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Philippine Normal University
National Center for Teacher Education

**A Respiratory Therapy Curriculum Model Responsive To The
21st-Century Global Competencies**

A
DISSERTATION
Presented to the

Faculty of College of Graduate Studies and Teacher Education Research
Philippine Normal University
Manila

In Partial Fulfillment
of the Requirements for the Degree
DOCTOR OF PHILOSOPHY
with specialization in CURRICULUM and INSTRUCTION

Danahlyn de Lima - Evangelista

APPROVAL SHEET

This thesis entitled “**A RESPIRATORY THERAPY CURRICULUM MODEL RESPONSIVE TO THE 21st-CENTURY GLOBAL COMPETENCIES**” prepared and submitted by **DANAHLYN DE LIMA-EVANGELISTA** in partial fulfillment of the requirements for the degree of **Doctor of Philosophy in Curriculum and Instruction**, is hereby recommended for approval and acceptance.

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Acknowledgement

A very stressful, long process...
 Lots of setbacks, lots of discouragements...
 Doubts about self and doubts about many things...
 Disruptions caused by the COVID-19 global pandemic that forced a paradigm shift for all walks
 of life...

Completing a doctorate degree has been truly a life-changing experience full of challenges and difficulties. It is important to have people who believe in someone's abilities and are willing to give extra support and encouragement in those trying times.

Writing this dissertation has been a humbling experience as I have been confronted with my frailty and need to rely on the support of others, to wit:

First and foremost, I thank God for His abundant grace. Without His blessings, this achievement would not have been possible;

I am truly grateful to my advisers, Dr. Eden Evangelista and Dr. Danilo Villena, for all the support, guidance, and wisdom in achieving this scholarly potential and in getting through this process;

My acknowledgment would be incomplete without thanking the prime source of my strength, my family. I would like to recognize my late parents, Mrs. Clarita and Mr. Danilo de Lima, for sending us their blessings and being our guardian angels;

Very special thanks to my loved ones who constantly provide unconditional love and patience - the best husband, Mr. Raul C. Evangelista, and my three wonderful daughters, Ina Patricia, Ina Regina, and Daniela Isabelle; and,

To Philippine Normal University, I will be forever grateful for giving me this chance to fulfill my dream even during these trying times. Let us hope and pray this global crisis will soon be part of our shared history.

D.D.E.

Abstract

From the different focus group discussions and dialogues of Respiratory Therapy (RT) educators and clinical practitioners, this group of stakeholders has examined the rapid expansion of global health programs and the current status of the RT program in meeting those demands. With the researcher's background, this study articulated issues and challenges in respiratory therapy education. Results served as bases in crafting a curriculum model for the BS Respiratory Therapy program responsive to the 21st-century global competencies. Following combined quantitative and qualitative research methods, the study involved three hundred twenty-two (322) respondents from seven (7) schools, twelve (12) hospitals, and different professional organizations. The data collection includes the administration of the questionnaire and document review considering the relevant local and international standards. As assessed by the respondents, including different insights and inputs from experts in the field of respiratory therapy, "Weaknesses" were identified in the curriculum that provided a reference in developing a curriculum framework comprising these essential elements: Respiratory therapists new roles and responsibilities or 21st-Century global competencies; Health professions education; Relevant tools and resources to supplement the training of RT students and prepare for global competencies; and, Attributes of globally competent and competitive respiratory therapists. Based on this framework, a proposed curriculum model was methodically formulated that integrates the different knowledge, skills, and attributes expected of a respiratory therapist in the 21st-century. The main objective is to improve the program to produce trained and globally competent respiratory therapists for a strengthened society's health system. A review of the curriculum model by major stakeholders could be considered before implementation and possibly a recommendation to the Philippine Society of Respiratory Educators. A regular evaluation, when possible and relevant, could report on the curriculum's alignment to systematic factors in relevance to the dynamic and always changing landscapes in Philippine education and healthcare systems.

Keywords: responsive, respiratory therapy curriculum, curriculum framework, curriculum model, 21st-century global competencies, health professions education

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CHAPTER I

INTRODUCTION

Background of the Study

Education is the most important aspect in the development of an individual and it is viewed as any country's pillar of success that prepares a person to face the challenges put before him or her. Quality education is the best that a school can offer to students, a call that leads to quality graduates for quality employment to attain better quality of life.

Emphasis on the change in modern-day universal education dialogue from education to lifelong learning, also as transference of skillful knowledge to education as developing learner capacities is spurred by ever-changing realities in the 21st century globalization in education. The emergence of globalization recognized the need of education to be responsive to international standards. Globalization entails a process of closer integration and exchange among different countries and people worldwide.

With the adoption of 21st century curriculum, educational setting includes blending of thinking, media, information and communications technology literacy, innovative skills, as well as exposure to real-life experience at the context of core courses. In achieving reliable learning that is expected of students, they are to effectively employ the various skills such as problem-solving skills, critical thinking skills, and collaboration so that they become successful in their future careers. The 21st century curriculum focuses in forming knowledge and in stimulating learners to construct the information that has significance to them in developing new skills. Developing a curriculum that is associated with real-life situations would motivate them to participate and better understand the academic courses to properly guide and prepare them for adult life and future roles in the community. Academic experts believed that curriculum standards should be relevant to the real world, responsive to the changes, and have the ability to satisfactory participate in the global workplace. Curriculum developers design curriculum that

guides the students to master knowledge, construct various competence in specified areas, and to perform with global readiness. It was pointed out that multi-literacy can equip students to build knowledgeable decision necessary to face the global challenges, having the opportunity to become successful in their future professional roles and responsibilities. In the current changing landscape in global education, there is a call to review and redesign curriculum and educational decisions to fully integrate future skills explicitly to students. It was also argued that real-life knowledge and skills should be an essential component of the curriculum. To cite the argumentation made by Herrington and Kervin in 2007, “A thinking curriculum is one that provides deep understanding of the subject and hones the ability to apply that understanding to the complex, real-world problems that the student will face as an adult” (p .64). Because of this demand, educators need to employ various teaching and learning strategies since not one particular and exact method nor model would suffice to reach this goal.

In January 2010, the Commission on Education of Health Professionals for the 21st Century was created to landscape the field of professional health education. Goals of the commission include the identification of gaps and opportunities and make proposals for a new era of reforms. Its vision as articulated in the Commission’s report titled “*Health Professionals for a New Century: Transforming Education to Strengthen Health Systems in an Interdependent World*”—is global. It calls for a new generation of health professional education that progress transformative learning and tackle the power of interdependence in education. The objective is to spark a second century of reforms in all countries and all health professions, eventually to ensure that people in every place have their means and access to high-quality extensive health services. Therefore, this translates to a foundational linkage between professional education on the one hand and health conditions on the other. Key recommendations of the commission are:

The Commission calls for a broad reform movement, encompassing instructional design (what we teach and how) and institutional design (schools or universities that should carry out instruction); Instructional design - the approach should be competency-based and inter-professional, bringing together health professionals to work as a cohesive team. It should use IT to empower health professional during training and in the field; Institutional design - much tighter coordination is needed between education and health sector to ensure that the type of health professionals trained matches health needs in every country. In addition, global coalitions, associations, and networks are needed to better leverage educational resources form around the world.

In relation to the foregoing concerns in 21st-century education, the Congressional Committee on Education or EDCOM report in the Philippines through Senator Edgardo Angara emphasized the need to address the persisting problems in education system. One problem noted was the lack of harmony of current structure with international standards. Although a lot has been done already to improve the system, still it has become apparent that the system needs to strive more in putting the country's educational system at par with the rest of the world. Angara noted ,“Since our educational system is not comparable with the more developed countries, our graduates are sometimes unable to become competitive. We must therefore strive to improve this system so that we may overcome the obstacles to national development” (p. 1).

Based on the Philippine Social Science Council observation, Department of Education (DepEd) and curriculum developers and specialist of the country have not fully considered the findings of the study that big gaps exist between education and workplace. Researchers observed the manifestation of weak linkages between educational preparation and background with employment expectation level. Mismatch between Filipino graduates and labor market needs both in local and international market continues to exist. For this reason, the Council

reiterated the need to strive and enhance the current system to defeat the hurdles towards national progress and development.

As a result, every minute is getting complex where the quality of education is getting high, a scenario in which Philippine education in itself must compete against the set standards. To support the social, economic and development needs, higher education institutions are supposed to address national concerns to develop human resources that possess various types of competencies and expertise as endorsed by the Commission on Higher Education (CHED), as articulated in its Handbook on Typology, Outcomes-based education, and Institutional Sustainability Assessment, 2014.

Mobilization of students, workers and business across countries in a borderless civilization leads to more opportunities for Filipinos to study or work abroad; whereas, foreign students and workers are also coming to the country. However, with this current landscape, there is a need to establish qualifications and competencies brought about by quality education at all levels. The government has been enforcing reforms in educational system for the past years relative to kindergarten universalization, mother-tongue based education, and the recent senior high school.

Meanwhile, higher education begins the shift to outcomes-based education from inputs-based. Because of the realities faced by different academic programs in competing with regional and global arena, the sector in health professions education started to hold consultative meetings to discuss the issues and challenges in the field. F.G. Gedik, Team Leader of Human Resource for Health of WHO articulated in 2013,

“Addressing the issues of 21st century education requires a comprehensive approach to education and an inclusion of this, in the same way, is the global methodology to health professions education. Main areas of intervention in transforming and scaling up health professions include education and training institutions, accreditation and regulation, financing and sustainability, monitoring implementation and evaluation, governance and planning. To meet the criteria of liberalization of trade in our

education services, there is a need to seriously consider enhancing and strengthening the qualifications and capabilities of faculty members, curricula, and higher education institutions to qualify in international standards” (p.11).

With the foregoing situation, health professions education aims to produce capable practitioners who are able to meet the 21st health care needs of the industry. Hence, health sciences schools are expected to create skilled health care professionals that meet the international expectations. Therefore, the researcher believed that there is a need to re-examine academic programs in the country including one of the youngest programs in the country, the Respiratory Therapy.

Respiratory Therapy is an allied health course officially established in the Philippines in 1980, through a two-year course leading to a Certificate in Pulmonary Therapy. It was only in 1990 when a four-year baccalaureate course was introduced. Change and innovation have been the conditions that best represent the development of the said profession. Today, respiratory therapy profession hardly resembles what it was in the 1980s, including the modern and global expectations from the profession and its professionals. From 1980 to 2006, each RT school utilized its own or had different degrees of educational levels and competencies of the graduates of the profession. It was only in 2007 that Respiratory Therapy education was standardized and regulated in the country through CHED Memorandum Order No. 9, series of 2007.

At present there are two existing CHED Memorandum Orders (CMO) on Respiratory Therapy: CMO No.9 Series of 2007, known as the Policies, Standards and Guidelines for Respiratory Therapy Education; and CMO No. 53 Series 2017, known as the Revised Policies, Standards and Guidelines for BS Respiratory Therapy. This study suggests that curriculum assessment be conducted in terms of its responsiveness in educating the health professions and in providing global competencies expected of its graduates in the 21st century.

The study considered reasons and processes of examining how the RT profession necessitates change in order to meet the demands of quality patient care in the modern world.

This included identifying the changes needed to enable the current education system produce respiratory therapists (RTs) with imperative skills, knowledge, and competencies to provide optimal care in the changing landscape of health care system. The American Association for Respiratory Care (AARC) has established a Taskforce to identify potential new roles and responsibilities of Respiratory Therapists in 2015 and beyond. AARC noted,

“The information age of the future will be replete with changes in scope of practice. The science of respiratory care will continue to expand at the same pace as medicine. Projections regarding the profession must incorporate new technology, new therapeutic approaches and data management skills, which the future RT will need to be successful in the workplace...the need for respiratory therapists to be actively involved in research will continue to grow” (p. 602).

Likewise, the accredited professional organizations, teachers and heads of RT schools from the Philippine Society of Respiratory Therapy Educators (PSRTE) and respiratory clinical practitioners of the Association of Respiratory Care Practitioners in the Philippines, Inc. (ARCPP), articulated in several meetings that there have been important matters that necessitate review of RT education and/ or its curriculum. One problem raised was on inadequate exposure to practice the skill as preparation in the work place (wherein graduates have difficulty in adjusting to the workplace even after the 10-month clinical training). Another was that students are having a hard time in applying the theories to practical training as evidence of difficulty in applying their learnings or theories learned inside the school to the actual patient care because they lacked experiential learning in schools. Also, there was poor performance of graduates in the professional licensure examination in some practice areas especially in neonatal and pediatrics, suggesting a foundational need of international affiliations or accreditations both in education and clinical practice for the advancement of the profession or education program. It was also problematic on the lack of benchmarking with international standards. Further, hospitals also observed the low-performing interns during their clinical training and upon entry at the work place. There was lack of new resources, no new technology

or updated equipment in the laboratory to practice the skill. If this situation continues, schools defeat the purpose of generating competent respiratory therapists who are globally competitive, as result of not possessing the competencies expected of the professionals. RT educators believe that given an apposite attention to improve the curriculum, subsequently, the learning process will enhance and will produce ideal graduates.

Apparently, no record of curriculum evaluation has been placed in RT education since its mandatory implementation in 2007. The researcher believed that assessment or evaluation activities at any degree could be a key to improving learning and teaching or in enhancing the whole program, considering that it is the basic intellectual attempt in attaining a high degree of quality in the operation or administration of such academic program. The process of making value judgments of the quality and benefits of the curriculum whether in part or whole is through evaluation of curriculum. Its evaluation usually entails measuring the impact on students' need, their level of performance, and degree of engagement in learning. While in terms of society and community, evaluation of curricula may involve its extent in addressing public satisfaction, expected values, and attitudes of learners and graduates. In terms of economy and labor market, it addresses the different indicators of developments in economy. Nevertheless, the content and design of the curriculum are being compared with the current changes happening in society, science, technology as well as the recent advances in educational context, research and standards. Possible future trends and orientations of curriculum change could also be taken into consideration.

Consequently, with a view to re-orienting RT education as the main purpose of this study, the existing curriculum went through an assessment in order to determine its usefulness. In the context and frame of reference in RT education, assessment would be described as determining the quality of the product, that is, the Respiratory Therapy graduates. This examination was expected to provide a general idea of the curriculum and its place in the total educational program. The information served as necessary foundation in planning the steps in curriculum development. On the basis of the evaluation/assessment findings, a curriculum

framework was proposed. Using the framework, a curriculum model was developed that is hoped to be relevant to the requirements of health professions education in the 21st century, producing ideal RT graduates that possess the global competencies and qualities expected from a respiratory therapist in the 21st century.

The present context and thrust in the Philippine education and health system affected by global health challenges led to the study on the current RT education curriculum assessment. It aims to revisit and determine the extent whether its curriculum responds and is still relevant to the demands and standards of 21st century in terms of health professions education and global competencies of its graduates. The above background led to the conduct of this study.

Literature Review

Relevant information and criteria from different sources and references were reviewed as guide in the process of conducting the study and producing the final output.

No studies were found that are exactly related to development of curriculum in respiratory therapy in the country. There are two Policies, Standards and Guidelines (or curriculum) for BSRT education institutionalized by the Commission on Higher Education - the CMO No. 9, series of 2007 and CMO No. 53, series of 2017. The BSRT program is considered one of the youngest and unknown health professions in the country, which could be the reason for its very limited related literature and studies. However, the researcher has reviewed several foreign sources found useful to provide pertinent foundation in establishing concrete context for this study.

Respiratory Therapy Profile in the Philippines

Respiratory Therapy is historically known as inhalation therapy. This health profession is considered one of the young professions in the country. Initially, clinical practitioners were called as oxygen therapy technicians. It was in the late sixties and early seventies when some of the medical doctors who specialized in pulmonology introduced the practice. Respiratory sections

and units were set-up in various hospitals in response to the need to monitor and manipulate the life-saving device in Intensive Care unit (ICU) and similar units, with the use of mechanical ventilators and respirators.

To trace its history in the Philippines, during the 1970's – 1980's at the Veterans Memorial Medical Center (VMCC) Nursing Aides were trained by Dr. Teresita S. de Guia and Associates to become their first "Inhalation Technician / IPPB Technician". They also trained Engineers from TOWER MEDICAL Corp. to become their "Mechanical Ventilator Troubleshooter" for any problems they were encountering with their ventilators.

Seminars and training programs were initiated to enhance the skills of practitioners. Americans from the Medical Services of America (MSA) had their first training of Filipino Respiratory Care Practitioners with Medical Technologist as the first Practitioners of the profession. Also Medical doctors who were trained in foreign hospitals returned to the Philippines and brought with them the new science and its accompanying technology in respiratory care. The development of the practice in medicine as well as the maturity of specialties in the field of pulmonology and critical care have necessitated the transfer of certain responsibilities to allied health practitioners, as in the case of medical functions that have been delegated to nurses or functions of the rehabilitation physicians that have been delegated to physical therapists. In the same manner, the respiratory therapists under the supervision of pulmonologists could also assume certain functions of said medical doctors. The respiratory care personnel become indispensable in the management of critically-ill patients whose life existence depends on mechanical ventilators manned by these people.

The Philippine government through the Commission on Higher Education recognized educational programs in respiratory therapy in 1980. During this year, the first to offer a formal education in Respiratory Therapy is the Mary Chiles College in Gastambide Manila to a group of Filipino students who underwent curricular training through a two-year course leading to certificate or associate in pulmonary therapy. Schools such as Manila Doctors and Emilio Aguinaldo College followed immediately in offering the same program. In 1987, the four-year

baccalaureate course in Respiratory Therapy was first offered at University of Perpetual Help System in Laguna. Emilio Aguinaldo College in Manila started the two-year certificate program in 1986 but few years after, this program was phased out due to the strengthening of the BS RT in 1990.

There was no standardized curriculum for RT during those years, which led RT schools to use diverse baccalaureate curricula, and this consequently resulted to offering the profession at an experimental stage. In 2007, CHED Memorandum Order No. 09 issued the Policies, Standards and Guidelines for Bachelor of Science in Respiratory Therapy Education. (Please see Appendix A for the whole text of the CMO). Then just recently, in compliance with outcomes-based quality assurance system as advocated under CMO No. 46 s 2012, the current CMO No. 53 series of 2017 was implemented (See Appendix B for the whole copy of CMO). Presently, there are more than twenty (20) Respiratory Therapy schools in the country, based on the record of PRC's Respiratory Therapist Licensure Examination and CHED record. It was only in 2013 that RT was professionalized through a licensure examination to deliver the competency in providing quality care for the profession. In January 22, 2013, the Philippine Respiratory Therapy Act of 2009 under Republic Act No. 10024 was institutionalized. This Act regulated the practice of the Respiratory Therapy profession by requiring all practitioners to undergo a licensure examination. The first licensure examination for respiratory therapy was conducted only last October 29-30, 2013 in Manila. To define Respiratory Care, also known as Respiratory Therapy, Egan's Fundamentals of Respiratory Care 10th edition (2013), said:

"A health care discipline that specializes in the promotion of optimal cardiopulmonary function and health. Respiratory therapists (RTs) apply scientific principles, to prevent, identify, and treat acute or chronic dysfunction of the cardiopulmonary system. Respiratory care includes the assessment, treatment, management, control, diagnostic evaluation, education, and care of patients with deficiencies and abnormalities of the cardiopulmonary system. Respiratory care is increasingly involved in the prevention of

respiratory disease, the management of patients with chronic respiratory disease, and the promotion of health and wellness" (p. 4).

The Bachelor of Science in Respiratory Therapy is a four-year allied medical profession consisting of general health education and professional courses. The first and second semesters of the fourth-year level comprised of one thousand six hundred (1,600) hours of clinical internship program in a CHED-DOH accredited training respiratory therapy laboratory with rotational duties in different sections of one or more hospitals. Rotation in different clinical areas includes pulmonary diagnostics, general respiratory care, adult intensive care unit, neonatal and pediatric critical care unit, sleep laboratory, and pulmonary rehabilitation. The professions or future careers of graduates include: in clinical practice, as respiratory therapist in hospital pulmonary therapy units, emergency medical services, home care services, pulmonary rehabilitation units, and sleep laboratories; in education, as faculty in RT schools to teach the professional courses and to conduct researches (Researcher); and, in respiratory care industry, as RT product specialist.

Defining 21st-Century Education

Based on preliminary reviews of foreign literature, well-known frameworks for 21st-century competencies were identified and selected for an in-depth analysis. The most cited 21st century skills frameworks are as follows: EnGauge 21st century skills (2003), Digital age literacy (basic, scientific, economic, technological, visual, information, multicultural literacy, global awareness), inventive thinking (adaptability, managing complexity, self-direction, curiosity, creativity, risk taking, higher-order thinking and sound reasoning), effective communication (teaming and collaboration, interpersonal skills, personal, social and civic responsibility, interactive communication), high productivity (prioritizing, planning and managing for results, effective use of real world tools, ability to produce relevant high quality products). OECD (DeSeCo) (2005), using tools interactively (language, symbols, texts, knowledge, information, technology), interacting in heterogenous groups (relate well to others, co-operate, work in

teams, manage and resolve conflicts), acting autonomously (act within the big picture, form and conduct life plans and personal projects, defend and assert rights, interests, limits and needs). European Parliament and Council (2006), communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression. The P21 Framework for 21st Century Learning (2007), learning and motivation skills: creativity, critical thinking, problem solving, communication, collaboration. Information, media and technical skills: information, media, communication and technology literacy. Life and Career skills: flexibility, adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility. UNESCO (LMTF, 2013), physical well-being, social and emotional skills, culture and the arts, literacy and communication, learning approaches and cognition, numeracy and mathematics, science and technology.

