	1TOT	2A	2B	2C	2TOT	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3TOT
Enter the following fields as shown on the report																				

RRT results:

a. Log in as usual to the NBRC school portal (www.NBRC.org....Educators....School Login)
b. Go to reports
c. Click "School Score Report"
d. Exam type: RRT
e. Enter dates to be captured: 7/10/2009-6/30/2011
f. Click "View Report" (this may take a few minutes to load)
g. Scroll down to detailed view of "New Candidate Summary"
h. Copy numbers to the right of "Average Score" into spaces below (2 decimal places)

	1A	1B	1C	1TOT	2A	2B	2C	2TOT	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3TOT
Enter the following fields as shown on the report																				

Please indicate if you would like to receive a copy of the abstract to be associated with this Credentialing Success Survey data:

- Yes (by selecting, you will need to provide an email address for contact)
- No, thanks.

Please provide any feedback about this survey that you feel is useful below (i.e. Was the survey user friendly? Did it function as expected? Were the questions/responses easy to understand? How long did it take to complete the survey? etc.):

Survey Powered By Qualtrics

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Appendix F

Final Survey

INFORMED CONSENT
Department of Teaching and Learning
TITLE OF STUDY: CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION: REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL

INVESTIGATOR(S): Dr. Howard R. D. Gordon, Principal Investigator; Karen L. Shaw, Assistant Investigator
CONTACT PHONE NUMBERS: 702-895-2729 or 702-327-7429

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Voluntary Participation
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Confidentiality
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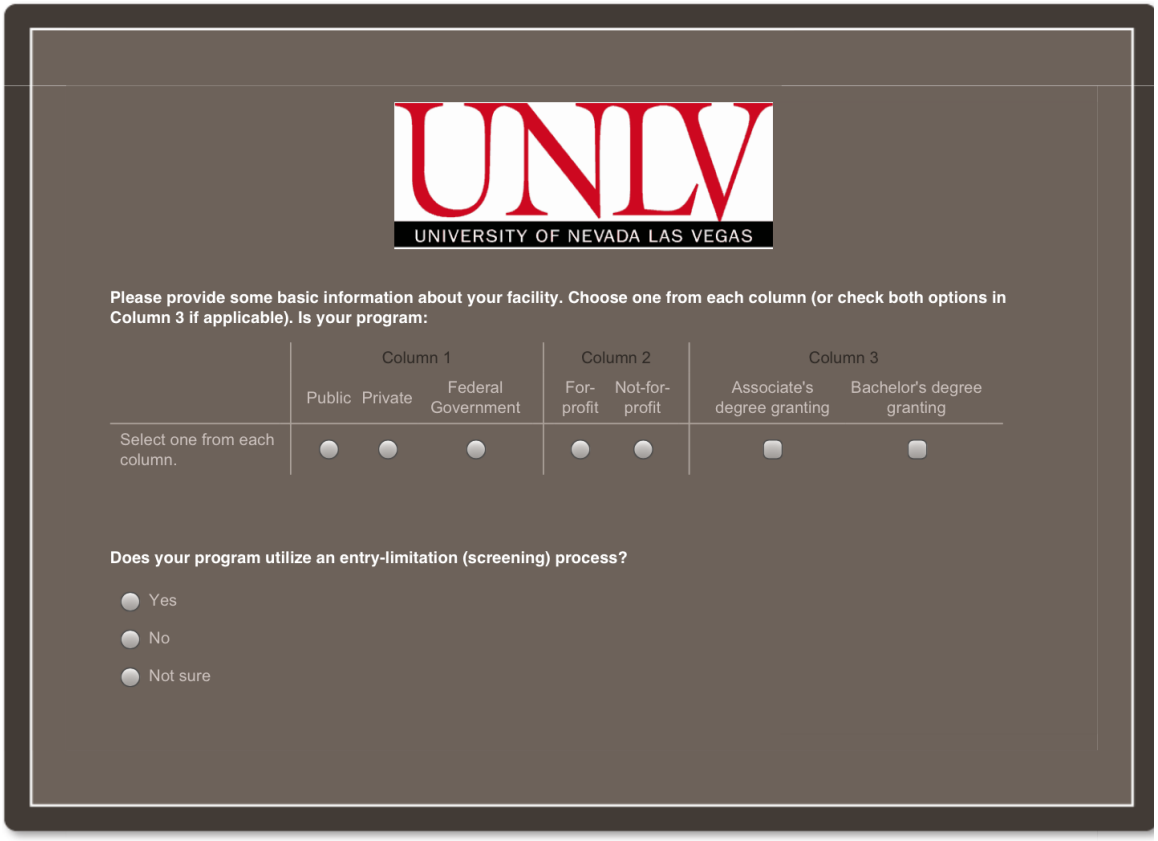
Participant Consent:
By beginning the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.