Literature show that no definitive and no clear definition of 21st century skills are embraced internationally. Education analysts mostly use the words 21st century as an encompassing conception that refers to multiple skills. According to Voogt and Roblin (2010, 2012), the term 21st century as 'new competencies' is progressively demanded by the society because of the existence of workforce expectations. With this, the educational institution should train the learners of today for future jobs and careers. They also articulated in 2010, "... 21st Century Skills or 21st century competences are an overarching idea for the knowledge, skills, and dispositions that citizens demand to be able to impart to the knowledge society ..." (p.16).

They consider that current frameworks analyzing 21st Century Skills usually apply to several sets and types of skill and competence, leading to difficulty in comparison. They also agreed that the vagueness in definitions and nomenclature is obstructing the approach in which such skills are taught. Scott (2015) noted, "...21st Century Skills as the knowledge, skills, and attitudes necessary to be competitive in the twenty-first century workforce, participate appropriately in an increasingly diverse society, use new technologies and cope with rapidly

changing workplaces...” (p. 8). Scott also presented a summary of essential competencies and skills for 21st century learning by examining various 21st Century Skills frameworks, a number of which work to synthesize the wide range of skills and attributes such as those stated by Lippmann et al. (2014), Wagner (2010, cited in Scott, 2015), and Barry (2012, cited in Scott, 2015) within a more conceptual and controllable setting. Conclusively, in her methodical review of studies on 21st Century Skills, Chalkiadaki (2018, p.5) describes 21st Century Skills as: Embracing a broad range of skill sets and professional attributes that include critical thinking, divergent thinking, creativity, team working (particularly in heterogeneous groups), developed cognitive and interpersonal skills, social and civic competences, acceptance and understanding of diversity, consciousness of interdependence, responsible national and global citizenship, work autonomy, digital competence, recognition and development of personal attributes, communication in mother tongue and foreign languages, mathematical and science competence, interactive use of tools, sense of initiative and entrepreneurship, accountability, cultural awareness and expression, leadership, and physical well-being.

More precisely, Asia–Pacific Economic Cooperation (2008) defined 21st century competencies, “...as the knowledge, skills and attitudes necessary to be competitive in the 21st century workforce, participate appropriately in an increasingly diverse society, use new technologies and cope with rapidly changing workplaces”, as cited in Scott (2015).

These themes, which cut across each of the studies cited, cover five key areas related with the primarily professional attributes: Collaborative skills, including management of group activities and social interaction; Communication skills, including language and presentation of ideas; Individual learning approaches including critical thinking, metacognition and new skills acquisition; ICT and digital literacy, including use of technology as tools for learning communication and collaboration; and, Individual autonomy, including flexibility, adaptability and entrepreneurship. Also featured are a number of core knowledge areas, including: Literacy, Numeracy, and STEM-associated fields of knowledge. Additional personal attributes seen by the majority of critics as necessary to performing life in the 21st century include: Physical well being

and personal health, Social citizenship, Social and emotional skills, and Creative and cultural expression.

In searching for definitions of 21st century skills, this study obtained a wide range of literature explaining the concept. With the examined literature, the usual consensus across analyses indicate the necessity for new forms of learning to confront global challenges. Nevertheless, regardless of various views, there is no distinctive and single approach to either the definition of 21st Century Skills, or models for structuring these within the context of education of children for the 21st century. As what has already been pointed out, multiple sources recognize a variety of competencies and skills framed as '21st Century Skills'.

Comparison of these frameworks in looking at the similarities and differences was done by Scott (2015), Voogt and Roblin (2010, 2012), and Chalkiadaki (2018). Evaluations showed an indication of differentiating types of attributes, competencies and skills that have been regarded in defining 21st Century Skills. Correspondingly, reviews and evaluations also emphasize a broad range of efforts to synthesize these in classification and analytical frameworks. Examples of these are the '4Cs' promoted by the P21 initiative, the '3Rs' as variously defined by Stenberg and Subotnik (2006) and Wagner et al. (2006), the '3Ps' by Prensky (2012), and ATC21S conceived by Griffin and Care (2012).

Some literatures also mentioned that other terminologies were related with 21st Century Skills like life skills, soft skills, transversal skills, digital skills, and critical skills. In spite of some significant diversity across a range of personal, professional and practical attributes, the constructs can be constantly regarded as having the same meaning with 21st Century Skills. According to Gates et al. (2016), the so-called soft skills can be regarded as a wide range set of skills that include 19 behaviors and personal skills that facilitate effective navigation of the environment, and satisfactorily perform in achieving their goals.

Notably, the World Health Organization (1997), and Kennedy et al. (2014) defined life skills as "...the abilities for adaptive and positive behavior that enables individuals to deal effectively with the demands and challenges of everyday life." The 'Life skills' attempt to stress

those attributes that assure strength in the face of conflict, poverty, environmental and economic crisis. This differs remarkably with the scope of attributes stated under 21st Century Skills in other frameworks, which show the prioritization of skill sets for operating within a highly connected and resourced globally diverse knowledge-based economy.

Discussions and synthesis study on 21st Century Skills by Voogt and Roblin (2010, 2012) drew attention to the range of drivers recognizing the high demand for 21st Century Skills globally. Reviewed frameworks mentioned in their study ascribe this largely to changes in society, particularly in global concerns. First, globalization and internationalization are distinguished as central drivers of change within the economy and labor markets at national, regional, and global levels. Secondly, many critics also drew awareness to the swift progress of technology and its impact on life, work, and learning in the growing globalized context. Specifically, ICT is perceived as driving a shift from an industrialized society on the road to information or knowledge-driven society.

Also, there are factors reflected in the emerging demands that are placed upon educational content and delivery. Firstly, while industrial societies necessitate factual or procedural models of knowledge, knowledge-based societies set a far greater importance on the need for metacognitive knowledge. Secondly, there is evidence of an increased demand for individuals to build abilities to flexibly adjust to fast-changing globalized social and economic models (see, for example, ATC21S and P21). Likewise, there is a need for states to nurture a socially and democratically engaged citizenship (see, for example, OECD, 2017). Yet while most countries identify 21st Century Skills as part of their broader educational goals, fewer countries impart evidence of their practical integration either through the curriculum or through particular skills development progressions (Care et al., 2016). Of the 102 countries covered by Care et al. (2016) in terms of frequency, only 36 mention '21st Century Skills' in their vision or mission statements; while 76 countries mention specific 23 skills as part of the same. However, only 51 countries mention those same skills in curriculum documents; and only 11 countries yield evidence of advancement of these skills across multiple age groups and subjects. Only six

countries (Australia, Hong Kong, Mauritius, Ontario in Canada, Scotland, and Singapore) discern 21st Century Skills across all four categories (vision-mission statement, skills in curriculum, skills identified, and skills progression); while 22 countries identify specific skills in three of the four categories. Although such skills are not included as a feature of national vision/mission statements, some countries, namely Brazil, Mexico, Namibia, Rwanda, and South Africa include evidence of 21st Century Skills within educational skills progression. Twenty-one countries do not feature 21st Century Skills in any of the four categories (Care et al., 2016). Secondly, in terms of definition, Care et al. (2016) conclude that the specific skills recognized in the national documentation vary widely from country to country, although some skills are more common than others. By nearly 33% of countries, followed by 'creativity' (23%), 'critical thinking' (20%), and 'problem-solving' (19%), the 21st Century Skills most frequently identified were 'communication.'

Health Professions Education

There are factors that influence the health professions education and have vital contributions and reasons in transforming RT education. These factors were reported by The Lancet Commission in the Health Professionals for a New Century, transforming education to strengthen health systems in an interdependent world (Julio Frenk, et. al.). According to the problem statement of the Commission led by Flexner report about a century ago, a progression of studies about health professions education ignited creative reforms. The reforms enabled health professionals with the kind of education that took a role to the doubling of life span during the 20th century by way of inclusion of contemporary science into the curricula at university-based schools. The outset of the 21st century, nonetheless, is not all well. Emphasizing the collective frustration to share the substantial health advances equitably, extreme gaps and partiality in health occur continuously both within and between countries. At the same time, fresh health challenges emerge. Several factors threaten health security of all, such as new environmental, infectious and behavioral risks, at a time of swift demographic and

epidemiological transformations. The health systems worldwide are confronting and striving to keep up, as they become more composite and costly, thus putting an extra need on health professionals.

Ill-equipped graduates are products of outdated, fragmented and static curricula where professional education failed to keep pace with the mentioned challenges. The problems are systemic: main focus on hospital orientation at the expense of primary care; disparity in the professional labor market, both in quantity and quality; absence of broader contextual understanding and restricted technical focus; mismatch of competencies to patient and population needs; episodic encounters rather than continuous care; and poor leadership to enhance health-system capability. Noteworthy attempts to handle these inadequacies have mostly floundered to some extent because of the so-called tribalism of the professions—for example, the movement of the diverse professions to act in isolation from or even in opposition with each other. In lieu of the opportunities for mutual learning and joint solutions rendered by global interdependence due to advancement of flows of knowledge, technologies, and the migration of both professionals and patients, redesign of professional health education is vital given the current condition. A meticulous and authoritative re-examination of health professional education is evidently needed, matching the zealous work of a century ago. The Commission together with 20 professional and academic leaders from different countries, gathered together to develop a common vision and a shared strategy for post-secondary education in nursing, medicine, and other allied health. They had dialogues and reached out beyond the confines of national borders and the silos of individual professions. A global perspective, a multi-professional outlook, and a systems approach were embraced by the commission; and this comprehensive framework was regarded as the connections between education and health systems.

To cultivate a new generation of health professionals who are qualified to address the current and future challenges, an independent initiative led by various groups of commissioners from around the world, embraced a global position aiming to progress health by recommending

instructional and institutional transformations. It revolved around people as co-producers and as drivers of needs and demands in both systems. Interplay through the labor market and the delivery of educational services gives rise to the supply of educated human resources to fulfill the demand for professionals to work in the health system. In providing a favorable impact on health outcomes, the professional education sub-system must devise new instructional and institutional strategies.

Based on the report, health professional education has three generations of educational reforms depicting development during the past century. The first generation taught a science-based curriculum; the second generation introduced the problem-based education; and the third generation is systems-based in order to improve the performance of health systems by means of conforming the core professional competencies to specific contexts, while drawing on global information. To advance the third-generation reforms, all health professionals in all countries should be educated to prompt knowledge and to involve in ethical conduct and critical reasoning so that they are proficient to take part in patient and population-centered health systems as members of locally responsive and globally connected teams. The ultimate purpose is to guarantee quality worldwide services that are requisite to advance opportunity for health equity within and between countries. As guided by transformative learning and interdependence in education, attainment of the vision necessitates a series of instructional and institutional reforms. The transformative learning is the highest of three successive levels, moving from informative to formative, and then to transformative learning. Informative learning is the acquisition of knowledge and skills, and its purpose is to produce experts. On the other hand, formative learning is about socializing students around values, and its purpose is to produce professionals. Transformative learning is about developing leadership attributes, and its purpose is to produce enlightened change agents.

Transformative learning involves three fundamental shifts for an effective outcome: to searching, analysis, and synthesis of information for decision making from fact memorization; to achieving core competencies for effective teamwork in health systems--from seeking

professional credentials; and to creative adaptation of global resources to address local priorities from non-critical adoption of educational models. Transformative learning is described as the proposed outcome of reforms in instruction, where institutional reform resulted to interdependence in education.

To improve systems performance, the Commission presents a number of recommendations in instructional reforms. These include adjusting competencies to rapidly changing conditions by drawing on global resources; embracing competency-driven methods in designing instruction; utilizing the power of information technology; updating and strengthening educational resources; promoting inter-professional and transformational education while also enhancing collaborative and non-hierarchical relationships in effective teams; and promoting a new professionalism that uses competencies as objective reference for categorizing of health professionals and that develops a common set of values around social accountability.

An utmost importance to attain the proposed reforms and outcomes is the engagement of leaders at local, national, and global levels. Also, an enabling measure to consider is that leadership has to come from within the academic and professional communities supported by political leaders in government and society. To build up the knowledge base about which innovations work under which circumstances, shared learning by supporting metrics, evaluation, and research should be strengthened.

In order to sustain the inefficient application of 20th century educational strategies that are not suitable to confront 21st century challenges, the health professionals have made extensive inputs to health and development over the past century. A call for a global social movement of all stakeholders was instituted, composed of students and young health workers, educators, professional bodies, universities, international agencies, non-governmental organizations, donors, and foundations. Social movement, like this, can drive measures on this vision and the recommendations to promote a new century of transformative professional education. Consequently, there would be concomitant benefits for patients and populations everywhere in interdependent world receiving impartial and improved health systems.

Opportunities are opening for a new round of reforms to craft professional education for the 21st century, spurred by mutual learning due to health interdependence, changes in educational pedagogy, the public prominence of health, and the growing recognition of the imperative for change. Paradoxically, regardless of glaring inequality, interdependence in health is growing and the set of circumstances for shared learning and mutual progress have markedly expanded. The international transfer of health risks and opportunities and flows across national borders are accelerating due to global movements of people, technologies, pathogens, financing, information, and knowledge.

Alongside the swift pace of change in health, there is a parallel revolution in education. The rapid increase not only in total volume of information, but also in ease of access to it, means that the role of universities and other educational institutions needs to be re-thought. In this abruptly evolving context, universities and educational institutions are expanding their customary role as places where people go to obtain information (eg, by consulting books in libraries or listening to expert faculty members), to subsume novel forms of learning that go beyond the confines of the classroom. The next generation of learners needs the capacity to discriminate vast amounts of information and extract and synthesize knowledge necessary for clinical and population-based decision making. These developments point toward new opportunities for the methods, means, and meaning of education. Like never before, the public prominence of health in general, and global health in particular, has generated an environment that is propitious for change. Health affects the most pressing global issues of present time: socioeconomic development, national and human security, and the global movement for human rights. People now understand that good health is not only a result of but also a condition for development, security, and rights. A full and authoritative examination and redesign of the education of health professionals is warranted to match the ambition of reformers a century ago. Such a review would necessarily be globally inclusive and multi-professional, spanning borders and constituencies. Reform for the 21st century is timely because it is imperative to align

professional competencies to changing contexts, growing public engagement in health, and global interdependence, including the shared aspiration of equity in health.

With an aim of understanding the complex interactions and linkage between education and health systems, the Commission developed a framework for this purpose. After identifying the specifications of the linkages between the health and educational domains, the framework identifies three key dimensions of education. First is the institutional design which specifies the structure and functions of the education system. Second is the instructional design which focuses on processes. Third is the educational outcomes which deals with the desired results.

A conference was held dated April 9-12, 2015 with the theme, “Enhancing Health Professions Education through Technology: Building a Continuously Learning Health System” in Josiah Macy Jr. Foundation, Arlington, Virginia, USA. As noted in this forum, opportunities are boundless to re-design and innovate health professions education and health care delivery systems in America. In order to increase access, value, better care and improved health outcomes for all, there was a need to re-orient health professions education and clinical practice. Also highlighted was that one significant factor in those changes is the use of technology. Bringing together all these transformative efforts by thoughtfully and creatively integrating and enhancing health professions education and clinical practice, and with the use of appropriate technology, the health of people and communities they serve can be prolonged and enhanced. Macy Foundation President George Thibault (2015) states that, “We’re seeing innovations in health professions education, in healthcare delivery, and in technology all around us. Things are moving and changing very quickly, and we have a tremendous opportunity right now to bring these forces together to achieve optimum health for all” (p.1). Conference Recommendations include:

A. In health professions education, technology should be used to support the ongoing development of learners from undergraduate levels through clinical practice; enhance inter-professional learning opportunities and empower every student, faculty member, and clinician to embrace the role of both teacher and lifelong learner.

- B. Faculty in health professions in education should be supported to develop skills and expertise in the selection and effective use of educational technologies to complement the teaching-learning process and assessment of outcomes.
- C. Educational technologies should be used to accelerate the transformation of health professions education to a system that is competency-driven, affordable, and accessible to each learner.
- D. Technology should be leveraged to bridge the gap between educational and clinical missions, where teaching and learning are embedded within a healthcare delivery system that continuously improves.
- E. Leaders of health professions education programs should employ technology to analyze community and population data and use those data to continuously contemporary health and healthcare need of society.
- F. Educational technologies should be used to facilitate the sharing of content and integration of data across systems and programs, thus promoting the scalability and adoption of efficient and effective educational strategies.

Competencies of RT Graduates

Competencies of respiratory therapy graduates are articulated in the “Competencies Needed by Graduate Respiratory Therapists in 2015 and Beyond (Barnes et al., Respiratory Care, Volume 55, No. 5). The American Association for Respiratory Care (AARC) has sponsored a project to warrant the competency and future of the respiratory therapy workforce. ‘The 2015 and Beyond’ project convened all the stakeholders to discuss and assess the need of the respiratory therapy profession to reform in order to meet the demands of patient care in the future. This forum revealed that changes are needed to enable the current education system produce RTs with the appropriate knowledge, skills and competencies to provide optimal care in 2015 and beyond. As a result, three (3) significant conferences were held in response to the call. The first conference with the theme, “Creating a Vision for Respiratory Care in 2015 and

Beyond” was held in March 2008. This created a foundation for the two (2) conferences by projecting how the changing healthcare delivery system needs to respond to patient needs within the context of diagnosis, treatment, and management of patients with acute and chronic respiratory disorders. This conference reported that because of the increasing population, attempts are made to improve quality healthcare in general while decreasing its overall cost. Expectations are enumerated as follows:

- a. An increased priority on managing chronic care, wellness, and prevention.
- b. An increased portion of care in the future will be delivered in lower-cost environments.
- c. Initiation of technology will provide greater knowledge and entitle the public to make more informed choices about their healthcare.
- d. Keeping enough number of expert healthcare workers will become an increasing challenge.
- e. Clinical clamor will increase the need for expert practitioners rapidly than the workforce can expand.
- f. Aging of the present workforce will compound this problem.
- g. A shortage of respiratory therapy faculty may limit the numbers of students that can enter college and university programs.
- h. Information age of the future will replete with changes in the scope of practice.
- i. Science of respiratory care will continue to expand at the same pace as medicine.
- j. Projections regarding the profession must incorporate new technology, new therapeutic approaches, and data management skills, which the future RT needed to become successful in the workplace.
- k. Clinical decisions will be increasingly data driven; with evidence-based medicine guiding the activities of the therapist.
- l. Need for therapists to be actively involved in research will continue to grow.
- m. Use of protocols to guide respiratory care within and outside the intensive care unit (ICU) will continue to expand.

- n. Respiratory care technology will expand, and ventilators will become more sophisticated and incorporate more closed-loop control modes of ventilation.
- o. Enhanced monitoring techniques will be incorporated into the basic operation of the mechanical ventilator.
- p. Explosion of drugs delivered via aerosol and aerosol devices are on the verge of clinical availability.
- q. Drugs affecting many organ systems as well as gene-replacement therapy will be delivered via aerosol.
- r. Simpler and more efficient extracorporeal gas-exchange devices will continue to be developed.
- s. Care teams will become the standard for providing care in the hospital.
- t. These teams may frequently be led by therapists.
- u. Therapists will become increasingly involved in patient and staff education, disease management, and the provision of respiratory care in the home.

The second AARC conference, “Educating the Future Respiratory Therapist Workforce: Identifying the Options,” was similar in format to the first conference. The goal of this event is to identify and reach a general agreement on the competencies required to fulfill the scope of practice described in the first conference for graduate RT and the RT workforce. Graduate respiratory therapists are defined as those who begin practice immediately after completion of an accredited education program. Meanwhile, RT workforce is defined as practitioners with varying amounts of work experience and number of credentials. The assumption, taken by the second conference attendees, is that the workforce must be at least as competent as the new graduate RT in 2015. Then a third conference was held in 2010, having a goal to agree on a plan, ensuring that “by 2015 the RT workforce and graduates of RT education programs have developed the competencies identified by the second conference.”

The first conference identified the respiratory care delivered to critically-ill patients as major competency area of the profession. Consequently, the second conference has a more

detailed discussion on the competencies needed in the future to deliver respiratory care to critically-ill patients. With an increasingly more sophisticated care and equipment as the hallmark of intensive care, operational capability with diversity in mechanical ventilators used in adult, neonate, and pediatric patients in ICUs are essential. A working knowledge of the different approaches is important to provide mechanical ventilation to various types of patients and various types of cardio-pulmonary diseases. Critical thinking and communication skills to discuss their position in the care of patients during treatments and rounds are vital in the delivery of care. The therapist should be relied upon as an expert source of knowledge of information and should be conversant in new technology and updates in providing respiratory care.

Some of the expected roles and competencies of a respiratory therapist include, but not limited to the following: comprehend the differences among these ventilators and be capable of examining the positives and negatives of each unit; must be proficient in the operation of these modes and understand the physiology supporting the use of each mode so that they can lead discussions on appropriate application; working knowledge of the indications, contraindications, risks, and benefits of each mode of ventilation; a working knowledge of the approaches used to provide mechanical ventilation to patients with various disease states (eg, chronic obstructive pulmonary disease, acute lung injury/acute respiratory distress syndrome, sepsis, trauma, postoperative care, asthma, and pneumonia); practice evidence-based protocols to the management of mechanically-ventilated patients (eg, the Acute Respiratory Distress Syndrome Network protocol); large number of randomized controlled trials in respiratory critical care necessitating the graduate to critically review the literature and to critique statistical methodology used to evaluate study results; must acquire the ability to distinguish between indications for invasive and noninvasive ventilation and high-frequency oscillation; must recognize the indications for rescue therapies such as extracorporeal membrane oxygenation; a broad knowledge of the various approaches to monitoring that includes radiograph, laboratory, bedside monitoring data, computed tomography, and magnetic resonance imaging data; must

be proficient in the monitoring of hemodynamics and must be able to evaluate pressure, flow, and volume waveforms to determine how the mechanical ventilator should be adjusted; have the ability to recommend alternate modes of ventilation to improve patient-ventilator synchrony; a working knowledge of pharmacology as a requisite specifically an understanding of drugs that affect the patient's interaction with the mechanical ventilator, and agents used to treat cardiovascular dysfunction; and must be able to modify respiratory care based on integration of data from the patient, hemodynamic monitors, the ventilator, radiographs, and laboratory reports.

Competency-based Education for Respiratory Care and Standards: CoARC

The Commission on Accreditation for Respiratory Care (CoARC) mapped the expected competencies of health professionals in respiratory during the Review of Policies and Implications for Respiratory Care Accreditation, the Competency-Based Education (CBE) on May 18, 2012.

As noted by the Commission, the 'learning outcomes' is the main emphasis of a competency-based education. CBE does not focus on 'what the students are expected to learn about' during the course of the study, but it addresses on 'what graduates are expected to do' upon completion of the study, for example, properly weaning patient from mechanical ventilator, skillfully coaching patient in pulmonary function test, providing respiratory care appropriately, among others.

In higher education institutions, CBE is not a new approach to learning because it has been in actuality for almost four decades in education but widely accepted only in the past decade. According to Rogers and Richards (2001), the educational goals in CBE framework can be defined as the accurate measurable representation of the knowledge, skills, and behaviors student would acquire upon completion of the program. In health professions education, CBE can be defined as the framework that centers on the health care professionals' desired performance attributes. The framework institutes observable and measurable outcomes

students are expected to achieve at the end of study thus, capacity to execute and perform the desired competencies by which a graduate or health professional be considered competent.

As noted by Gruppen, Mangrulkar and Colar (2010), CBE provides a tangible shift in what stakeholders and accreditors look for in judging and certifying success of educational programs; therefore, result is important than the process. Customarily, the accreditation standards involve a set of recommended courses of instruction mandated by an authorized agency, based on traditions, importance and merit of a particular profession. The rapidly changing and technology-driven health care environment and the curriculum are steadily making partial changes to keep pace with innovations and adaption to the new content. Standards on competency-based accreditation aim at the expected competencies needed for entry in the workplace and profession. This enables flexibility to curriculum and successfully bring about the desired knowledge and competencies and to establish criteria to measure success and deficiencies by monitoring the outcomes.

The Pew Health Professions Commission published a report that influenced the shift to Recreating Health Professional Practice for a New Century. Said commission drafted several recommendations toward transforming the health professions workforce (O' Neil & Pew Health Professions Commission, 1998). Included in the recommendations was an appeal for health professions programs to 'realign training and education to be more consistent with the changing needs of the care delivery system'. The four action steps for fulfilling this recommendation were: Professional school faculty members and administration should assess their existing course of study to specify whether or not they are satisfactory preparing students to handle the challenges set forth in the competencies; professional associations should consolidated the competencies into their accreditation and licensing processes, benchmarks for graduation, entry into professional practice and continuing competence; students should evaluate the quality of educational programs based on how well they will construct them to apply the competencies in their careers; and, hospitals and other institutional providers should consider partnerships with

academic institutions that continuously revise their curricula to reflect changing market dynamics and that embody the competencies.

After the Pew Commission report was released, the Institute of Medicine (IOM) published a report that advocated an interdisciplinary summit to develop the next steps for revising the health professions education in order to enhance patient care quality and safety. This resulted to a conference on Crossing the Quality Chasm: A New Health System for the 21st Century (2001). Attended by 150 participants across disciplines and professions, the Institute of Medicine (IOM) convened a summit in June 2002. In 2003, the IOM of the United States of America encouraged higher education institutions to produce more health professions graduates and to prioritize the upgrading of knowledge, skills, and abilities of graduates to address the ever-changing health care system. Pushing for a competency-based approach in education and accreditation, the IOM defined five core competency areas expected across health professions, described through a vision to be embraced by all institutions of health professions education. IOM (2003) stated, “All health professionals should be educated to deliver patient-centered care as members of an inter-disciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics (p.3).”

CoARC (2010) added that, “Competencies are the written statements describing the measurable set of specific knowledge, skills, and affective behaviors expected of graduates” (p. 10). The minimum evidence of compliance associated with this CoARC Standards refers to the documentation of competencies encompassing knowledge, technical adeptness, and behaviors expected of program graduates as well as evaluation tools designed to monitor knowledge, performance, and behavior. Also, the types of learning activities and assessments would indicate compliance with recognized competencies. The student learning outcomes encompass the integration of a specialized set of knowledge, skills, and abilities that students have attained at the completion of their professional program required for entry into the profession.

Specifically, CoARC Standard 4.01 (2010) noted, “...programs prepare students to meet the recognized competencies for registered respiratory therapists identified in these

Standards” (p. 23). The curriculum should be the framework for a deliberate and systematic educational process in the three domains: cognitive, psychomotor, and affective, to develop a competent respiratory therapist. It should propose to generate new skill with an application in mind, presented with attention to needs, objectives, activities, and a defined method of evaluation. This should incorporate supervised pre-clinical (didactic and laboratory) and clinical learning strategies, as well as written record of progress towards reaching the required competency. CoARC Standard 4.02 (2010) noted, “....requires programs to define and list the competencies it requires for graduation. The program must employ student evaluation methods that measure all defined program competencies. These competencies and evaluation methods must be written and communicated to the enrolled students” (p. 23).

As regards minimum evidence of compliance associated with this Standard, an evaluation mechanism was designed for the purpose of monitoring knowledge, performance, and behaviors as well as published materials demonstrating communication of competencies to students. The competencies for the respiratory care education program should include the preparation of graduates who possess the knowledge, skills and values to practice respiratory care. A variety of objective testing measures should include both process and end-product assessment to measure student performance. These methods furnish student performance data concomitant in evaluating specified competencies throughout the program for the students, faculty members, and college administration. The student should be aware of the competencies required for completion of the program by providing proof (i.e., written acknowledgement).

Higher order assessments would require direct observation, structured feedback on performance, or skills-based evaluations in simulated or real patients. A competency-based accreditation review needs the inclusion identified set of competencies that must be achieved at the end of the program of study and there should be a set of desired competencies for each degree level. It can also include the learning experiences (e.g., specific course or activity within a course, clinical training or other degree requirement) by which competencies are met. Also, a curriculum map or matrix is necessary, along with identified deficiencies or gaps in the

curriculum, and a comprehensive analysis of the completed matrix or map based on a comparison with the expected learning outcomes.

The revisions in the curriculum brought about by its thorough analysis must be presented. These may include the description of the following: method in which competencies are built, utilized and made obtainable to students and the public; method in which the program regularly assesses the changing health practice or needs; procedures used for monitoring and evaluating on how the student is achieving the expected competencies, including processes for identifying competency attainment; and outcomes that serve as measures by which the program will evaluate student achievement. The student clinical evaluation mechanisms should include the students' competence in clinical skills, communication and practice management, or other identified competency domains.

Essary and Statler (20017) noted, "A curriculum map traditionally offers a comprehensive overview of the content and the respective assessment tools used to measure student outcomes. Curriculum maps also provide programs with a tool to facilitate continuous curricular evaluation and identify potential areas for improvement" (p. 22). The Commission on Accreditation in Respiratory Care uses a particular form of a curricular map, the *CRT/RRT Combined Detailed Content Outline Comparison* that permits program to compare the content areas of the National Board for Respiratory Care (NBRC) examination matrices with program course content areas, to identify gaps in the curriculum.

As previously discussed in the second '2015 and Beyond' conference, the knowledge, skills, and attributes that future RT will need exceed those of today's respiratory therapy program graduates. The roles and responsibilities of the profession have greatly evolved, but the education requirements of the graduate respiratory therapist have not changed. The 2015 and Beyond project convened stakeholders representing employers, professional organizations, government agencies, patients and consumers, the education community, accrediting and credentialing agencies, state licensure boards to study how the profession needs to change to meet the demands of patient care in the future. The 2015 conferences assumed the difficult task

of identifying changes needed to enable the current education system to produce RT with the competencies and attributes necessary to provide optimal care in 2015 and beyond.

The RT of today performs diagnostic and therapeutic procedures that are entirely different many decades ago. The RT of today is expected to perform the following roles, but not limited to: assess and quantify patients with cardio-pulmonary conditions, bedside critical care provider; contribute to discussion on the plan and management of therapy; provide evidences to support various approaches to respiratory care in critical cases; and recommend management of patients.

Educators are constantly challenged to innovate and expand their curricula to satisfactory prepare students to the new roles and responsibilities. American Association of Respiratory Care recommends standards and qualifications to assess and enhance the competency level of professionals in workplace relative to job assignments. Specialty areas are recognized and established such as pulmonary function technology, sleep disorders, neonatal and pediatrics respiratory care, diagnostics, ground and air transport, long-term respiratory care, adult or geriatric respiratory care, and management and education. Competency standards should address the various work sites and present the knowledge, skills and attributes relative to the tasks required in each specialty area. AARC explored development and promotion of career ladder in education options to progress the competencies of students in the baccalaureate level and advancement of professionals as well. The identified roles and responsibilities of the RT workforce change substantially in the near future, in response to major changes in the United States healthcare system. The AARC must provide possibilities for the current RT workforce to prepare for the new roles and responsibilities in 2015 and beyond. Further education and training in each of the seven (7) competency areas identified by the conference and in all the specialty areas need to begin immediately by 2015.

Program Assessment and/or Evaluation

"If the program is working well, the students are learning, there is no need to bother with assessment" is a common misconception about program assessment. The Southern Association of Colleges and Schools in Georgia, USA, reiterates improvement of education through accreditation. Hence, it should be emphasized that its main purpose is to upgrade or enhance the quality even if the existing educational program is working well. Educators should always consider a room and provide possibilities for advancement. Academic institutions necessitate that every program should assess its students and graduates and use the assessment results to further improve the programs. Therefore, not conducting the assessment should not be an option especially in schools. Assessment or evaluation may mean a lot of things and has various definitions; but as a whole it may refer to the types or processes of measuring a student's achievement on a test; or it may also refer to the processes of measuring the effectiveness of a program. This study measured *the what and the how* of respiratory therapy program as regards its contribution to learning and in preparing the students to workplace demands.

The study involved the process applied to RT program in obtaining feedbacks from selected group of stakeholders. It measures, what the students and graduates know, what they can do with the acquired knowledge, and what they value as a result of this knowledge. The result equips the administrators, faculty members, and decision makers to develop useful information about the respiratory therapy program based on the gathered evidence. The result may guide them in making acceptable and proper decisions about program quality, effectiveness in relation to how it affects students learning and development. As stated on the Handbook on Typology Outcomes-based Education, and Institutional Sustainability Assessment from CHED (2014):

"Mature evaluation systems are based upon outcomes, looking particularly into the intended, implemented, and achieved learning outcomes. Inputs and processes remain important, as they shape the learning experience that is made available to

students. CHED adopts two different approaches to outcomes-based evaluation of programs and of institutions: Approach 1: A direct assessment of educational outcomes, with evaluation of the individual programs that lead to those outcomes. This can provide a basis for program accreditation. Approach 2: An audit of the quality systems of an institution, to determine whether these are sufficiently robust and effective to ensure that all programs are well designed and deliver appropriate outcomes. Such an audit will not normally make direct judgements on academic programs, but it will consider program-level evidence to the extent necessary to establish that institutional systems are functioning properly. These can also provide a basis for future institutional accreditation" (p. 11).

In developing a Curriculum Evaluation model for RT education, this study considered not only those parameters recognized by the commission, but also the integration of 21st century standards and demands, both local and international, in health professions education. This is done to make the evaluation suitable to assess the responsiveness of RT education or curriculum to the health professions education for the 21st century.

As regards curriculum review process, the discussion of the "desired" or ideal state for the program typically includes data or information from alumni surveys, advisory board reviews, employer surveys, professional accreditation reviews, and data or information from other sources. They have been selected to provide feedback on such things as how well graduates of the program perform in their current positions, and where the field is going, among others. It is a useful exercise for program faculty to think about the larger picture of the developing professional to gauge what students can accomplish given the time they spend in the program. Then, in comparison of desired and current state, they use matrix that presents one way to direct the degree to which courses map to program outcomes, permitting the unit to see where there are gaps to be filled, essential and non-essential overlaps and unmet needs, for example, the outcomes not supported by courses or courses not supporting outcomes.

Two approaches are popular in this era of changing landscape both in education and in health care system, Outcomes-based education and Competency-based education. Competency based assessment is the process of gathering evidence and instituting conclusions on the character and the learner's progress scope toward professional standards. Competence goes beyond mere mastery of information, but is an assumption to cleverly structure factual knowledge within the framework consisting of clinical reasoning, communication skills, professional ethics, interpersonal conduct, and cross-cultural awareness and social engagement.

Assessments are on the actual skill and knowledge the learner can demonstrate in clinical setting, and their general features include: Criterion based – on standards of practice; Evidence based – accumulation of informal verbal/ written assessment/feedback, assignments, log, critique and self-assessments; and, Participatory based – learner is involved in the process and consults with the assessor. Hence, the systematic way to determine if a program has attained its goals is called Outcome-based evaluation or outcomes measurement. An organized course of formulating an outcome-based program and a logic model (an evaluation plan) aid academic institutions to communicate effectively and institute comprehensive program benefits (outcomes). It also recognizes strategies to assess program benefits (indicators), clarifies certain individuals or groups for which the program's advantages are intended (target audience), and drafts program services to reach that audience and achieve the preferred and desired results.

Curriculum Transformation for RT (in other countries) and Other Health Professions

Alongside literature and studies on OBE, the curricula of nursing and other medical care programs are currently going through transformations. It is noted that current emphasis is on the learner and assessment of learning outcomes, quality and safety concepts integration in the curriculum, translational science and research, evidence-based practice, and the application of technology to the delivery of instruction. In reviewing the curricula and considering change,

educators must weigh these factors. The current and future curricula call for the integration of approaches to guarantee excellence in learning by constructing outcome measures to decide the high quality standard of the program.

Health professions education has evolved over the years employing various theories and having identified and developed new roles to meet the needs of the professions' practice settings with the growing demand with emphasis on education, primary prevention and management of chronic diseases. The American Association of Colleges of Nursing in 2013 noted the need for change in presenting more importance on evidence-based practice, quality improvement approaches, safety standards, competency frameworks, informatics, and inter-professional education. Also Andre and Barnes (2010), Callen and Lee (2009), Phillips et al. (2013), Spences (2012), Stephens-Lee, Der-Fa, and Wilson (2013), and Sullivan (2010) stated that given the knowledge rapid explosion and emphasis on substantial reform of health care education, Giddens and colleagues (2008) pointed out the overwhelming undertaking in redesigning the nursing curriculum. It was widely noted in the different literature that transformation of nursing education through curriculum development is vital due to the complexity of today's health care system, delivery and nature of the health care environment in which future nurses will work (AACN, 2008; Bellack, 2008; Coonan, 2008; Greiner & Knebel, 2003; IOM, 2010; Phillips et al., 2013). The traditional methods of nursing education need to give way to more innovative approaches to prepare graduates for the nursing practice of the future.

The National Council of State Boards of Nursing (2009) defined innovation as “ a dynamic, systematic process that envisions new approaches to nursing education.” Innovations reported in the nursing literature include the use of high-fidelity simulation as a supplementary tool or replacement for clinical experiences. Partnering with other clinical agencies or educational institutions to form a consortium for sharing resources in the delivery of education is one measure of innovation. Accordingly, to meet the future needs and the demands of the health care environment, restructuring is a must.

Today and tomorrow's education of RT certainly needs a significant increase in the utilization of simulation. A growing education requirement is a big challenge to higher education in baccalaureate level in the delivery of new training set of circumstances both in computer and human simulations. Valuable knowledge and practices that can be gained in simulation environment may include pulmonary system simulators modeling, computerized anatomic and physiologic models, computerized simulation of patient signs and symptoms. They further include neonatal, pediatric and adult full-size patient simulators, mechanical ventilators, upper and lower airways anatomy models, pulmonary breath sounds, distribution of ventilation, mechanics of gas exchange, bronchoscopy simulation, and 3-dimensional virtual bronchoscopy, among many other things.

Clinical simulation is an effective tool to train not only the RT students but also other medical care providers in variety of clinical scenarios. Preparing a student for future respiratory therapy work in intensive care and trauma units can be successfully attained through proper incorporation of different simulation platforms and through feedbacks from individuals or groups with regard to the expanding education needs of future RTs. Moreover, simulation in didactic and clinical scenarios in the delivery of instruction is still invaluable.

Skiba and Spences (2012) noted the importance of integrating utilization of new technology in the 21st century nursing curriculum. Another issue impacting curricular development and change is the administration of curricular content. The nursing literature provides a vast amount of evidence showing that faculty and students are besieged with content (AACN, 2009; Giddens et al., 2008; Mailloux, 2011; Powell-Cope et al., 2008). An increasing amount of new content is found to be of utmost importance to include in nursing curricula brought about by continuously growing health sciences education (AACN, 2008; Accreditation Commission for Education in Nursing [ACEN], 2013a; Skiba, 2012). One example of essential knowledge content to include in nursing curriculum relates to a series of reports issued by the IOM (Greiner & Knebel, 2003) that generated a great deal of attention to the need to enhance the quality and safety of health care delivery. This led to dramatic changes in the practice of

nursing, medicine, and other health disciplines. Based on the reports, the nursing profession aimed at improving the quality of education and safety of the community; yet, apparently its graduates lacked the knowledge, skills and attitudes expected of them. For this reason, a nationwide initiative in education centered on patient safety and quality health care services, where the ultimate purpose is to prepare students face the issues and concerns in health system in the future.

According to World Health Organization (2020), health is “ a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (p.1). Thus, health inconsistencies persist at every level of the definition. In this aspect, many medical academic institutions provide a set of circumstances for students to understand about health inequalities, social determinants of health, and the physician’s role in promoting health equity. Survey of the literature recommends that community or public visits and placements both in clinical and non-clinical environments can help the students in developing communication skills, valuing non-medical community health support, and better understanding of community health. Many institutions provide several types of opportunities for community participation and public health involvement through elective and extracurricular courses.

Additionally, which is very relevant to the current global pandemic, a recent paper on COVID-19 and Health Professions Education: A 360° View of the Impact of a Global Health Emergency by Adrian Rabe[1], Michael Sy[2], Wayne Yik Wai Cheung[3], Don Eliseo Lucero-Prisno[4]; Institution: 1. Global Health Focus and Imperial College London, 2. National Teacher Training Center - Health Professions, University of the Philippines, Manila, 3. Global Health Focus, 4. London School of Hygiene and Tropical Medicine, and the University of the Philippines (Open University) With the disease dynamic changing rapidly across different contexts, alongside our evolving understanding of the disease, it is not entirely known whether COVID-19 will disappear, or stay over the long term. Countries that have initially controlled the number of confirmed new cases are facing a resurgence of infections after loosening up their lockdowns (Anthony, *et al.*, 2017; Li, *et al.*, 2020; Reuters, 2020; FRANCE24, 2020; Rogers,

2020). Thus, it is important to understand how health professions education (HPEd) is being impacted and what adaptations have to be considered in the near future and the long-term. In some countries, universities have collaborated with international organizations to temporarily divert their curricular offerings into COVID related training sessions and webinars (WHO, 2020). This diversion signposts to curriculum developers the need to include mandatory courses or electives on pandemic and emergency responses. The course can contain a range of topics or can be divided into different training sessions. We suggest the following topics that can be emphasized and integrated further into the curriculum of various health professions: Respiratory disease and infectious disease, Home-based medical and health care, Telemedicine, Vaccination, Community and population health, and Inter-professional education and collaborative practice.

Synthesis

It can be noted that the BS RT program being one of the youngest health professions in the country is presently facing the need for transformation in its curriculum to prepare its students/graduates in meeting the demands of 21st century health care. No studies were found exactly related but the reviewed sources were found to be very useful in providing the foundation and in establishing the concrete context of the study. Given the literature review, it was established that assessment of the current Respiratory Therapy curriculum was not an option, but an essential part in developing a framework as basis in forming the curriculum model

for the program. Literature on assessment also guided the researcher on the initial process of the study since assessment results provide rich and reliable data about the effects of current curriculum. This being so, credible decisions about the design and content of the model can also be made. The design of the framework served as the preliminary step in developing a curriculum model for program modification. Innovation was also included to decide on a proposed curriculum model that appropriately addresses the challenges posed by 21st century

health professions education and new roles of the profession. Other inputs for the design of the framework came from the reviews and of the analysis of documents. Said documents provided the means of tracking changes and developments for comparison and identification of agencies or professional organizations that played a role in curriculum improvement. The review helped the researcher develop broad understanding on relevant concepts, discover insights relevant to the research problem, and complement other research methods used in this study. Furthermore, personal experiences of the researcher as licensed respiratory therapist and expert in the field of respiratory therapy education were useful in crafting the model of the study.