UNLV
UNIVERSITY OF NEVADA LAS VEGAS
Please provide some basic information about your facility. Choose one from each column (or check both options in Column 3 if applicable). Is your program:
Column 1
Column 2
Column 3
Public
Private
Federal Government
For-profit
Not-for-profit
Associate's degree granting
Bachelor's degree granting
Select one from each column.
Does your program utilize an entry-limitation (screening) process?
Yes
No
Not sure
Survey Powered By Qualtrics
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Pedagogy: Do you or your educators employ particular teaching methods for your didactic courses? Choose all that apply:

- [ ] Lecture
- [ ] Socratic discussion
- [ ] Problem-based learning
- [ ] Debate
- [ ] Practice exam questions
- [ ] Other

What is your average teacher-to-student ratio in your didactic courses?

What is your average teacher-to-student ratio in your laboratory courses?

What is the minimum number of clock hours that the typical CRT-eligible graduate has accrued:

	Minimum number of clock hours accrued
At clinical sites?	
In the laboratory?	
Practicing with human patient simulators?	

What is the minimum number of clock hours that the typical RRT-eligible graduate has accrued (including CRT hours):

	Minimum number of clock hours accrued
Same as previous question (CRT and RRT eligibility occur at the same time)	
At clinical sites?	
In the laboratory?	
Practicing with human patient simulators?	

In your geographic area, is it customary for the clinical facilities to hire new graduates?

- ○ Yes
- ○ No
- ○ Not sure
- ○ Other

Survey Powered By Qualtrics

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UNIVERSITY OF NEVADA LAS VEGAS

In the following questions, please provide information about your respiratory educators. There are separate questions for full-time and part-time faculty.

How many full-time faculty members teach in your program?

Referring to the full-time faculty counted previously:
Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.)
In the second column, please indicate number of teachers (if any) with a degree in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

	Number with this degree	Number with degree focus in Education
AS/AAS or equivalent or Associate's level equivalent	0	0
BS/BAS/BA or Bachelor's level equivalent	0	0
MA/MS or Master's level equivalent	0	0
Ph.D./Ed.D or Doctoral equivalent	0	0
Other	0	0
Total	0	0

How many part-time (adjunct) faculty members teach in your program?

Referring to the part-time faculty previously counted:
Indicate the total number of educators with each degree. (If educator has multiple degrees, designate only the highest degree.)
In the second column, please indicate number of teachers (if any) with a degree in Education (educational leadership, workforce education, etc.) Fill in a zero if their degree is in biology, respiratory therapy, or other.

	Number with this degree	Number with degree focus in Education
AS/AAS or equivalent or Associate's level equivalent	0	0
BS/BAS/BA or Bachelor's level equivalent	0	0
MA/MS or Master's level equivalent	0	0
Ph.D./Ed.D or Doctoral equivalent	0	0
Other	0	0
Total	0	0

In this final section, please follow the step-by-step instructions to report the average cumulative test scores over the designated reporting period in each of the 20 NBRC curricular content areas:

CRT results:

a. Log in as usual to the NBRC school portal (www.NBRC.org....Educators....School Login)
b. Go to reports
c. Click "School Score Report"
d. Exam type: CRT
e. Enter dates to be captured: 7/10/2009-6/30/2011
f. Click "View Report" (this may take a few minutes to load)
g. Scroll down to detailed view of "New Candidate Summary"
h. Copy numbers to the right of "Average Score" into spaces below (2 decimal places)

	1A	1B	1C	1TOT	2A	2B	2C	2TOT	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3TOT
Enter the following fields as shown on the report																				

RRT results:

a. Log in as usual to the NBRC school portal (www.NBRC.org....Educators....School Login)
b. Go to reports
c. Click "School Score Report"
d. Exam type: RRT
e. Enter dates to be captured: 1/1/2010-6/30/2011
f. Click "View Report" (this may take a few minutes to load)
g. Scroll down to detailed view of "New Candidate Summary"
h. Copy numbers to the right of "Average Score" into spaces below (2 decimal places)

	1A	1B	1C	1TOT	2A	2B	2C	2TOT	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J	3K	3TOT
Enter the following fields as shown on the report																				

Please indicate if you would like to receive a copy of the abstract to be associated with this Credentialing Success Survey data:

- Yes (by selecting, you will need to provide an email address for contact)
- No, thanks.

Appendix G

Postcard Reminder

Time is running out:

Survey Deadline:
Midnight, Monday,
Oct. 8

Final request:
Please take
15 minutes
to complete the
credentialing
success survey!

Please check your
e-mail inbox
for the Oct. 1
mailing from the
UNLV Cannon
Survey Center.

Please disregard if you
have already responded.
Your participation in
this research is greatly
appreciated!

Appendix H

Copyright Permission

Permission to Use Copyrighted Material

University of Nevada, Las Vegas

I am preparing a master's thesis/doctoral dissertation at the University of Nevada, Las Vegas, and request your permission to include the following material in this and all subsequent editions of the above-referenced thesis/dissertation:

Title: 20/20 Analysis Manual

Holder/date of copyrighted material: Temple University Center for Research in Human Development and Educaton

Authored by Maynard C. Reynolds

Originally published in Philadelphia, PA

Title of selection: Figure 1

From page _____, line _____, beginning with the words _____

To page _____, line _____, ending with the words _____

Figure # 1 on page 6 Table # _____ on page _____

(Attach continuation sheets as necessary.)

Appropriate credit will be given as provided above.

Author/tentative title: Karen L. Shaw/ CREDENTIALING SUCCESS IN RESPIRATORY THERAPY EDUCATION: REVISITING BOURDIEU'S CONCEPTS OF FIELD AND CAPITAL

Please indicate agreement by signing and returning the enclosed copy of this letter to me. In signing, you warrant that you are the sole owner of the rights granted and that your material does not infringe upon the copyright or other rights of anyone. If you do not control these rights, I would appreciate your letter letting me know to whom I should apply.

Thank you,

Karen Shaw

Name

1961 Redwood Street

Las Vegas, NV 89146 (702-327-7429)

Requester's return address

Agreed to and accepted: MARILYN MURPHY

by: Marilyn Murphy Interim Director (ISS)

(signature) (title)

Credit and/or copyright notice: ©Rs. cite Center for Research in Human Development and Education, Temple Univ.

INST FOR SCH&SOC Fax:215-204-7015 Oct 15 2012 12:16 P.02

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Vita

College of Education
University of Nevada, Las Vegas

Karen L. Shaw

Home Address:
1961 Redwood Street
Las Vegas, NV 89146

Degrees:
Bachelor of Science, Biology, 1976
Nebraska Wesleyan University

Master of Liberal Arts, 1979
The Johns Hopkins University

Dissertation Title: Credentialing Success in Respiratory Therapy Education: Revisiting Bourdieu's Concepts of Field and Capital

Dissertation Examination Committee:
Chairperson, Howard Gordon, Ph. D.
Committee Member, Clifford McClain, Ph. D.
Committee Member, Dale Pehrsson, Ph. D.
Graduate Faculty Representative, Cecilia Maldonado-Daniels, Ph. D.