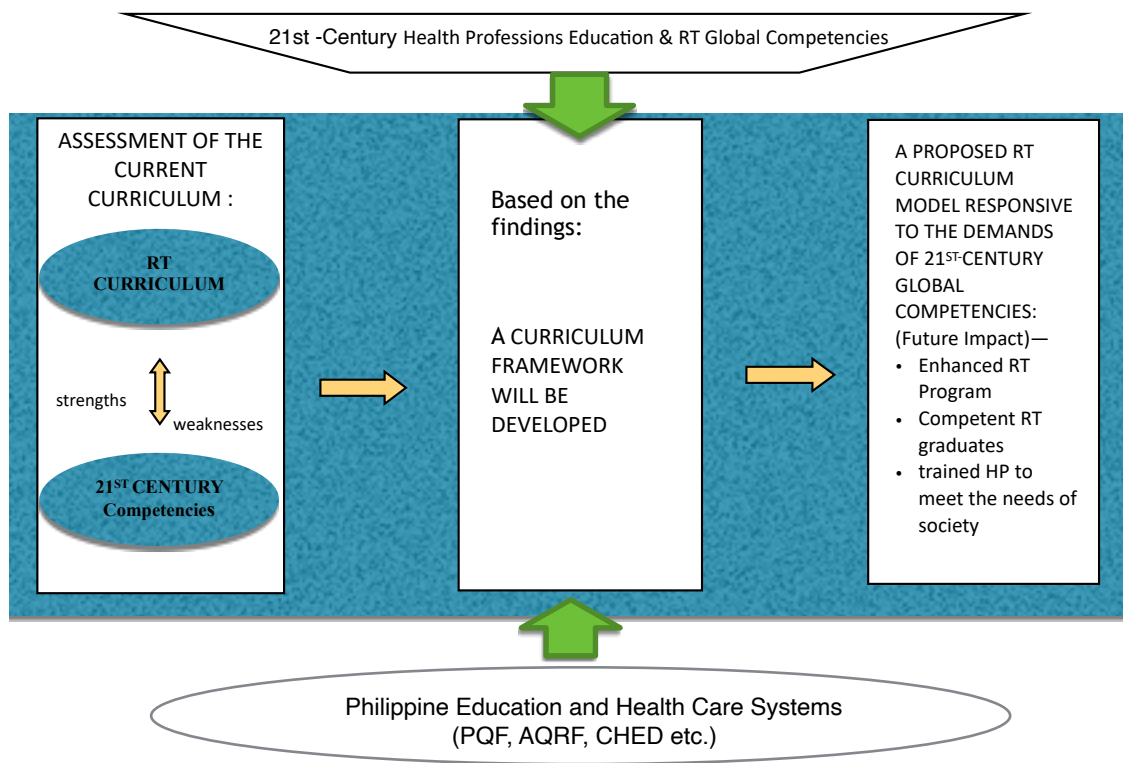
The topic on 'Competencies needed by graduates, is a significant basis on what parameters or indices to consider in designing the curriculum framework. It also rationalizes that the role and responsibilities of the respiratory therapists have substantially changed in response to major changes in the health care system. Furthermore, the literature substantiated that the education system needs change or reform so that learning gained could meet the needs of the patient/client. Hence, any health profession could respond to the dynamic changes in health care system/health care needs of the community through the process of educational change, reform, or adjustment. The related studies in nursing program and case studies in medicine were also invaluable contributions in the course of developing the RT curriculum model. Also added which is very relevant at this current global pandemic is the recent paper on COVID-19 and its effect on health professions education. The related literatures did not only validate that a transformation or reform in health professions education or curriculum is necessary but also provided the basic principles and guide questions on what to include and what to expect in the curriculum that is responsive and relevant to the 21st century education and expectations in health care system. The ultimate aim of this research is coming up with a framework as basis in creating a curriculum model to reform the respiratory therapy education in order to (future impact) produce globally trained and highly skilled respiratory therapist who can meet the needs of the society (their patients) for a strengthened health system (respiratory care).

Conceptual Framework

To organize ideas, key concepts, and the relationships among those concepts were identified and illustrated as shown in Figure 1.

Figure 1

Diagram showing the relationship among variables in the study



Literature reviews show that as the twenty-first century hits its stride, health professions training and education programs are re-examining their validity and relevance in the context of their social accountability. Health professionals in the new century called for a change and need to transform education, to strengthen widespread health systems internationally and to train health professionals that meet the needs of society.

Fragmented, outdated, and static education models widely adopted now produce graduates who fail to meet the demands of society. Also a mismatch between these health education programs and the health system is at the heart of this problem. There are different

related literature and studies which argued for major reforms across the entire medical and health education system to produce competency-led curricula for the future.

In this regard, massive and disruptive instructional and institutional reforms were recommended. Reform movements across the world have all been asking the question: What do twenty-first century health professionals need to know? What changes are needed in the education curricula to ensure that health profession students graduate or complete the program having the competencies required of them to address the society's health need?

With the initial analysis of the researcher, the current situation of RT education in the country was previously discussed together with the synthesis of the different literature and studies. These served as anchor of the conceptual framework (Figure 1). The identified driving forces of conducting this study are the country's current context and thrusts in education and health care systems, and the demands of health professions education and global competencies expected of respiratory therapy graduates in the 21st century.

The current context of higher education in the country is now more complex because it is not limited to the local, regional, or national conditions. Global mobility, international rankings, and institutional sustainability are just a few factors considered. Philippine HEIs are particularly challenged to produce Filipino graduates who can engage meaningfully in their communities and the nation, and who are productive and competitive, especially in the context of ASEAN 2015 and the globalization of professional practice.

CHED recognizes how HEIs respond appropriately to particular global and national challenges. To be globally competitive, there is a need to ensure that Filipinos have the right competencies and attitudes through excellent quality education at all levels. To address the demands and challenges of an international community, the Philippine government has been implementing educational reforms for the past few years. The processes include CHED adopting an outcomes-based approach to assessment (including monitoring and evaluation) because of its potential "to greatly increase both the effectiveness of the QA system, and the quality, efficiency, and effectiveness of higher education" (p.10). There is a need to demonstrate

that the achievement of outcomes matches international norms. The Philippine Qualification Framework (PQF) is designed to make systems more aligned with these norms. Increasingly, these agreements are made among accrediting bodies, and the government is entering into Mutual Recognition Agreements (MRAs) with ASEAN. These allow for global mobility (e.g., for studies and employment) and competitiveness of graduates in whatever industry they are involved in. This can be achieved through quality tertiary education. Thus, CHED is interested in developing the systems that would help the country produce the best and the most competitive professionals.

The new breed of national curriculum, exemplified by the CHED, manifests several common design features. Relevant to this study, such is the curriculum that exemplifies a set of inter-related and parallel trends in world-wide policy-making, as is seen in 'the introduction of Philippine Qualifications Framework' and 'the shift to outcomes-based education from inputs-based education'.

Given the essential concerns on national educational reform, the need for re-designing health professions education to align with the challenges or changes in health care system in the 21st century is deemed a priority. The health professions education should venture beyond its traditional emphasis on conveying diagnosis and treatment skills, to integrate meaningfully the new elements and demands of the 21st century into the health professions curricula, considered as the main anchorage in aiming for a reformed RT education.

This study employed two processes as basis in developing the major output. First is on assessing the curriculum, followed by designing and developing a curriculum framework based on the findings of assessment, and the creation of a proposed curriculum model for BS Respiratory Therapy based on the framework. Meanwhile, the role of assessment/evaluation was to measure appropriately the level of responsiveness of the present BSRT curriculum in producing graduates with competencies expected of the 21st century respiratory therapists.

Assessment/evaluation was an integral part of the process that systematically collects, provides, and utilizes information with regard the present curriculum to determine the nature,

quality, and efficiency of the BSRT program. Specifically, the purpose is on looking at the level of responsiveness of the current RT curriculum to health professions education and global competencies in meeting the international standards in the 21st century. Assessment then was done to identify the strengths and weaknesses of the current curriculum. The evaluation was based on the measure of the actual skills and knowledge or competencies that a graduate respiratory therapist can demonstrate in the workplace or other contexts. Furthermore, the evaluation provided an evidence base on the subsequent judgement and decision making on curriculum model development and reformation. Different parameters were included, along with the legal bases from CHED and other concerned professional accredited organizations or agencies, 21st century standards in education and health care systems relevant to RT both local, national and international demands.

After the initial process of assessment is the planning stage in developing a framework. The design of the framework was utilized in drafting the BSRT Curriculum model. The model should possess the qualities and requirements of a curriculum that answers and matches the demands of health professions education and global competencies of RT graduates in the 21st century.

A. Health professions education. To discuss further, the perceived emerging challenges of the health system are epidemiological and demographic transitions, professional differentiation, population demands, and technological innovation. The recommended core competencies in the global health workforce emphasize patient and population centeredness, competency-based curriculum, inter-professional and team-based education, IT-empowered learning, and policy and management leadership skills. These areas provide a strong base for formulation of reform initiatives into 21st century scenarios. The focus is on core competencies beyond the command of knowledge and facts. The competencies include patient-centered care, interdisciplinary teams, evidence-based practice, continuous quality improvement, use of new informatics, and integration of public health. Research skills are valued, as are competencies in policy, law, management, and leadership. It also prepares graduates for lifelong learning.

Curriculum reforms include outcome-based programs tracked by assessment, capacity to integrate knowledge and experiences, flexible individualization of the learning process to include student-selected components, and development of a culture of critical inquiry—all for equipping health professionals with a renewed sense of socially responsible professionalism.

B. Competencies of RT graduates. The identified competencies for RT graduates in administering respiratory care are diagnostics, disease management, evidence-based medicine and respiratory care protocols, patient assessment, leadership, emergency and critical care and therapeutics, based on American Association of Respiratory Care standards and guidelines. The results reported are for graduate competency, with the understanding that the workforce must also have, at a minimum, the same knowledge, skills, and attributes. Competency area 1: Diagnostics. Descriptors: Pulmonary Function Technology, Sleep, and Invasive Diagnostic Procedures; Competency area 2: Disease Management. Descriptors: Chronic disease management and Acute disease management; Competency area 3: Evidence-based Medicine and Respiratory Care Protocols. Descriptors: Evidence-based medicine and Respiratory care protocols; Competency area 4: Patient Assessment. Descriptors: Patient assessment, Diagnostic data and Physical examination; Competency area 5: Leadership. Descriptors: Team member, Healthcare regulatory systems, Healthcare finance, Written and verbal communication and Team leader; Competency area 6: Emergency and Critical Care. Descriptors: Emergency care and Critical care; Competency area 7: Assessment Prior to Therapy. Descriptors: Assessment of Need for Therapy, Assessment Prior to Therapy, Administration of Therapy, Evaluation of Therapy; Competency area 8: Therapeutics- Application to Respiratory Care Practice. Descriptors: Medical gas therapy, Humidity therapy, Aerosol therapy, Hyperinflation therapy, Bronchial hygiene therapy, Airway management and Mechanical ventilation).

The ultimate aim of this study is to produce a Curriculum model responsive to 21st century RT global competencies that contributes in reforming respiratory therapy education in order to (future impact) produce trained and globally competent professional respiratory

therapists who meet the needs of the society (its patients) for a strengthened health system (respiratory care) in the 21st-century.

Research Problems

The purpose of this study was to develop a framework as basis in proposing a curriculum model for Bachelor of Science in Respiratory Therapy that is responsive to the 21st-century RT global competencies within the Philippine context and thrust in education and health care systems. This endeavor seeks to answer the following specific research questions:

- a. What are the strengths and weaknesses of the current Respiratory Therapy curriculum in terms of its responsiveness to 21st-century global competencies?
- b. Based on the findings, what curriculum framework could be developed in conceptualizing the contents of a responsive respiratory therapy curriculum in the 21st-century global competencies?
- c. After utilizing the framework, what enhancements and contents are needed to integrate in a respiratory therapy curriculum model?

Significance of the Study

Generally, the information drawn from the assessment of curriculum served as data base necessary for the formulation or creation of the major output of this study. Results of this will benefit the health professions education system as a whole for it will offer feasible concepts for leaders and planners in the field. The use or application of the model would establish and sustain quality educational program of academic institutions encountering gaps and issues in the 21st century.

Moreover, this will also function as reference to provide background and generate ideas for future researches, studies or experiments in other areas of interest or related studies as the case maybe.

Specifically, this study will be beneficial to the following stakeholders:

Administration/management. With the use of the curriculum model, the school authorities will be able to ensure and can be guided of the quality education they are offering to their students, particularly for RT students for the purpose of this study. They may also benefit from the results of the study by taking into considerations the factors that may help them implement successful educational program in their own institutions.

Faculty members. With the use of curriculum model, the RT teachers would be able to assess and evaluate regularly the quality of instruction and curriculum they give to students and interns, both inside and outside (clinical internship training) the classroom or school, as this constitutes LIFE LONG LEARNING.

Students. With the use of the model, they could obtain the kind of instruction that meets the professions' demands of the constantly changing and globally competitive workforce.

Patients. The patients would be guaranteed that they are receiving the proper RT management and treatment for their illnesses from the competent graduates and professionals of the program.

Employer. They would also be assured that they are hiring skilled respiratory therapists/ staff that meet the patients' demand for quality care and service.

Commission on Higher Education. The findings of the study would enable the CHED accredited higher institutions to gauge the actualities of the program goals, program implementation, student competencies, and application of knowledge and skills learned by RT students. This maybe used as basis for CHED Technical Committee in Respiratory Therapy Education (TCRTE) to revisit, and if necessary, re-engineer the PSG of the program for its alignment to the 21st century demands. Likewise, the instrument used in this study may be adopted by the Commission in their final monitoring and evaluation of the program and future planning and decision-making on future review and revision of RT curriculum.

RT Evaluation Instrument/Assessment Tool. A self-made assessment/survey tool specific for RT program that can be utilized in the academe even in clinical practice in evaluating the strengths and weaknesses of BSRT in responding to the demands of 21st century. As also seen by the

researcher, this could offer an opportune venue where all the concerned professional agencies related and relevant to RT profession are consulted and given the chance and privilege to express their real sentiments and concerns about the program. This allows the service providers to incorporate some changes or transformation in the RT education based on the identified needs and concerns by utilizing (future) the developed curriculum model.

Finally, this study is envisioned by the researcher to contribute to the body of knowledge in the field of Curriculum and Instruction that could be used by future researchers in the area of curriculum planning and development, not only in respiratory therapy but also in other health academic programs or disciplines.

Scope and Limitations of the Study

The study identified the result of assessment from seven (7) RT schools out of more than twenty (20) CHED accredited schools offering RT program in the country, and twelve (12) Respiratory therapy units from different hospitals. The inclusion criterion of respondent schools is that they must have more than ten (10) years of offering the BSRT program, who had experienced and currently using the two CMOs.

These 7 schools started offering the program with CMO No. 9 series of 2007. It only involved the fourth year students, faculty members, heads and deans, and BSRT graduates of said curriculum. The students were currently employed as RT clinical practitioners in hospitals at the time of the study. Other stakeholders from different accredited organizations such as the Professional Regulation Commission –Professional Regulatory Board for Respiratory Therapy and Continuing Professional Development Council, Association of Respiratory Care Practitioners Philippines, and Philippine Society of Respiratory Therapy Educators also contributed in the study.

The study identified the strengths and weaknesses of the present BSRT curriculum in terms of its responsiveness and alignment to health professions education and in producing respiratory therapy graduates with global competencies in the 21st century. This was conducted

in different RT schools, pulmonary therapy units in different hospitals, and recognized professional organizations from year 2017 to 2019.

Definition of Terms

For a better understanding of the terms used in the study, the following are defined operationally:

Alignment. This refers to the course programs and outcomes are properly presented in conformity with the demands of the 21st century RT global competencies.

Assessment/Evaluation. This refers to the process of identifying strengths and weaknesses of current BSRT curriculum in terms of its responsiveness in health profession education and global competencies of RT graduates in the 21st century.

Curriculum. This refers to the set of courses constituting the BS RT program.

Framework. This refers to the basic structure in conceptualizing the contents of the curriculum model responsive to the 21st century RT global competencies.

RT Global Competencies. This refers to the required and needed ability or skills (competencies) Respiratory Therapy graduates should possess, in meeting local and international standards and expectations in respiratory care in the 21st century.

Curriculum model. This refers to the the final output of the study, a proposed curriculum model for BSRT which is more responsive and aligned to the needs of RT education in the 21st-century global competencies. The model has the characteristics of integrating the enhancements and contents based on the developed curriculum framework.

Professionals (PQF Entry Level 6). This refers to the globally competitive respiratory therapists who first and foremost serve the country but whose competencies are recognized in the regional and international communities; and/or graduates of BS RT program.

Reformed BS Respiratory Therapy program. This refers to the expected impact of this research, RT program that has the following qualities: can fill the present 'gaps' between the standards and expected performance of the students and graduates for the 21st century which satisfactory and competently serve the needs of the students/graduates, satisfactory responding to the national and international expectations of the practice of the profession. The program if properly implemented in schools will help its students thrive in today's world.

Responsiveness. Utilizing the developed framework, this refers to the model that appropriately addresses, through an enhanced curriculum for BS Respiratory Therapy program, the needed education in producing a globally competent and competitive Filipino respiratory therapy graduates in the 21st century.

Strengths. This refers to the courses/subjects in the BS Respiratory Therapy curriculum that do not need enhancement.

Weaknesses. This refers to the courses/subjects in the BS Respiratory Therapy curriculum that need major enhancement.

21ST Century Health Professions Education – the anchor, a new vision and a renewed action to a better health professions education in order to improve the health of the society they are serving, particularly for respiratory therapy program for this study.

CHAPTER II

METHODS

This chapter presents the research design, population and sample, instruments, data gathering procedure, statistical tools applied and in designing a framework to be utilized in proposing a curriculum model. This part also includes the discussion on how to ensure the welfare and processes in safeguarding not only the participants but also the research locale and the researcher.

Research Design

The study employed the combined quantitative and qualitative approach to assess and evaluate the BS Respiratory Therapy curriculum. The main goal of this study was towards the development of a proposed curriculum model that is more responsive to the health professions education and global competencies of RT graduates in the 21st century.

Current curriculum for BS Respiratory Therapy education was the main consideration in this study. CMO No. 9 series of 2007 was the basis for assessment of curriculum for the reason that the respondents in the study were senior students; graduates/alumni employed in clinical practice and in the academe who were graduates of this curriculum; and, the deans/heads of RT schools and different Pulmonary Units in different hospitals. Meanwhile, CMO No. 53 also played a major role since it was used as main reference and guide in designing the framework and integrating the needed enhancements and contents in the proposed curriculum model.

The proposed model is expected to serve as future guideline in mapping a BS Respiratory Therapy curriculum specific for an academic institution offering the program. However, an assessment or evaluation using the researcher's self-made questionnaires and document reviews was first employed, the result of which served as bases on how and what to include in designing the curriculum framework and was then utilized in proposing a model, as the final output of this study.

Congruent with the main goal of this research was the proper ethical procedure guidelines practiced and employed to ensure safety and protection of the participants or respondents, research locales, and the researcher in data gathering and method of sharing.

Research Site

The study was conducted in seven (7) RT schools : Pines City Colleges (Baguio, Benguet), University of Perpetual Help System DALTA (Las Pinas City, Metro Manila), Emilio Aguinaldo College (Ermita, Manila), University of Perpetual Help System Laguna (Binan, Laguna), Mary Chiles College (Sampaloc, Manila), Our Lady of Fatima University (Valenzuela, Metro Manila), and St. Jude College (Sampaloc, Manila). Twelve (12) medical and hospital institutions also participated in the study: Chinese General Hospital (Blumentritt Rd., Sampaloc, Manila), Veterans Regional Hospital (Bayombong, Nueva Vizcaya), Cardinal Santos Medical Center (San Juan, Metro Manila), San Lazaro Hospital (Santa Cruz, Manila), Notre Dame Chartres Hospital (Baguio Benguet), Jose B. Lingad Memorial Regional Hospital (San Fernando, Pampanga), Pampanga Premier Medical Center (Apalit, Pampanga), Ospital ng Angeles (Angeles, Pampanga), Veterans Memorial Medical Center (Diliman, Quezon City), General Trias Medical Center and Hospital Inc. (General Trias, Cavite), Our Lady of Pillar Medical Center (Imus, Cavite), and the Lung Center of the Philippines (Diliman, Quezon City).

RT professional organizations like PRC-PRBRT and CPDC, CHED-TCRTE, ARCPP, PSRTE also took part in this study.

Research Process

The researcher observed the following processes in conducting the study:

Phase I Pre-Data Gathering: Validation of Instruments, Selection Criteria of Respondents

The survey method, open-ended questionnaires, and document reviews were the techniques for data gathering where results were used as reference in the proposing a curriculum model, based on the designed framework. The researcher also developed an

assessment tool specific for the purpose of the study that directly assessed the responsiveness of the current BSRT curriculum in terms of educating the respiratory therapy students and preparing them to their future roles and responsibilities as professional respiratory therapists. Different evaluation tools and 21st century assessment tools in health professions education and the 21st century RT global competencies expected of the graduates and professionals served as basis and were utilized in developing the main instrument to evaluate the areas of concerns in the current curriculum. The instrument were the same set of questionnaires administered to RT students and employed RT graduates. While, an Open-ended questionnaire was used to substantiate information collected from the survey questionnaires where the respondents were requested to evaluate and answer honestly each area.

These instruments were first submitted to the advisers for comment/s and suggestion/s, and then referred to curriculum and education experts to examine their content validity. Content validation experts were composed of one (1) professor from Philippine Normal University Manila graduate school, two (2) PNU doctorate graduates, two (2) Deans/researchers of allied health programs at New Era University, Quezon City, one (1) CHED-Technical Committee for Respiratory Therapy Education Chairman, and one (1) PRC-Board Member for RT.

Several Focus Group Discussions (FGDs) during accredited professional organizations' meetings were conducted. Group of educators (Philippine Society of Respiratory Therapy Educators) and clinical practitioners (Association of Respiratory Care Practitioners, Philippines) were involved in the dialogues concerning the BSRT curriculum, education and competencies of students and graduates as they enter the clinical internship and workplace. The researcher took FGDs as opportunities for interacting and initially seeking verbal permission from the heads/deans of seven (7) respiratory therapy schools offering the RT program for more than ten (10) years, using CMO No. 9 series of 2017 as program guide. Likewise, the same was done for the twelve (12) chief RTs of hospitals' pulmonary/respiratory therapy department to conduct the study in their respective institutions. The concerned groups articulated their willingness to support the study in accordance with one mission and vision of advancing the profession in the

country. Subsequently, the formal request or permission to conduct the study in their respective institutions followed.

Purposive sampling was used to identify the respondents of the study, since it involved the senior students, deans, heads, coordinators, and faculty members of these schools offering the Respiratory Therapy program for more than 10 years. This study also involved graduates of this curriculum that are currently employed as RT clinical practitioners/staffs in twelve (12) hospitals.

After the questionnaires were validated, and with the university ethics committee and adviser's approval, with the permission from participant schools to conduct the study, and with approval from hospital-respiratory therapy department heads, the researcher personally went to seven (7) schools and twelve (12) hospitals. The purpose of personal visit was to meet the heads of these institutions, faculty members, and RT hospital heads to discuss the purpose of the study. Clarifications and administration of survey instrument and the whole process of the study were discussed. The researcher provided these institutions the instruments, in which both parties agreed that the RT deans/heads and RT chiefs would take the responsibility in administering the questionnaires to their students and faculty members for schools and RT clinical practitioners /staffs for hospitals.

The researcher also sought their consent, making use of the "Informed Consent Form". It was also emphasized that the respondent's participation was voluntary and all information and data that gathered were to be treated with utmost confidentiality.

Moreover, the researcher sought permission from PRBRT (Professional Regulatory Board for Respiratory Therapy), ARCPP (Association of Respiratory Care Practitioners in the Philippines, Inc.), PSRTE (Philippine Society of Respiratory therapy Educators), and RTACCP (Respiratory Therapy Academy of Critical Care, Phils.). Again, these groups of professionals articulated their willingness to support and contribute to the study.

Table 1*Number of Respondents in the Study*

Research Sites	NUMBER OF RESPONDENTS
<i>A. Survey Questionnaire:</i>	
RT Schools (students)	184
Clinical Practitioners (heads and staff)	107
RT Faculty Members	21
Total	312
<i>B. Open-ended Questionnaire:</i>	
Heads of RT Schools	7
Total	7
<i>C. Statements/Insights:</i>	
Professional Regulatory Board for Respiratory Therapy (Chairman)	1
Association of Respiratory Care Practitioners, Phils. (ARCPP-President)	1
Respiratory Therapy Academy of Critical Care, Phils. (RTACCP-President)	1
Total:	3
Grand Total:	<u>322</u>

Phase II: Data Gathering

The researcher then provided the respondents and institutions the instruments needed for data gathering. The administration of an open-ended questionnaire to RT school deans and heads was conducted after the survey method to substantiate the quantitative data with qualitative data. Initially, it was an interview process of gathering the data, but the respondents

themselves requested the researcher to provide them with just the “Interview Guide Questions” so that they could fully answer all the questions since they were very much concerned of this most opportune avenue to share and contribute in advancing the profession. In this approach, the researcher solicited honest and extensive responses from respondents as these were very important in the analysis and interpretation of data derived from closed-ended/survey questionnaires. In addition, insights were noted from the officers of three (3) professional organizations: PRBRT, ARCPP, and RTACCP. The researcher obtained their insights, opinions and suggestions on the current program through an open-ended questionnaire.

The study necessitated the involvement professionals as they are in the best apposite positions to provide the much needed data and information for describing and assessing the status of respiratory education in the country, most specifically on how relevant and responsive was the RT curriculum in providing the graduates the entry-competencies at workplace both at the local and international employment.

Also, document reviews served as an adjunct process in collecting the relevant and credible data during the process of designing and planning the output of the study. Documents were reviewed and analyzed to give meaning to the findings of assessment as initiated in the study. Included in the review were local and international RT public documents : the official CHED Memorandum Orders No.9, series 2007 and CMO No. 53, 2017; and Implementing Rules and Regulations of Republic Act 10024, known as the “Philippine Respiratory Act of 2009”. Additionally, legal bases and records of professional organization’s policies and activities were considered. There were also analysis of mission statements of Philippine Qualifications Framework and Asean Qualifications Reference Framework, accredited professional organization’s annual reports, code of ethics, scope of practice, and clinical internship training manuals. International standards and competencies expected of the graduates were also considered in drafting the framework from International Council for Respiratory Care, American Association of Respiratory Care, Canadian Society of Respiratory Therapists, and Commission on Accreditation in Respiratory Care.

Data Analysis

Mixed method was employed in the study. The qualitative method was incorporated with quantitative method to provide richness to the database and maximize the results of assessment. Quantitative approach included the administration of questionnaires and document reviews. On the other hand, the qualitative approach included the open-ended questionnaire ('interview guide questionnaire') for validation of findings. The researcher also worked with the major stakeholders of the profession consisting of the RT school administrators, faculty members, students, graduates, clinical coordinators of both the schools and affiliated hospitals, and professional agencies and accredited organizations. The study obtained their insights, opinions and recommendations pertaining to the status of the RT program.

The type of data collection began with documenting the design, development, and evaluation. This was followed by documenting the conditions under which the development took place, including factors such as equipment and resources available, participants' expertise and background, and time constraints. Participants were initially briefed and informed of the background of the study and were given the assurance that the data would be treated anonymously and confidentially. In making the procedure official, written consent was asked from the participants for them to sign and attest to their willingness and voluntary participation in the study.

The collected data from the assessment were organized in tabular form and synthesized using statistical tools.

While the responses in the open-ended questionnaire produced descriptive data that the researcher interpreted using rigorous and systematic methods of transcribing, coding, and analysis of trends and themes. The method allowed for the generation of comprehensive analysis, collected an in-depth perceptions and descriptions of the current curriculum from the specific group of respondents, the RT educators, clinical practitioners and officers of accredited professional organizations. Content analysis for interpreting meaning of the data collected and thus identify important aspects of the content. It included processes and procedures for the

categorization of text data for the purpose of classification and summarization on how they assessed the RT education, particularly specific in the curriculum.

Statistical Treatment of Data

For analyzing data quantitatively, data gathered are summarized, presented and analyzed using the following statistical tools.

Frequency Distribution Table was used to summarize and present the data gathered in tabular form for readers to see relevant information at a glance of the table.

Relative Frequency, or percentage, was used to express the number of observations having the same characteristics as a percentage of the sample size. The relative frequency, or simply percentage, was obtained by the following formula:

$$rf = \frac{f}{n} \times 100\%$$

where f is the number of entities having the same traits, and n is the sample size.

Mean was used to summarize the ratings of respondents for the indicators of competencies that Respiratory Therapy students should be proficient with after completion of the program for BS Respiratory Therapy. Mean was chosen by the researcher since it would give a single numerical description of the assessments of all the respondents for the competencies in the different areas of Respiratory Therapy.

The mean has the advantage that it takes into account all the ratings of all the respondents in its computation. Thus, the mean is a more reliable measure of central tendency that reflects the assessments of all respondents as compared to other measures of central tendency. That is, according to Dawes (2016) the use of mean provides a numerical description of a set of data, in this study it was a set of ratings of respondents, that represents

a typical value from that set of data that is centrally located in the distribution of data and around which the rest of the values in the set of data tend to cluster.

Dawes (2016) also said that the use of mean is appropriate for quantitative data that are either counted or measured. In the study the researcher deals with numerical data where the researcher counted the number of respondents that have given a certain, specified rating for a specific indicator of competency of Respiratory Therapy students in some area of Respiratory Therapy. More particularly, Dawes (2016) added that mean is appropriate to use for two (2) types of measurement scales, namely, interval and ratio. In the study, the researcher used interval scale since there is no rating of zero (0) available for any competency being assessed. The mean is also useful for parametric procedures such as statistical tests, said Dawes (2016).

For aforementioned reasons, the researcher opted to use the mean for summarizing the ratings of all respondents to assess the levels of competencies of Respiratory Therapy students in the different areas of the program BS Respiratory Therapy. The mean was obtained by adding the observed values and dividing by the number of observed values. The mean was calculated using the following formula:

$$\bar{x} = \frac{\sum x}{n}$$

where x was the observed value and n is the sample size. The computed means have the following verbal interpretations and descriptions:

Mean:	Description:
1.00-1.50	The area/descriptor is not present or not provided in the curriculum
1.51-2.50	The area/descriptor to some degree or extent is provided in the curriculum
2.51-3.50	The area/descriptor is provided in the curriculum but needs major enhancement
3.51-4.50	The area/descriptor is provided in the curriculum but needs minor enhancement
4.51-5.00	The area/descriptor is well provided in the curriculum and no enhancement is needed

Qualitative data were gathered through the administration of the open-ended questionnaire ('interview guide questionnaire') to the following participants: faculty, clinical instructors, deans, heads and chairpersons from colleges and universities offering the RT program and hospitals offering respiratory care. The set of questions that was asked to all participants pertained to vital areas and parts in the curriculum namely, "Program Description, Objectives, Content, Length, and Admission, Courses, Instruction, Assessment, Evaluation, Global Competitiveness, Curriculum Enhancement, Internship Program, Adequacy, and Specific courses to be Given More Emphasis and Should Be Included" in the curriculum. In particular, the researcher quoted the participants' verbatim and what they actually said to explain the weaknesses of the program BS Respiratory Therapy in terms of the different areas of the curriculum. The study used both quantitative data obtained by survey and qualitative data obtained to establish agreement between the assessments of the program by the participants in the survey and the experiences and evaluation of the same program or curriculum. Analysis of qualitative data provided the researcher with confirmation of the strengths and weaknesses of the program BS Respiratory Therapy. Both quantitative and qualitative data were gathered, analyzed and formed the basis for the framework for improving the curriculum.

Ethical Considerations

Part of the research objective was to ensure the safety and protection not only of the participants but also of the research locale and the researcher.

The study applied and practiced ethical procedures to individuals, institutions, and agencies involved to guarantee that the research plan was thoroughly reviewed by the university's Ethics Committee and dissertation advisers. The study provided assurance that the participant's welfare was protected and the respondents were properly informed of the background and nature of the study.

The respondents were treated as autonomous individuals entitled for protection. Principle of respect is necessary, where elements of information, comprehension, and voluntariness through informed consent were identified. Respect for persons was interpreted to mean that participants were presented with relevant information in an understandable format and that they voluntarily agreed to participate.

Administration of questionnaires were done in their respective institutions or in any appropriate safe place based on the agreed and approved upon time and date of the researcher and participants.

This study did not involve minors or indigenous population; however, all research requires informed consent and voluntary participation of respondents. Information was presented to enable the subject population to voluntarily decide whether or not to participate in research as respondents. The researcher made certain that the following general requirements for ethics were satisfied in the study: informed consent was obtained from the respondents; respondents were given sufficient opportunity to consider whether they want to participate; and, consent was given without coercion or undue influence. Respondents were furnished with written profile of the study.

The researcher provided the complete information to school and hospital respondents regarding the nature of the study, both verbally and in writing. The written information and

briefing of the respondents were discussed by the heads of the schools and hospital units, as agreed upon by both parties. They discussed the main purpose of the study, along with the goal and objectives, and the reason why they were selected to participate in the study. It was reiterated that the study posed no harm, and possible benefits were discussed, together with the commitment to privacy, right to decline of participation and their right to withdraw at any stage of the study without any consequences or penalty. anonymity and confidentiality of information.

Furthermore, strategies that were employed such as the rigorous reviews by the research advisers and strict compliance with the ethics guidelines of the institution increased the capacity to obtain scientifically valid research outcomes without undue influences by secondary conflict of interests.

Methods of Sharing

The researcher will disseminate the study to seminars, conference talks, call for papers 'abstracts and posters. Generally, these communications and means are seen as preliminary in nature, giving the study the chance to get feedback also to progress or to future researches in curriculum and instruction. However, informing respondents of the final output through small group presentation to acknowledge their contribution is first and foremost, showing respect and seeing them not only as a means to the researcher's end.

CHAPTER III

RESULTS AND DISCUSSION

This chapter presents the findings, analysis, and interpretation of the data collected as a basis for developing a curriculum framework to be used in conceptualizing contents and integrating enhancements needed in the curriculum model. The Bachelor of Science in Respiratory Therapy curriculum should be responsive to the demands of health professions education and global competencies of graduates for the 21st-century in the Philippine context, and thrust in education and health care system.

The discussion of findings is presented according to the research questions posed earlier.

Research Problem No. 1:

What are the strengths and weaknesses of the current Respiratory Therapy curriculum in terms of its responsiveness to the RT global competencies in the 21st-century?

Strengths and Weaknesses of the Current BS Respiratory Therapy Curriculum in terms of its Responsiveness to the Expected Competencies of its Graduates in the 21st Century

The summary of the strengths and weaknesses of the current BS Respiratory Therapy curriculum in terms of inclusion of the expected areas or competencies that should be provided in the curriculum can be seen in Appendix B. As assessed by the respondents, the curriculum has more weaknesses than strengths. As previously mentioned, the researcher has considered the areas or competencies needing *major enhancement as the weaknesses* of the BS Respiratory curriculum which were prioritized in developing the curriculum model.

Areas that Need Minor Enhancement in the Curriculum for BS Respiratory Therapy

The following, *Table 2*, summarizes areas or competencies that need “Minor Enhancement.” The BS Respiratory Therapy students and alumni-respondents assessed that these areas or competencies are provided in the curriculum but need minor enhancement. Accordingly, the researcher categorized these areas as the Strengths of the curriculum and presumed that the areas can be improved without altering the contents of the curriculum.

It can be seen in the preceding discussion that no areas or competencies are well provided in the curriculum where no enhancements are needed, as assessed by the respondents. This implies that each competency needs enhancement in the curriculum. Findings show that the areas or competencies need either minor enhancement or major enhancement, depending on how it was provided in the curriculum as assessed by the respondents.

Table 2

Areas/Competencies that Need Minor Enhancement

Area	Competency
Health Professions Education Mean = 3.54	Provide patient-centered care. Apply quality improvement.
Pulmonary Function Technology Mean = 3.65	Perform basic spirometry.
Invasive Diagnostic Procedure Mean = 3.61	Perform arterial puncture and sampling and blood analysis.
Disease Management Mean = 3.71	Understand the etiology, anatomy, pathophysiology, diagnosis, and treatment of cardiopulmonary diseases (eg, asthma, chronic obstructive pulmonary disease) and comorbidities. Establish specific desired goals and objectives. Evaluate the patient.
Chronic Disease Management Mean = 3.54	Apply a working knowledge of the pharmacology of all organ systems. Complete the assessment through direct contact, chart review, and other means as appropriate, and share the information with healthcare team members.
Patient Assessment Mean = 3.77	Obtain medical, surgical, and family history. Obtain social, behavioral, and occupational history, and other historical information incident to the purpose of the current complaint. Review and interpret Pulmonary function studies (Spirometry). Review and interpret lung volumes. Review and interpret arterial blood gases.
Diagnostic Data Mean = 3.82	Inspect the chest and extremities to detect deformation, cyanosis, edema, clubbing, and other anomalies. Measure vital signs (blood pressure, heart rate, respiratory rate). Evaluate patient breathing effort, ventilatory pattern, and use of accessory muscles.
Physical Examination Mean = 3.74	
Emergency Care Mean = 3.73	Perform Basic Life Support (BLS).
	Apply to practice knowledge, understanding, and analysis of invasive mechanical ventilators.
	Apply to practice knowledge, understanding, and analysis of non-invasive mechanical ventilators.
	Apply to practice all ventilation modes currently available on all invasive mechanical ventilators.
Critical Care Mean = 3.64	Apply to practice all ventilation modes currently available on all non-invasive mechanical ventilators. Manage airway devices and sophisticated monitoring systems. Make treatment recommendations based on waveform graphics, pulmonary mechanics, and related imaging studies. Apply knowledge, understanding, and analysis of use of therapeutic medical gases in the treatment of critically ill patients.
Assessment of Need for Therapy in all Patient Settings Mean = 3.67	Medical gas therapy. Humidity therapy. Aerosol therapy. Hyperinflation therapy. Bronchial hygiene therapy. Airway Management. Mechanical Ventilation.
Assessment Prior to Therapy Mean = 3.82	Review order or implement protocol. Review patient history, laboratory results, imaging data. Determine indications for therapy. Interview and conduct physical examination of patient. Determine appropriateness of order. Determine need for physician communication.
Administration of Therapy Mean = 3.76	Select and assemble equipment. Apply and administer therapy. Educate and instruct patient. Recognize and rectify equipment malfunction (troubleshooting). Maintain infection control.
Evaluation of Therapy Mean = 3.54	Recognize complications and adverse effects. Assess therapy effectiveness. Document therapy.

In the area of “Health Professions Education,” the BS Respiratory Therapy curriculum needs minor enhancement on competencies in providing patient-centered care and applying quality improvement, with mean ratings of 3.56 and 3.51, respectively.

The competency for “Pulmonary Function Technology” needs minor enhancement (with mean rating of 3.65) in specific area of performing basic spirometry. Similarly, the competency for performing arterial puncture and sampling and blood analysis in the area of “Invasive Diagnostic Procedure” (with mean rating of 3.61) needs minor enhancement .

In the area of “Disease Management,” there is a need for minor enhancement of the competency in understanding the etiology, anatomy, pathophysiology, diagnosis, and treatment of cardiopulmonary diseases (eg, asthma, chronic obstructive pulmonary disease) and comorbidities” with mean rating of 3.71.

In the area of “Chronic Disease Management,” competencies or areas in the curriculum that need minor enhancement is in evaluating the patient, establishing goals and objectives, and in applying knowledge of pharmacology. Particular, for competencies in evaluating the patient, establishing specific desired goals and objectives, and applying a working knowledge of the pharmacology of all organ systems need minor enhancement with mean ratings of 3.58, 3.54, and 3.51, respectively.

In the area of “Patient Assessment,” there are three (3) competencies that need minor enhancement in the curriculum: obtaining medical, surgical, and family history; obtaining social, behavioral, and occupational history, and other historical information incident to the purpose of the current complaint; and completing the assessment through direct contact, chart review, and other means as appropriate, and share the information with healthcare team members (with mean ratings of 3.79, 3.78, and 3.75, respectively).

In the area of “Diagnostic Data,” BS Respiratory Therapy students need to be more competent in reviewing and interpreting arterial blood gases, lung volumes, and pulmonary function studies (spirometry) (with mean ratings of 3.83, 3.82, and 3.82, respectively), implying the need for minor enhancement.

Minor enhancement is also needed in the area of “Physical Examination,” for specific competencies in measuring vital signs (blood pressure, heart rate, respiratory rate), evaluating patient breathing effort, ventilatory pattern, use of accessory muscles, and inspecting the chest and extremities to detect deformation, cyanosis, edema, clubbing, and other anomalies (with mean ratings of 3.77, 3.76, and 3.70, respectively).

In the area of “Emergency Care, specific competency in performing Basic Life Support (BLS)” (with mean rating of 3.73) also needs minor enhancement. In the area of “Critical Care,” the minor enhancements needed are those in the application to practice of knowledge and understanding of this knowledge. Particularly, for the competencies in application to practice all ventilation modes currently available on all invasive mechanical ventilators (with mean rating of 3.72); application to practice knowledge, understanding, and analysis of non-invasive mechanical ventilators (with mean rating of 3.70); application to practice all ventilation modes currently available on all non-invasive mechanical ventilators (with mean rating of 3.66); application to practice knowledge, understanding, and analysis of invasive mechanical ventilators and application to practice knowledge, understanding, and analysis of use of therapeutic medical gases in the treatment of critically ill patients (with the same mean rating of 3.63); managing airway devices and sophisticated monitoring systems (with mean rating of 3.57); and, making treatment recommendations based on waveform graphics, pulmonary mechanics, and related imaging studies (with mean rating of 3.55).

In “Assessment of Need for Therapy, in all Patient Settings”, all competencies need minor enhancement for mechanical ventilation (with mean rate of 3.78); aerosol therapy (with mean rating of 3.77); airway management (with mean rating of 3.69); humidity therapy (with mean rating of 3.66); medical gas therapy (with mean rate of 3.62); bronchial hygiene therapy (with mean rating of 3.61), and hyperinflation therapy (with mean rating of 3.57).

Six (6) competencies in the area of “Assessment Prior to Therapy” need minor enhancement. These competencies are the following: determine indications for therapy with mean rating of 3.89; review patient history, laboratory results, imaging data with mean rating of

3.86; review order or implement protocol and interview and conduct physical examination of patient with the same mean rating of 3.82; determine appropriateness of order with mean rating of 3.78; and, determine need for physician communication” with mean rating of 3.76.

Likewise, there is a need for minor enhancement in the area of “Administration of Therapy.” Specific competencies include the application and administration of therapy with mean rating of 3.90, selection and assembly of equipment with mean rating of 3.88, educate and instruct patient with mean rating of 3.86, and recognize and rectify equipment malfunction (troubleshooting)” with mean rating of 3.64.

In the area of “Evaluation of Therapy,” the competencies that need minor enhancements are the following: document therapy with mean rating of 3.57, assess therapy effectiveness with mean rating of 3.55, and recognize complications and adverse effects with mean rating of 3.51.

Table 3 summarizes and presents the competencies that need minor enhancement in the areas of applying knowledge, understanding, and troubleshooting skills to medical gas delivery systems, humidity therapy systems, and aerosol systems.

Table 3

Competencies in Therapeutics that Need Minor Enhancement in Application to Respiratory Care Practice in Medical Gas, Humidity Therapy and Aerosol Systems

Area	Competency
Apply knowledge, understanding, and troubleshooting skills to medical gas delivery systems Mean = 3.69	High pressure cylinders for adult patients. Regulators and flow meters for adult patients. Oxygen concentrators (stationary and portable) for adult patients. Liquid-oxygen systems (stationary and portable) for adult patients. High-flow air-entrainment systems (e.g. Downs flow generator, Caradine Whisper Flow, Maxtec) for adult patients. Oxygen and air-flow-meter mixing systems (requires competence in algebra). Air/oxygen blenders for adult patients. Hyperbaric oxygen systems for adult patients. Sub-ambient oxygen delivery systems (neonatal only) for adult patients. Nasal Cannulas High-flow nasal cannulas (eg, Vapotherm, Aequinox, Maxtec) for adult patients. Reservoir masks for adult patients. Nasal masks for adult patients. Non-reservoir masks for adult patients. Air-entertainment masks for adult patients. Aerosol mist tents for adult patients. Unheated bubble humidifiers for adult patients. Active and passive heat-and-moisture exchangers (HMEs) for adult patients. Heated humidifiers for medical gas delivery systems via mask or tracheal catheter for adult patients. Non-medicated (water/saline): Large-volume pneumatic nebulizers, via mask, T-piece, or tracheostomy collar; heated and unheated for adult patients. For delivery of medication: Small-volume pneumatic nebulizers for nebulization of liquids for adult patients. For delivery of medication: Intermittent for adult patients For delivery of medication: Breath-actuated for adult patients. For delivery of medication: Nebulizers for bronchial challenge testing for adult patients. Nebulizers for continuous nebulization for adult patients. Ultrasonic nebulizers for adult patients. Pressurized metered-dose inhalers for adult patients. Inhalers and dry-powder inhalers for adult patients.
Apply knowledge, understanding and troubleshooting skills to humidity therapy systems Mean = 3.82	Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Adrenergics Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Anticholinergics, cholinergics Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Decongestants, antimicrobials Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Mucolytic/proteolytics Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Pulmonary vasodilators Mathematics required: competency in algebraic calculation of and modification of drug dosing based on weight of patient.
Apply knowledge, understanding, and troubleshooting skills to aerosol systems Mean = 3.66	

In the area of applying knowledge, understanding, and troubleshooting skills to medical gas delivery systems, the researcher has identified sixteen (16) competencies that all need minor enhancement to improve the BSRT curriculum. These sixteen (16) competencies are those that involve the use of “Nasal Cannulas” with mean rating of 3.90; “Regulators and flow meters for adult patients” with mean rating of 3.80; “Reservoir masks for adult patients” and “Nasal masks for adult patients” with the same mean rating of 3.70; “High pressure cylinders for adult patients” with mean rating of 3.77; “Oxygen concentrators (stationary and portable) for adult patients” and “Non-reservoir masks for adult patients” with the same mean rating of 3.75; “Air-entertainment masks for adult patients” with mean rating of 3.71, “Air/oxygen blenders for adult patients” with mean rating of 3.69; “High-flow nasal cannulas (eg, Vapotherm, Aequinox, Maxtec) for adult patients” with mean rating of 3.68; “Oxygen and air-flow-meter mixing systems (requires competence in algebra)” with mean rating of 3.66; “Liquid-oxygen systems (stationary and portable) for adult patients” and “High-flow air-entrainment systems (e.g. Downs flow generator, Caradyne Whisper Flow, Maxtec) for adult patients” with the same mean rating of 3.62; “Aerosol mist tents for adult patients” with mean rating of 3.52; and “Hyperbaric oxygen systems for adult patients” and “Sub-ambient oxygen delivery systems (neonatal only) for adult patients” with the same mean rating of 3.51.

There are only three (3) competencies identified that need minor enhancement in the area of applying knowledge, understanding, and troubleshooting skills to humidity therapy systems. In particular, the competencies that need to be strengthened by minor enhancement involved the use of “Heated humidifiers for medical gas delivery systems via mask or tracheal catheter for adult patients” with mean rate of 3.85; “Unheated bubble humidifiers for adult patients” with mean rate of 3.81; and “Active and passive heat-and-moisture exchangers (HMEs) for adult patients” with mean rate of 3.80.

There are fifteen (15) competencies identified by researcher in the area of applying knowledge, understanding, and troubleshooting skills to aerosol systems that need minor enhancements. These competencies include “Non-medicated (water/saline): Large-volume

pneumatic nebulizers, via mask, T-piece, or tracheostomy collar; heated and unheated for adult patients”; and “For delivery of medication: Small-volume pneumatic nebulizers for nebulization of liquids for adult patients” with the mean rate of 3.80; the use of “Nebulizers for continuous nebulization for adult patients” with mean rate of 3.79; use of “Inhalers and dry-powder inhalers for adult patients” with mean rate of 3.78; use of “Pressurized metered-dose inhalers for adult patients” with mean rate of 3.77; use of “Ultrasonic nebulizers for adult patients” with mean rate of 3.73; competencies “For delivery of medication: Intermittent for adult patients” and “For delivery of medication: Nebulizers for bronchial challenge testing for adult patients” with the same mean rate of 3.68; competency “For delivery of medication: Breath-actuated for adult patients” with mean rate of 3.63; “Competency in algebraic calculation of and modification of drug dosing based on weight of patient” with mean rate of 3.58; “Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Mucolytic/proteolytics” with mean rate of 3.55; “Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Pulmonary vasodilators” with mean rate of 3.53; “Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Decongestants, antimicrobials” with mean rate of 3.52; and “Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Adrenergics” and “Competency in pharmacology nomenclature, physiologic action, adverse effects, doses: Anticholinergics, cholinergics” with the same mean rate of 3.51.

Table 4 summarizes and presents the competencies that need minor enhancements in application of therapeutics to respiratory care practice in “Hyperinflation Therapy,” “Bronchial Hygiene Therapy,” “Airway Management,” and “Mechanical Ventilation.”

Table 4

Competencies that Need Minor Enhancement in Application of Therapeutics to Respiratory Care Practice in Hyperinflation Therapy, Bronchial Hygiene Therapy, Airway Management, and Mechanical Ventilation

Area	Competency
Apply knowledge, understanding, and troubleshooting skills to hyperinflation equipment. Mean = 3.73	Incentive spirometers (flow-based and volume-based) for adult patients. Continuous positive airway pressure (CPAP) devices for adult patients. Expiratory positive airway pressure (EPAP) devices for adult patients. Intermittent positive-pressure breathing devices for adult patients. Manual hyperinflation with bag-valve-mask devices for adult patients.
Apply knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy Mean = 3.72	Positioning for bronchial drainage adult patients. Chest percussion: manual and mechanical percussor for adult patients. Vibratory continuous positive airway pressure (CPAP) for adult patients. Expiratory positive airway pressure (EPAP) devices for adult patients. External chest-wall-vibration devices for adult patients. Head-tilt chin-lift airway-opening maneuver for adult patients.
Apply knowledge, understanding, and troubleshooting skills to airway management Mean = 3.71	Oropharyngeal airway for adult patients. Nasopharyngeal airway for adult patients Face mask and bag-valve-mask for adult patients. Care of oral and nasal endotracheal tubes for adult patients. Advising discontinuance or change to alternative airway based on assessment/protocols for adult patients. Care of tracheostomy tube (Advising decannulation or change to alternative airway based on assessment/protocols) for adult patients. Care of tracheostomy "button" or valve for adult patients. Suction via artificial airway, operate suction system, select suction catheter for adult patients.
Apply knowledge, understanding, and troubleshooting skills to mechanical ventilation Mean = 3.75	Incorporate the mechanical ventilation principles in critical care for adult patients. CPAP devices for adult patients. Bi-level positive airway pressure (BiPAP) devices for adult patients. Noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet for adult patients.

In the area of applying knowledge, understanding, and troubleshooting skills to hyperinflation therapy, the researcher has identified five (5) competencies for which BS Respiratory Therapy curriculum need minor enhancements. These competencies involve the use of “Continuous positive airway pressure (CPAP) devices for adult patients” with mean rate of 3.83; “Incentive spirometers (flow-based and volume-based) for adult patients” with mean rate of 3.77; “Manual hyperinflation with bag-valve-mask devices for adult patients” with mean rate of 3.76; “Expiratory positive airway pressure (EPAP) devices for adult patients” with mean rate of 3.65; and “Intermittent positive-pressure breathing devices for adult patients” with mean rate of 3.62.

There are five (5) competencies that need to be strengthened in the area of applying knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy. The competencies in the said area that need minor enhancements include “Chest percussion: manual and mechanical percussor for adult patients” with mean rate of 3.86; “Positioning for bronchial drainage adult patients” with mean rate of 3.83; use of “Vibratory continuous positive airway pressure (CPAP) for adult patients’ with mean rate of 3.69; use of “Expiratory positive airway pressure (EPAP) devices for adult patients” with mean rate of 3.61; and use of “External chest-wall-vibration devices for adult patients” with mean rate of 3.59.

In the area of applying knowledge, understanding, and troubleshooting skills of airway management, the researcher found nine (9) competencies needing minor enhancements. These competencies include the following: “Oropharyngeal airway for adult patients” and “Face mask and bag-valve-mask for adult patients” with the same mean rate of 3.78; “Head-tilt chin-lift airway-opening maneuver for adult patients” with mean rate of 3.76; using “Suction via artificial airway, operate suction system, select suction catheter for adult patients” with mean rate of 3.74; “Care of tracheostomy tube (Advising decannulation or change to alternative airway based on assessment/protocols) for adult patients” with mean rate of 3.71; “Care of oral and nasal endotracheal tubes for adult patients” with mean rate of 3.69; “Nasopharyngeal airway for adult patients” with mean rate of 3.68; “Care of tracheostomy “button” or valve for adult patients” with

mean rate of 3.63; and “Advising discontinuance or change to alternative airway based on assessment/protocols for adult patients” with mean rate of 3.61.

In the area of applying knowledge, understanding, and troubleshooting skills to mechanical ventilation, there are four (4) competencies needing minor enhancement. The competencies include “Incorporate the mechanical ventilation principles in critical care for adult patients” with mean rate of 3.79;p using “CPAP devices for adult patients” with mean rate of 3.76; use of “Bi-level positive airway pressure (BiPAP) devices for adult patients” with mean rate of 3.74; and using “Non-invasive ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet for adult patients” with mean rate 3.71.

Table 5 summarizes and presents the competencies in “Applying Critical Thinking Skills” that need minor enhancement.

The two (2) competencies in “Applying Critical Thinking Skills” that need minor enhancement are “Prioritizing” and “Communicating.” Specifically, in the area of “Prioritizing” the competencies “Arrange scheduled work to treat the most critical or unstable patient first” with mean rating of 3.63; “Make rapid adjustments to the work schedule” with mean rating of 3.54; and “Adjust to unexpected circumstances” all need minor enhancement in the curriculum in teaching them to BS Respiratory Therapy students.

Table 5

Competencies in Applying Critical Thinking Skills that Need Minor Enhancement

Area	Competency
Prioritizing Mean = 3.56	Arrange scheduled work to treat the most critical or unstable patient first. Adjust to unexpected circumstances. Make rapid adjustments to the work schedule. Gather and give information: verbal, non-verbal, and written. Establish working relationships with others.
Communicating Mean = 3.55	Modify communication dependent on the practitioner and the situation. Deliver the appropriate message with clarity, professionalism, and good timing. Speak with appropriate intonation, facial expression, and body language.

In the area of “Communicating,” the competencies “Deliver the appropriate message with clarity, professionalism, and good timing” with mean rating of 3.58; “Establish working relationships with others” and “Modify communication dependent on the practitioner and the situation” with the same mean rating of 3.55; “Speak with appropriate intonation, facial expression, and body language” with mean rating of 3.54; and “Gather and give information: verbal, non-verbal, and written” with mean rating of 3.51 all need minor enhancement in the curriculum in teaching BS Respiratory Therapy students.

Areas that Need Major Enhancement in the Curriculum for BS Respiratory Therapy

Table 6 summarizes the areas or competencies that need “Major Enhancement.” The BS Respiratory Therapy students and alumni-respondents assessed these areas or competencies are provided in the curriculum but need major enhancement. Accordingly, the researcher categorized these areas as the “Weaknesses” of the curriculum and presumed that the areas can be improved by altering, transforming, revising the curriculum, and making it more

responsive to the demands of the 21st century. Thereby, the end product of these findings is the for BS Respiratory Therapy.

There are seven (7) competencies in the area of “Health Professions Education” that need major enhancement. Enhancement of these competencies was prioritized in this study in developing the framework and curriculum model. Thus, major enhancement in the curriculum for this area includes the following: “Employ evidence-based practice” with mean rating of 2.54; “Utilize informatics” with mean rating of 2.86; “Engage basic supervisory skills practice in the management of the respiratory department” with mean rating of 2.98; “Engage in lifelong learning” with mean rating of 3.17; “Engage practice in professional, social and ethical responsibilities” with mean rating of 3.24; and “Utilize effective communication orally and in writing using both English and Filipino” and “Work in interdisciplinary teams, to ensure that care is continuous and reliable” with the same mean rating of 3.33. These are the specific areas needing enhancement to raise the competence of BS Respiratory Therapy students.

Table 6

Areas/Competencies that Need Major Enhancement

Area	Competency
Health Professions Education Mean = 3.06	Engage in lifelong learning. Utilize informatics. Utilize effective communication orally and in writing using both English and Filipino. Work in interdisciplinary teams, to ensure that care is continuous and reliable. Employ evidence-based practice.
Pulmonary Function Technology Mean = 3.00	Engage basic supervisory skills practice in the management of the respiratory department. Engage practice in professional, social and ethical responsibilities.
Sleep Mean = 2.45	Compare and evaluate indications and contraindications for advanced pulmonary function tests. Explain the indications and contraindications, and general hazards and complications of bronchoscopy.
Invasive Diagnostic Procedure Mean = 3.07	Compare and evaluate the indications and contraindications for sleep studies Understand results in relation to types of respiratory sleep disorders. Describe the bronchoscopy procedure and describe the respiratory therapist's role in assisting the physician.
Chronic Disease Management Mean = 3.29	Monitor and evaluate the patient's clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices. Communicate and educate to empower and engage patients.
Acute Disease Management Mean = 3.09	Develop, administer, and re-evaluate the care plan.
Evidence-based Medicine Mean = 2.51	Develop, administer, evaluate, and modify respiratory care plans in the acute-care setting, using evidence-based medicine, protocols, and clinical practice guidelines. Incorporate the patient/therapist participation principles in chronic disease management.
Respiratory Care Protocols Mean = 3.16	Apply evidence-based medicine to clinical practice.
Diagnostic Data Physical Examination Mean = 3.42	Explain the use of evidence-based medicine in the development and application of hospital-based respiratory care protocols. Evaluate and treat patients in a variety of settings, using the appropriate respiratory care protocols.
Leadership Mean = 3.19	Review and interpret. Measure and document oxygen saturation with oximetry under all appropriate conditions (with or without oxygen at rest and during sleep, ambulation, and exercise). Understand the role of being a contributing member of organizational teams as it relates to planning, collaborative decision making, and other team functions. Understand fundamental/basic organizational implications of regulatory requirements on the healthcare system.
Emergency Care Mean = 3.20	Demonstrate effective written and verbal communication with various members of the healthcare team, patients, families, and others (cultural competence and literacy). Demonstrate basic knowledge of health-care and financial reimbursement systems and the need to reduce the cost of delivering respiratory care. Understand the role of team leader: specifically, how to lead groups in care planning, bedside decision making, and collaboration with other healthcare professionals.
Critical Care Mean = 3.33	Perform basic emergency care. Maintain current AHA certification. Perform emergency response. Participate in mass casualty staffing. Provide intra hospital transport. Provide cardiopulmonary life support and airway control during transport. Interpret ventilator data and hemodynamic monitoring data, and calibrate monitoring devices. Apply knowledge and understanding of circulatory gas exchange devices to respiratory therapy practice.
Evaluation of Therapy Mean = 3.50	Participate in collaborative care management based on evidence-based protocols. Deliver therapeutic interventions based on protocol. Integrate the delivery of basic and/or advanced therapies in conjunction with or without the mechanical ventilator in the care of critically ill patients. Make recommendations and provide treatment to critically ill patients based on pathophysiology. Recommend cardiovascular drugs based on knowledge and understanding of pharmacologic action. Use electronic data systems in practice. Respond to complications. Recommend therapy modifications.

In the area of “Sleep,” there are two (2) competencies that need major enhancement. These competencies are “Compare and evaluate the indications and contraindications for sleep studies” and “Understand results in relation to types of respiratory sleep disorders” with the same mean of 2.45, suggesting the need for major enhancement.

The researcher has identified three (3) competencies in the area of “Invasive Diagnostic Procedure” that all need major enhancement, as assessed by the respondents. These are “Explain the indications and contraindications, and general hazards and complications of bronchoscopy” with mean rating of 2.89; “Describe the bronchoscopy procedure and describe the respiratory therapist’s role in assisting the physician” with mean rating of 2.91; and “Monitor and evaluate the patient’s clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices” with mean rating of 3.23.

In the area of “Chronic Disease Management,” there are two (2) competencies that have been identified as needing major enhancement in the curriculum. These are “Develop, administer, and re-evaluate the care plan” with mean rating of 3.23 and “Communicate and educate to empower and engage patients” with mean rating of 3.34. Further, there are also (2) competencies in the area of “Acute Disease Management” that need major enhancement. These are “Develop, administer, evaluate, and modify respiratory care plans in the acute-care setting, using evidence-based medicine, protocols, and clinical practice guidelines” with mean rating of 3.01; and “Incorporate the patient/therapist participation principles in chronic disease management” with mean rating of 3.16.

In the area of “Evidence-based Medicine,” major enhancement is needed in competency “Apply evidence-based medicine to clinical practice” with mean rating of 2.51. Likewise, major enhancement is also needed in “Explain the use of evidence-based medicine in the development and application of hospital-based respiratory care protocols” with mean rate of 3.11. Additionally, “Evaluate and treat patients in a variety of settings, using the appropriate respiratory care protocols” with mean rate of 3.20 in the area of “Respiratory Care Protocols” needs major enhancement. As well, the competency in reviewing and interpreting “Diagnostic

Data” with mean rate of 3.44 needs major enhancement of the curriculum in this area. Competency in “Measure and document oxygen saturation with oximetry under all appropriate conditions (with or without oxygen at rest and during sleep, ambulation, and exercise)” with mean rate of 3.42 in the area of “Physical Examination” needs major enhancement.

Developing “Leadership” among BS Respiratory Therapy students is one area in the curriculum that has five (5) competencies needing major enhancement. With mean rate of 2.83, developing the competency “Demonstrate basic knowledge of health-care and financial reimbursement systems and the need to reduce the cost of delivering respiratory care” among BS Respiratory Therapy students need major enhancement. With the same mean rate of 3.25, teaching and cultivating the competencies “Understand the role of being a contributing member of organizational teams as it relates to planning, collaborative decision making, and other team functions” and “Understand fundamental/basic organizational implications of regulatory requirements on the healthcare system” among BS Respiratory Therapy students both need major enhancement. Moreover, the competency “Understand the role of team leader: specifically, how to lead groups in care planning, bedside decision making, and collaboration with other healthcare professionals,” with mean rate of 3.26, also needs major enhancement in developing this particular competency among BS Respiratory Therapy students. The competency “Demonstrate effective written and verbal communication with various members of the healthcare team, patients, families, and others (cultural competence and literacy) has a mean rate of 3.34, implying the need for major enhancement in the curriculum.

There are six (6) competencies in the area of “Emergency Care” that need major enhancement in the curriculum for BS Respiratory Therapy students to be excellent in the execution of these competencies. Particularly, the competencies in the area of “Emergency Care” that require major enhancement are “Maintain current AHA certification” with mean rating of 3.01; “Participate in mass casualty staffing” with mean rate of 3.13; “Perform emergency response” with mean rating of 3.18; “Perform basic emergency care” with mean rating of 3.27;

“Provide intra hospital transport” with mean rating of 3.28; and “Provide cardiopulmonary life support and airway control during transport” with mean rating of 3.34.

The area of “Critical Care” that needs “Major Enhancement” includes “Participate in collaborative care management based on evidence-based protocols” with mean rating of 3.05; “Recommend cardiovascular drugs based on knowledge and understanding of pharmacologic action” with mean rating of 3.29; “Make recommendations and provide treatment to critically ill patients based on pathophysiology” with mean rating of 3.42; “Integrate the delivery of basic and/or advanced therapies in conjunction with or without the mechanical ventilator in the care of critically ill patients” with mean rate of 3.43; “Deliver therapeutic interventions based on protocol” with mean rate of 3.45, and “Interpret ventilator data and hemodynamic monitoring data, and calibrate monitoring devices” with mean rate of 3.48.

There are two (2) competencies in the area of “Evaluation of Therapy” that have been identified as needing major enhancement. These competencies are “Respond to complications” with mean rate of 3.49; and “Recommend therapy modifications” with mean rate of 3.50.

Table 7 shows the competencies that need major enhancement in application to respiratory care practice in medical gas, humidity therapy and aerosol systems.

Applying knowledge, understanding, and troubleshooting skills to medical gas delivery systems for both pediatric and neonatal patients is one area in the curriculum for BS Respiratory Therapy with the greatest number of competencies that need major enhancement. Particularly, there is need for major enhancement in the areas of “Helium/oxygen therapy” for neonatal patients and pediatric patients with mean rates of 2.77 and 2.82, respectively; competency in using “Nitric oxide therapy” for both pediatric patients and neonatal patients with mean rates of 2.91 and 2.92, respectively; competency in using “Transtracheal oxygen therapy” for both neonatal patients and pediatric patients with mean rates of 3.09 and 3.14, respectively; competency in using “Hyperbaric oxygen systems” for both pediatric patients and neonatal patients with the same mean rate of 3.10; and competency in using “Sub-ambient oxygen delivery systems” for neonatal patients with mean rate of 3.12.

Table 7

Competencies in Therapeutics that Need Major Enhancement in Application to Respiratory Care Practice in Medical Gas, Humidity Therapy and Aerosol Systems

Area	Competency
Apply knowledge, understanding, and troubleshooting skills to medical gas delivery systems Mean = 3.22	High pressure cylinders for pediatric patients.
	High pressure cylinders for neonatal patients.
	Regulators and flow meters for pediatric patients.
	Regulators and flow meters for neonatal patients.
	Oxygen concentrators (stationary and portable) for pediatric patients.
	Oxygen concentrators (stationary and portable) for neonatal patients.
	Liquid-oxygen systems (stationary and portable) for pediatric patients.
	Liquid-oxygen systems (stationary and portable) for neonatal patients.
	High-flow air-entrainment systems (e.g. Downs flow generator, Caradyne Whisper Flow, Maxtec) for pediatric patients.
	High-flow air-entrainment systems (e.g. Downs flow generator, Caradyne Whisper Flow, Maxtec) for neonatal patients.
Apply knowledge, understanding and troubleshooting skills to humidity therapy systems Mean = 3.31	Oxygen and air-flow-meter mixing systems (requires competence in algebra) for pediatric patients.
	Oxygen and air-flow-meter mixing systems (requires competence in algebra) for neonatal patients.
	Air/oxygen blenders for pediatric patients.
	Air/oxygen blenders for neonatal patients.
	Hyperbaric oxygen systems for pediatric patients.
	Hyperbaric oxygen systems for neonatal patients.
	Sub-ambient oxygen delivery systems (neonatal only) for pediatric patients.
	Sub-ambient oxygen delivery systems (neonatal only) for neonatal patients.
	Nasal Cannulas
	High-flow nasal cannulas (eg. Vapotherm, Aequinox, Maxtec) for pediatric patients.
Apply knowledge, understanding, and troubleshooting skills to aerosol systems Mean = 3.24	High-flow nasal cannulas (eg. Vapotherm, Aequinox, Maxtec) for neonatal patients.
	Reservoir masks for pediatric patients.
	Reservoir masks for neonatal patients.
	Nasal masks for pediatric patients.
	Nasal masks for neonatal patients.
	Non-reservoir masks for pediatric patients.
	Non-reservoir masks for neonatal patients.
	Air-entertainment masks for pediatric patients.
	Air-entertainment masks for neonatal patients.
	Aerosol mist tents for pediatric patients.
	Aerosol mist tents for neonatal patients.
	Transtacheal oxygen therapy for pediatric patients.
	Transtacheal oxygen therapy for neonatal patients.
	Nitric oxide therapy for pediatric patients.
	Nitric oxide therapy for neonatal patients.
	Helium/oxygen therapy for pediatric patients.
	Helium/oxygen therapy for neonatal patients.
	Unheated bubble humidifiers for pediatric patients.
	Unheated bubble humidifiers for neonatal patients.
	Active and passive heat-and-moisture exchangers (HMEs) for pediatric patients.
	Active and passive heat-and-moisture exchangers (HMEs) for neonatal patients.
	Heated humidifiers for medical gas delivery systems via mask or tracheal catheter for pediatric patients.
	Heated humidifiers for medical gas delivery systems via mask or tracheal catheter for neonatal patients.
	Non-medicated (water/saline): Large-volume pneumatic nebulizers, via mask, T-piece, or tracheostomy collar; heated and unheated for pediatric patients.
	Non-medicated (water/saline): Large-volume pneumatic nebulizers, via mask, T-piece, or tracheostomy collar; heated and unheated for neonatal patients.
	For delivery of medication: Small-volume pneumatic nebulizers for nebulization of liquids for pediatric patients.
	For delivery of medication: Small-volume pneumatic nebulizers for nebulization of liquids for neonatal patients.
	For delivery of medication: Intermittent for pediatric patients.
	For delivery of medication: Intermittent for neonatal patients.
	For delivery of medication: Breath-actuated for pediatric patients.
	For delivery of medication: Breath-actuated for neonatal patients.
	For delivery of medication: Nebulizers for bronchial challenge testing for pediatric patients.
	For delivery of medication: Nebulizers for bronchial challenge testing for neonatal patients.
	Nebulizers for continuous nebulization for pediatric patients.
	Nebulizers for continuous nebulization for neonatal patients.
	Ultrasonic nebulizers for pediatric patients.
	Ultrasonic nebulizers for neonatal patients.
	Pressurized metered-dose inhalers for pediatric patients.
	Pressurized metered-dose inhalers for neonatal patients.
	Inhalers and dry-powder inhalers for pediatric patients.
	Inhalers and dry-powder inhalers for neonatal patients.
	Nebulizers using porous membranes for adult, pediatric and neonatal patients.
	Peak flow meters and inspiratory flow meters for pediatric patients.
	Peak flow meters and inspiratory flow meters for neonatal patients.
	Conversion of dosing based on mg, mL and % strength or ratio.

Moreover, in the area of applying knowledge, understanding, and troubleshooting skills to medical gas delivery systems, the competency in using “Aerosol mist tents” for both neonatal patients and pediatric patients with mean rates of 3.14 and 3.15, respectively, also needs major enhancement. Likewise, the competency in “Liquid-oxygen systems (stationary and portable)” for both neonatal patients and pediatric patients with mean rates of 3.18 and 3.19, respectively, needs major enhancement. Similarly, the competency in using “High-flow air-entrainment systems (e.g. Downs flow generator, Caradyne Whisper Flow, Maxtec)” for both pediatric patients and neonatal patients with mean rates of 3.18 and 3.22, respectively, needs major enhancement.

Competence of BS Respiratory Therapy students in the area of applying knowledge, understanding, and troubleshooting skills to medical gas delivery systems also needs to be developed, a need for major enhancement in the curriculum for using “High-flow nasal cannulas (eg, Vapotherm, Aequinox, Maxtec)” for both pediatric patients and neonatal patients with mean rates of 3.21 and 3.22, respectively; in terms of the competency in “Air/oxygen blenders” for both pediatric patients and neonatal patients with mean rates of 3.22 and 3.28, respectively in terms of competency in using “Oxygen and air-flow-meter mixing systems (requires competence in algebra)” for both pediatric patients and neonatal patients with mean rates of 3.23 and 3.26, respectively; and in terms of the competency in using “High pressure cylinders” for both neonatal patients and pediatric patients with mean rates of 3.23 and 3.24, respectively.

Competency in the use of “Air-entertainment masks” for both pediatric patients and neonatal patients with mean rates of 3.28 and 3.32 needs major enhancement in the curriculum. Major enhancement is needed in the use of “Reservoir masks” for both neonatal patients and pediatric patients with mean rates of 3.32 and 3.33, respectively. Likewise, the use of “Non-reservoir masks” for both pediatric patients and neonatal patients with mean rates of 3.32 and 3.34, respectively, needs major enhancement.

The final set of competencies in the area of applying knowledge, understanding and troubleshooting skills to medical gas delivery systems that need major enhancement include the

use of “Nasal masks” for both pediatric patients and neonatal patients with mean rates of 3.32 and 3.34, respectively; competency in the use of “Regulators and flow meters” for both pediatric patients and neonatal patients with mean rates of 3.35 and 3.39, respectively; and competency in the use of “Oxygen concentrators (stationary and portable)” for both neonatal patients and pediatric patients with mean rates of 3.35 and 3.39, respectively.

Table 8 summarizes the competencies that need major enhancement in application of therapeutics to respiratory care in hyperinflation therapy, bronchial hygiene therapy, airway management, and mechanical ventilation. In terms of the competency “Apply knowledge, understanding, and troubleshooting skills to hyperinflation therapy,” there is a need for major enhancement in the curriculum to improve the competence of BS Respiratory Therapy students in using “Incentive spirometers (flow-based and volume-based)” for both neonatal patients and pediatric patients with mean rates of 3.04 and 3.26, respectively; in using “Intermittent positive-pressure breathing devices” for both pediatric patients and neonatal patients with mean rates of 3.11 and 3.15, respectively; and in using “Expiratory positive airway pressure (EPAP) devices” for both neonatal patients and pediatric patients with mean rates of 3.15 and 3.19, respectively.

Table 8

Competencies that Need Major Enhancement in Application of Therapeutics to Respiratory Care Practice in Hyperinflation Therapy, Bronchial Hygiene Therapy, and Mechanical Ventilation

Area	Competency
Apply knowledge, understanding, and troubleshooting skills to hyperinflation equipment Mean = 3.21	Incentive spirometers (flow-based and volume-based) for pediatric patients.
	Incentive spirometers (flow-based and volume-based) for neonatal patients.
	Continuous positive airway pressure (CPAP) devices for pediatric patients.
	Continuous positive airway pressure (CPAP) devices for neonatal patients.
	Expiratory positive airway pressure (EPAP) devices for pediatric patients.
	Expiratory positive airway pressure (EPAP) devices for neonatal patients.
	Intermittent positive-pressure breathing devices for pediatric patients.
	Intermittent positive-pressure breathing devices for neonatal patients.
	Manual hyperinflation with bag-valve-mask devices for pediatric patients.
	Manual hyperinflation with bag-valve-mask devices for neonatal patients.
Apply knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy Mean = 3.12	Positioning for bronchial drainage pediatric patients.
	Positioning for bronchial drainage neonatal patients.
	Chest percussion: manual and mechanical percussor for pediatric patients.
	Chest percussion: manual and mechanical percussor for neonatal patients.
	Vibratory continuous positive airway pressure (CPAP) for pediatric patients.
	Vibratory continuous positive airway pressure (CPAP) for neonatal patients.
	Expiratory positive airway pressure (EPAP) devices for pediatric patients.
	Expiratory positive airway pressure (EPAP) devices for neonatal patients.
	External chest-wall-vibration devices for pediatric patients.
	External chest-wall-vibration devices for neonatal patients.
Apply knowledge, understanding, and troubleshooting skills to airway management. Mean = 3.22	Assist physician in therapeutic bronchoscopy for adult, pediatric and neonatal patients.
	Intrapulmonary percussive ventilation (IPV) for adult, pediatric and neonatal patients.
	Cough-assist device (insufflator-exsufflator) for adult, pediatric and neonatal patients.
	Head-tilt chin-lift airway-opening maneuver for pediatric patients.
	Head-tilt chin-lift airway-opening maneuver for neonatal patients.
	Oropharyngeal airway for pediatric patients.
	Oropharyngeal airway for neonatal patients.
	Nasopharyngeal airway for pediatric patients
	Nasopharyngeal airway for neonatal patients
	Face mask and bag-valve-mask for pediatric patients.
Apply knowledge, understanding, and troubleshooting skills to mechanical ventilation Mean = 3.32	Face mask and bag-valve-mask for neonatal patients.
	Care of oral and nasal endotracheal tubes for pediatric patients.
	Care of oral and nasal endotracheal tubes for neonatal patients.
	Advising discontinuance or change to alternative airway based on assessment/protocols for pediatric patients.
	Advising discontinuance or change to alternative airway based on assessment/protocols for neonatal patients.
	Care of tracheostomy tube (Advising decannulation or change to alternative airway based on assessment/protocols) for pediatric patients.
	Care of tracheostomy tube (Advising decannulation or change to alternative airway based on assessment/protocols) for neonatal patients.
	Care of tracheostomy "button" or valve for pediatric patients.
	Care of tracheostomy "button" or valve for neonatal patients.
	Suction via artificial airway, operate suction system, select suction catheter for pediatric patients.
	Suction via artificial airway, operate suction system, select suction catheter for neonatal patients.
	Incorporate the mechanical ventilation principles in critical care for pediatric patients.
	Incorporate the mechanical ventilation principles in critical care for neonatal patients.
	CPAP devices for pediatric patients.
	CPAP devices for neonatal patients.
	Bi-level positive airway pressure (BiPAP) devices for pediatric patients.
	Bi-level positive airway pressure (BiPAP) devices for neonatal patients.
	Noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet for pediatric patients.
	Noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet for neonatal patients.

Moreover, to improve the level of competence in the area of applying knowledge, understanding, and troubleshooting skills to hyperinflation therapy, major enhancement is also needed in the curriculum in teaching these specific areas: “Manual hyperinflation with bag-valve-mask devices” for both neonatal patients and pediatric patients with mean rates of 3.25 and 3.30, respectively; as well as in teaching the competency in using “Continuous positive airway pressure (CPAP) devices” for neonatal patients and pediatric patients with mean rates of 3.28 and 3.31, respectively. In the area of applying knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy, major enhancement is needed in competencies “Assist physician in therapeutic bronchoscopy for adult, pediatric and neonatal patients” with mean rate of 2.96; in the use of “Intrapulmonary percussive ventilation (IPV) for adult, pediatric and neonatal patients” with mean rate of 2.97 and in the use of “Cough-assist device (insufflator-exsufflator) for adult, pediatric and neonatal patients” with mean rate of 3.02.

Furthermore, major enhancement is needed in the curriculum in using “External chest-wall-vibration devices” for both pediatric patients and neonatal patients with mean rates of 3.10 and 3.12, respectively; in the use of “Expiratory positive airway pressure (EPAP) devices” for both neonatal patients and pediatric patients with mean rates of 3.10 and 3.14, respectively; and competency in “Positioning for bronchial drainage” of both neonatal patients and pediatric patients with mean rates 3.15 and 3.26, respectively.

Additionally, in the area of applying knowledge, understanding, and troubleshooting skills to bronchial hygiene therapy, major enhancement is needed to further develop the competence of BS Respiratory Therapy students in using Vibratory continuous positive airway pressure (CPAP)” for both pediatric patients and neonatal patients with the same mean rate of 3.18; and in using “Chest percussion: manual and mechanical percussor” for both neonatal patients and pediatric patients with mean rates of 3.19 and 3.24, respectively.

In the area of applying knowledge, understanding, and troubleshooting skills to airway management, major enhancement is needed in performing these competencies: “Care of tracheostomy tube (Advising decannulation or change to alternative airway based on

assessment/protocols)” for both neonatal patients and pediatric patients with mean rates of 3.12 and 3.138, respectively; “Care of tracheostomy “button” or valve” for both pediatric patients and neonatal patients with mean rates of 3.13 and 3.15, respectively; and “Care of oral and nasal endotracheal tubes” for both neonatal patients and pediatric patients with mean rates of 3.20 and 3.22, respectively.

There is also a need for major enhancement in “Advising discontinuance or change to alternative airway based on assessment/protocols” for both neonatal patients and pediatric patients with mean rates of 3.21 and 3.22, respectively; in using “Suction via artificial airway, operate suction system, select suction catheter” for both neonatal patients and pediatric patients with mean rates of 3.24 and 3.25, respectively; and in using “Face mask and bag-valve-mask” for both neonatal patients and pediatric patients with mean rates of 3.24 and 3.33, respectively.

There is also a need for major enhancement in using “Nasopharyngeal airway” for both neonatal patients and pediatric patients with mean rates of 3.16 and 3.24, respectively; in the use of “Head-tilt chin-lift airway-opening maneuver” for both neonatal patients and pediatric patients with mean rates of 3.25 and 3.33, respectively; and in the use of “Oropharyngeal airway” for both neonatal patients and pediatric patients with mean rates of 3.26 and 3.29, respectively.

The competency “Apply knowledge, understanding, and troubleshooting skills to mechanical ventilation,” needs major enhancement in the use of “Bi-level positive airway pressure (BiPAP) devices” for pediatric patients and pediatric patients with mean rates of 3.22 and 3.24, respectively; use “Noninvasive-ventilation interfaces: nasal mask, nasal pillows, oro-nasal mask, full-face mask, helmet” for both neonatal patients and pediatric patients with mean rates of 3.26 and 3.27, respectively; use “CPAP devices” for both neonatal patients and pediatric patients with mean rates of 3.29 and 3.34, respectively; and in terms of the competency “Incorporate the mechanical ventilation principles in critical care” for both neonatal patients and pediatric patients with mean rates of 3.43 and 3.49, respectively.

Table 9 summarizes and presents the competencies in application of “Critical Thinking Skills” that need major enhancement in the curriculum for BS Respiratory Therapy. In particular, competence of BS Respiratory Therapy students needs major enhancement in “Prioritizing,” “Anticipating,” “Troubleshooting,” “Negotiating,” “Decision Making,” and “Reflecting.”

In the area of “Prioritizing,” there are two (2) competencies that need major enhancement in performing them. These areas are “Respond quickly to a changing situation” with mean rate of 3.48; and “Solve problems while completing other tasks” with mean rating of 3.50.

There are five (5) competencies that need major enhancement in the area of “Anticipating.” In particular, these competencies are “Restock supplies prior to depletion” with mean rate of 3.42; “Think ahead to avoid problems” and “Continually assess situations” with the same mean rate of 3.46; “Foresee adverse outcomes” with mean rate of 3.48; and “Recognize the early signs of a changing situation” with mean rate of 3.49.

Table 9

Competencies that Need Major Enhancement in Applying Critical Thinking Skills

Area	Competencies
Prioritizing Mean = 3.49	Respond quickly to a changing situation. Solve problems while completing other tasks. Think ahead to avoid problems.
Anticipating Mean = 3.46	Recognize the early signs of a changing situation. Continually assess situations. Foresee adverse outcomes.
Troubleshooting Mean = 3.48	Restock supplies prior to depletion. Locate and correct technical problems. Find lost equipment. Teach staff to troubleshoot equipment. Negotiate a change in behavior.
Negotiating Mean = 3.25	Mandate a needed change in behavior when negotiation is inappropriate. Use managers and supervisors appropriately to counsel staff on changes in behavior. Present a suggestion in the form of a question. Avoid negotiating to a breaking point. Negotiate with veracity for emergency situations worked outside of medical orders. Reach a judgment or conclusion.
Decision Making Mean = 3.21	Make a decisions during grand rounds or when using protocols. Ask questions and share information before making a decision. Rely on common sense, gut feelings, intuition. Make decisions based on experience. Use trial and error when no evidence is available.
Reflecting Mean = 3.05	Reflect on work, patients, decisions, profession. See multiple perspectives. Accept that there is no solution at times. Develop coping mechanisms. Find greater compassion for patients Develop a broader context of healthcare: costs, services, reform, restructuring.

In the area of “Troubleshooting,” there are three (3) competencies in applying critical thinking skills that need “Major Enhancement” to improve the level of competence. These competencies are “Find lost equipment” with mean rate of 3.46; “Teach staff to troubleshoot equipment” with mean rate of 3.49; and “Locate and correct technical problems” with mean rate of 3.50.

BS Respiratory Therapy curriculum needs major enhancement in the area of “Negotiating” to improve the student and graduate’s level of competence. These areas are “Avoid negotiating to a breaking point” with mean rate of 3.21; “Mandate a needed change in behavior when negotiation is inappropriate” with mean rate of 3.23; “Negotiate a change in behavior” with rate of 3.24; “Present a suggestion in the form of a question” with mean rate of 3.26; “Use managers and supervisors appropriately to counsel staff on changes in behavior” with mean rate of 3.28; and “Negotiate with veracity for emergency situations worked outside of medical orders” with mean rate of 3.29.

The competencies in the area of “Decision Making” that need major enhancement include “Use trial and error when no evidence is available” with mean rating of 3.03; “Reach a judgment or conclusion” and “Make decisions based on experience” with the same mean rating of 3.24; “Ask questions and share information before making a decision” and “Rely on common sense, gut feelings, intuition” with the same mean rating of 3.25; and “Make a decisions during grand rounds or when using protocols” with mean rating of 3.27.

BS Respiratory Therapy students and alumni-respondents assessed the provision of the aforementioned competencies in the curriculum, but major enhancement is needed for them to raise their level of competence equivalent to responding to the demands of 21st century.

Likewise, major enhancement is needed in the area of “Reflecting.” Particularly, there are six (6) competencies in this area for enhancement: “Accept that there is no solution at times” with mean rate of 2.97; “See multiple perspectives” with mean rate of 3.03; “Reflect on work, patients, decisions, profession” and “Develop coping mechanisms” with the same mean rate of

3.07; and “Find greater compassion for patients” and “Develop a broader context of healthcare: costs, services, reform, restructuring” with the same mean rate of 3.09.

Assessments, Feedbacks and Insights of Deans/Heads of RT Schools and Hospitals and Officers of Accredited Professional Organizations on the BS Respiratory Therapy Curriculum

Open-ended questionnaire was provided to the deans/heads of colleges and universities that offer the program in BS Respiratory Therapy, and Heads of Respiratory Therapy units from hospitals. These individuals are hereby referred as participants whose participation in the study as respondents is very much appreciated and their contributions are considered invaluable.

The comments, feedbacks and assessments from participants are grouped by the researcher into three (3), namely, “Program Description, Objectives, Content, Length, and Admission;” “Courses, Instruction, Assessment, and Evaluation;” and “Global Competitiveness and Curriculum Enhancement.”

As shown in *Table 10*, the comments, feedbacks, assessments from participants in terms of “Program Description,” “Program Learning Objectives,” “Program Content,” “Program Length,” and “Program Admission” are summarized.

Table 10*Program Description, Objectives, Content, Length, and Admission*

Area	Feedback
Program Description	"The type of duties mentioned were not explicit as to the coverage of each area like to what extent is PFT-will it cover instruction, quality control, interpretations, etc." P4
	"Not enough program description, maybe there's a need to revise according to the present needs of health prof. education and health care system." P5
	"Somehow, yes. But still needs enhancement." P3
Program Learning Objectives	"...I don't recall CMO 9 s 2007 having a set of Program Learning objectives..." P1
	"Learning objectives are not clearly described what the learners will be able to demonstrate are not clearly stated and needs improvement." P3
	Yes, however restating these objectives to measurable ones. P4
	Yes, but needs to be enhanced to match today's or nowadays RT graduates P5
Program Content	"...also needs enhancement." P3
	"...Fundamentals of Respiratory Therapy should be taken/placed earlier before the students will be having their professional courses. Microbiology should be placed before Pharmacology, because students should be acquainted with the pathogens before knowing the treatment. Human Anatomy should be a pre-requisite to Medical Terminology because students need to learn the general anatomy and physiology and be oriented with the different organ system before going to specific terms, symbols discussed in medical terminology. Pulmonary Rehabilitation should be taken after CAP and NAP because students should be able to know the disease process before they can plan the treatment/ rehabilitation program." P4
	"Organic chemistry should be included in the course program after inorganic chemistry to really prepare them for Biochemistry. According to Chemistry teacher, our students had a hard time learning Biochemistry since they skipped Organic Chemistry. Biochemistry should be the pre-requisite for Pharmacology." P1
Program Length	"The program length is sufficient..." P1
	"...both in knowledge and skill the program length is more than adequate." P2
	"...the program length is sufficient..." P5
	"Four years is just enough..." P3
Program Admission	"No, because we are open admission... they are welcome to take any program they want provided they will pass the entrance exam. Moreover, there's only one entrance exam for all programs." P1
	"I think yes through interview and entrance exam that include academic and psychological exam." P2
	"We do implement open admission and selective retention... if the student meets the admission requirement of the school." P3
	"Our institution imposes open admission, selective retention...students...however needs to achieve the necessary standards required to be able to continue in the program." P4

According to participants, the description of the program BS Respiratory Therapy in general, is inadequate and has to be made more relevant for the present time when so much has changed in the provision of health care, medical attention, and in the way the medical

needs of people are met. Though Participant 3 agrees that program description is clear in some way, enhancement should be made in describing the program BS Respiratory Therapy more appropriately in such a way that intention, mission, purpose, and aim of the program are clarified. These are the words of Participant 3:

“Somehow, yes. But still needs enhancement.”

The inadequacy of the program description for BS Respiratory Therapy is confirmed by Participant 5 who specifically said that a need to revise the program description is necessary to incorporate the needs of the health professions education at present time as well as the needs of the health care system. There have been innovations made in the health care system to better serve people with health problems, to better meet their health needs, and to provide them with better quality health care. Most of the innovations that are introduced not only in the health care department but also in almost all departments of management, production, customer service and customer care including health and medical care are brought about by integration of technology in business, commerce, industry, health, and education. Thus, the participants think that it is only proper that these innovations are reflected in the program description for BS Respiratory Therapy since the license respiratory therapist together with other health professionals lead the health team in the provision of health care with their competence and skills in the utilization of whatever technology is available for facilitating their jobs, for efficiency and accuracy of their performance on the job. These are the exact words of Participant 5:

“Not enough program description, maybe there’s a need to revise according to the present needs of health prof. education and health care system.”

Participant 4 is more specific in saying that a program description for BS Respiratory Therapy should be explicit enough in terms of the scope of the program indicating the internship part of the program as well as the delivery of instruction. Participant 4 is saying that a program description, when it is read by someone who is interested in the program and is considering seriously the possibility of pursuing the program BS Respiratory Therapy, should give direction as to the prospects of the profession in the field of respiratory therapy. The program description,

moreover, should guide the individual who has interest in respiratory therapy as to what can be expected from the program, and, specifically, what the person would become at the end of the program. Participant suggests that program description for BS Respiratory Therapy provide more details that are concise and yet clear and particular. Participant 4 has these words to say about program description for BS Respiratory Therapy:

“The type of duties mentioned were not explicit as to the coverage of each area like to what extent is PFT-will it cover instruction, quality control, interpretations, etc...”

Participant 1 may be right in saying that the CHED Memorandum Order (CMO) Number 9, series of 2007, on the policies and standards for Bachelor of Science in Respiratory Therapy, does not contain Program Learning Objectives. However, objectives may be found explicitly stated for each of the courses in the program for BS Respiratory Therapy. Additionally, under Section 4 (a) of Article III of the CMO No.9, the three (3) objectives of BSRT education are enumerated. Participant sees the objectives of BSRT education as different from Program Learning Objectives and as different also from course objectives. These are the exact words of Participant 1:

“...I don't recall CMO 9 s 2007 having a set of Program Learning objectives...”

Participants 4 and 5, on the other hand, believe that there are Program Learning Objectives but they have to be modified, revised, and enhanced. Particularly, Participant 1 says that learning objectives have to be restated to make the expected outcomes of learning more measurable; while Participant 5 says that learning objectives have to be enhanced in the light of the recent developments in health care system and in society, as a whole, that are brought about by integration of technology in the provision of health care in almost all medical and health institutions both in national and international setting. Participants 4 and 5 have these words to say about program learning objectives:

“Yes, however restating these objectives to measurable ones.”

“Yes, but needs to be enhanced to match today’s demands from RT graduates.”

According to Participant 3, learning objectives are vague and there is much to be desired in the way that they are described. Though Participant 3 must be referring to course objectives, Participant 3 proceeds to say that learning objectives are not specific as to what BS Respiratory Therapy students are expected to demonstrate at the end of the course in terms of cognitive skills and behavioral objectives. Thus, Participant 3 says that learning objectives in the curriculum for Bachelor of Science in Respiratory Therapy need improvement. The feedback from Participant 3 is expressed in these words:

“Learning objectives are not clearly described what the learners will be able to demonstrate are not clearly stated and needs improvement.”

Two (2) of the participants who have commented lengthily on Program Content both suggest that there should be reordering of the sequence of the course offerings for the program BS Respiratory Therapy. According to these two (2) participants, the poor sequence, or order, in which the courses are to be taken by BS Respiratory Therapy students have created difficulties for some students who found themselves unprepared and inadequate for the course they are taking for they have not taken yet the pre-requisite course. It is further inferred from the comments of the two (2) participants that there are courses offered, but they are not those to be taken by BS Respiratory Therapy students. This causes some problems for BS Respiratory Therapy students because they do not have some background knowledge of a course that is not offered in their program but that should be part of their program. Participant 4, who is an expert in the field of Respiratory Therapy, is very specific and meticulous in mentioning the courses that should be re-ordered in the program as well as some courses that should be taken by BS Respiratory Therapy students as pre-requisites to other courses. These are the precise comments of Participant 4:

“...Fundamentals of Respiratory Therapy should be taken/placed earlier before the students take their professional courses. Microbiology should be placed before Pharmacology, because students should be acquainted with the pathogens before knowing the treatment. Human Anatomy should be a pre-requisite to Medical Terminology because

students need to learn the general anatomy and physiology and be oriented with the different organ system before going to specific terms, symbols discussed in medical terminology. Pulmonary Rehabilitation should be taken after CAP and NAP because students should be able to know the disease process before they can plan the treatment/rehabilitation program.”

Participant 1 is also specific in her comments to identify the course that should be included in the program for BS Respiratory Therapy and to indicate which course should be taken by BS Respiratory Therapy students before they take another course. For Participant 1, offering the courses included in the program for BS Respiratory Therapy is one of the solutions for learning difficulties that some BS Respiratory Therapy students experience because of lack of background knowledge, insufficient preparation and readiness for the courses that require basic knowledge and skills. In other words, Participant 1 is saying that re-structuring the course offerings for the program for BS Respiratory Therapy will be beneficial for the structure of knowledge and repertoire of skills that BS Respiratory Therapy students are constructing from their first year through their fourth year in their program. Participant makes the following observations and suggestions for the enhancement of the program for BS Respiratory Therapy:

“Organic chemistry should be included in the course program after inorganic chemistry to really prepare them for Biochemistry. According to Chemistry teacher, our students had a hard time learning Biochemistry since they skipped Organic Chemistry. Biochemistry should be the pre-requisite for Pharmacology.”

On the length of the program which is to be taken and completed by BS Respiratory Therapy students within the span of four (4) years, the four (4) participants who commented on this aspect of the curriculum are unanimous that the program length for BS Respiratory Therapy is adequate for students to acquire the knowledge they need and be competent enough in applications of skills required for the practice of the profession in respiratory therapy. Participant 1 has these words to say about the length of the program for BS Respiratory Therapy:

“The program length is sufficient...”

Participant 5 agrees with Participant 1 by saying that:

“...the program length is sufficient...”

Participant 3 is more specific by saying that four (4) years is enough for the study of respiratory therapy. These are the exact words of Participant 3:

“Four years is just enough...”

It is Participant 2 who specifies that BS Respiratory Therapy students can very well gain all that they need to know about the program and learn all the skills with competence they need to perform for the practice of the profession in respiratory therapy. That is, four (4) years of study for the program in BS Respiratory Therapy is ideal length for the said program. These are the exact words of Participant 2:

“...both in knowledge and skill the program length is more than adequate.”

As it is implemented in most private higher educational institutions, admission to the program is open to all those students who have successfully completed senior high school. This means that aside from the entrance examination that they have to take and the required documents that they need to submit to be formally and officially admitted into the program, there are no other requirements that students have to meet.

There is no minimum grade requirement in science or in any other learning areas related to the program that student-applicants have to meet and show evidence of such academic achievement. As long as the student-applicant shows interest to the program, then that student gets admitted. This aptitude for the program is determined through an interview with the student applying to the program. It could also be indicated by the results of the entrance examination that is usually composed of two (2) parts: the psychological test and the academic proficiency test.

According to Participant 2, it is through interview with student-applicants and by the results of both the psychological test and academic proficiency test that they determine whether the student applying for the program will be successful or not in the program. These are the words of Participant 2 when asked if their school has requirements to ensure that students who opt to take BS Respiratory Therapy will be successful in the program or not:

"I think yes through interview and entrance exam that include academic and psychological exam."

In the school where Participant 1 is connected, passing the common examination administered to all student-applicants for different programs is their only requirement from students who wish to take the program for BS Respiratory Therapy. Participant 1 has these words to say when asked if the admission policy of their school ensures the success of those students admitted into the program for BS Respiratory Therapy:

"No, because we are open admission... they are welcome to take any program they want provided they will pass the entrance exam. Moreover, there's only one entrance exam for all programs."

Participants 3 and 4 belong to schools that both implement open admission policy for high school graduates who wish to enroll in some programs in their schools. However, to maintain the standards of their schools, administrators and management also implement selective retention when students are half-way through the program. This means that for BS Respiratory Therapy students to be able to continue with their program for BS Respiratory Therapy, there are grade requirements to meet, battery of tests to pass, and other conditions to comply with, which are made clear to them upon admission to the program and are also spelled out clearly during the orientation for freshmen. However, requirements for selective retention vary from one school to another. That is, there is no uniformity in requirements and conditions for selective retention in all schools offering the program. These are the comments of Participants 4 and 3 on admission and selective retention to the program for BS Respiratory Therapy:

"Our institution imposes open admission, selective retention... students...however needs to achieve the necessary standards required to be able to continue in the program."

"We do implement open admission and selective retention... if the student meets the admission requirement of the school."

As shown in *Table 11*, the assessments, comments, personal perceptions and feedbacks on the curriculum for BS Respiratory Therapy by deans and heads of schools that offer the program as well as from heads or chief respiratory therapists of hospitals are presented.

Specifically, these pertain to course offerings in the program, course objectives, course length, instruction or the teaching of skills to BS Respiratory Therapy students, educational resources, and assessment and evaluation of learning.

Table 11

Courses, Instruction, Resources, Assessment, and Evaluation

Area	Feedback
Course Length/Objectives	"It's sufficient enough to provide more activities to students because just "teaching" is not enough, students should perform as well to measure whether they are learning or not. More seatwork, activity sheet, library work." P1
	"Microbiology--too long for lecture Suggest: 2 hours. Pulmonary rehab--too long; 2 hours. ICU Crisis--inadequate; 2 hours. Thesis Writing--inadequate, at least with Intro before the Implementation." P2
	"Needs enhancement especially alignment of objectives and correlation of the different courses." P4
	"...needs modification and enhancement... There are courses with learning objectives not so relevant or lacking to satisfy the needs" P3
	"...Some courses have excessive contact hours while others are insufficient. An example is the Neonatal and Pediatric, the basis is insufficient to finish the course content, advance mechanism which only has 1 hr." P4
	"Review the courses for appropriate time allocation/contact hours per week... Neonatal/Pedia. Cardiopulmonary Pathophysiology, Research (evidence-based) contain learning objectives not particularly relevant to the course/program" P5
	"...course objectives should match the course description and the sample outline should match the course objectives." P1
	"Subject Area inclusion and/or emphasis: RT Specific: Rationale - to address growing role of RT's Cardiac Diagnostics Procedure Analgesia and Sedation (Anesthesia) Neonatal and Pediatric PFT not just Spirometry ECMO and Perfusion" P7
Teaching of Skills	"...I suggest some modifications with regard to the number of hours allotted for specific courses... with Master's degree, clinical exposure not necessarily years of experience, but at least updated with new modalities in RT as well as new/updated practices should be required for potential instructors..." P3
	"...there's a need to arrange and improve the course placement and number of contact hours... at least master's degree graduate relevant to the profession with clinical exposure should be required for potential instructors..." P5
	"Neonatal and Pediatric, Bronchoscopy, Pulmonary Function test, Anaesthesia. Please add specialty areas like sleep studies, bronchoscopy, ECMO, etc. require a different combination of training and experience than that held by potential instructors hired to teach core competencies/courses." P5
	"Principles of Neonatal/Pedia Resp care-lecture-Pulmonologist Doctor require a different combination of training and experience than that held by potential instructors... clinical experience should be required for potential instructors." P2
	"My immediate concern is to get a professor who has a clinical experience and exposed to hospitals with wide scope of practice. Hindi yung hiring a professor na kaka- graduate lang na nag- internship program sa isang hospital na ang ginagawa ay puro nebulization lang. Wala syang magiging contribution kundi puro theoretical lang. What EAC is doing now is good kasi they tap part time professor who are in clinical practice to better educate the students not only in theory but in clinical experience as well." P7
	"A graduate and master's program preferably in Health Sciences Education, or the like... should be required form potential instructors..." P1

(Continuation of Table 11)

Educational Resources	"...add more references. Updated books."	P2
	"Some textbooks listed... are not available. Some are not even current-some references are dated/copyrighted 1970... learning resources (i.e. printed media, audio-visual materials, etc.) provided for the program delivery and to actively engage the students."	P1
	"Additional learning resources is needed like Anatomage and other RT equipment."	P3
	"...learning resources (i.e. printed media, audio-visual materials, etc.) provided for the program delivery and to actively engage the students are inadequate."	P5
	"...instructional materials model are not so appropriate work habits in industry... since we now have advanced/modern machines in pulmonary units in hospital."	P3
Assessment and Evaluation of Learning	"...the affiliated centers has its own evaluation for the internship/training and some doesn't have."	P1
	"...evaluation for the internship/training is not based subjectively... recommend Peer/Self-assessment."	P2
	"The evaluation should be in OBE or measures what actually needs to be measured especially in skills expected at work environment."	P3
	"...evaluation methods utilized for the internship/training are not appropriate but we can enhance to give appropriate weight to each area and how they are being evaluated."	P4
	"Use or improve the evaluation of the clinical training and use a standardized tool... recommend Actual skills evaluation."	P5

As suggested by Participant 1, there is a need to enhance the descriptions of courses and course objectives to make certain that they are aligned. BS Respiratory Therapy students should be able to tell from the course description what they can expect to study when they take a given course in the program. The course objectives should be able to tell them what they can expect to learn in terms of knowledge and skills that will be useful when they eventually work as respiratory therapist. These are the words of Participant 1 on course description and course objectives:

"...course objectives should match the course description and the sample outline should match the course objectives."

Comments of Participant 4 are similar to what Participant says about course objectives. However, Participant 4 adds that alignment should not only be evident between course description and course objectives, but there should also be alignment between and among the courses offered in the program. This means that all courses that BS Respiratory Therapy

students are required to take should be related to one another and should be able to help students prepare for their chosen profession in the field of Respiratory Therapy and be able to equip them with knowledge and skills that are indispensable in the practice of the profession. Participant 4 has these words to say about course objectives and the courses in the program BS Respiratory Therapy that both need enhancement:

“Needs enhancement especially alignment of objectives and correlation of the different courses.”

Participant 3 agrees with Participants 1 and 4 that course objectives should be modified in order to improve them. But Participant 3 observes that there are course objectives that are not very much relevant for the present time; and she suggests that they be enhanced in order to make them more relevant to present time and to what BS Respiratory Therapy students need to know and learn in terms of technical knowledge and competencies for them to meet and satisfy the needs of their patients in the future. With the utilization of technology in the provision of health care, course objectives should reflect how it may be used for the teaching of knowledge and skills to BS Respiratory Therapy students. In this way, students become proficient in the use of technology in every facet of their work as respiratory therapist in the 21st century. These are words that Participant 3 have expressed as her own personal perception about the course objectives in the program for BS Respiratory Therapy:

“...needs modification and enhancement... There are courses with learning objectives not so relevant or lacking to satisfy the needs”

Participant 1 further comments that course length is enough for the teaching of the course content; but teaching the course does not only involve teacher activities or what the teacher does in class. It is more important that student activities be given more emphasis since learning should really focus on what the student does in class. The point that Participant 1 makes is that student activities provide learners opportunities to better understand what has been delivered in the lecture by the instructor. They also opportunities to practice the skills they need to gain confidence, accuracy, and adeptness in applying these in different settings and contexts. Hence, Participant 1 doubts whether the time allotted for each course in the

program is enough if activities to be given to learners are taken into account when deciding on the length of the course.

These are the comments of Participant 1 on course length:

"It's sufficient enough to provide more activities to students because just "teaching" is not enough, students should perform as well to measure whether they are learning or not. More seatwork, activity sheet, library work."

Most of the participants find that the time allocation for the delivery of most of the courses in the program for BS Respiratory Therapy is not appropriate for the courses. The course length is either too long for delivery of the course contents or inadequate for the instructor to cover all the contents of the course. This is what Participant 4 has expressed, who says that course lengths for both Neonatal and Pediatric are insufficient for covering the contents of these courses. Moreover, Participant 4 says that one hour time allotment for Advance Mechanical Ventilation is not realistic considering that it is one of the major courses in the program. This is what Participant 4 has commented about course lengths, mentioning specific course with insufficient time allocation for delivery:

"...Some courses have excessive contact hours while others are insufficient. An example is the Neonatal and Pediatric, the basis is insufficient to finish the course content, advance mech vent which only has 1 hr."

Participant 5 is one with Participant 4 in saying that time allotted for both the courses in Neonatal and Pediatric is not enough for teaching the contents of these courses. It can be recalled that many of the competencies in the application of therapeutics to respiratory care practice for both neonatal patients and pediatric patients need major enhancement to raise the level of competence of BS Respiratory Therapy students in these two (2) areas. The insufficiency of time allocation for both teaching and practice of the competencies in application of therapeutics to respiratory care practice for both neonatal patients and pediatric patients can be one of the reasons that BS Respiratory Therapy students have not attained "Excellent" level of competence in these two (2) areas.

Participant 5 also makes mention of the courses Cardiopulmonary Pathophysiology and Research as two (2) courses that need to be reviewed for more appropriate and realistic time allocations. As for the course Research, Participant 5 also suggests that its learning objectives be reviewed to make them more aligned, relevant, and consistent with the program objectives. Participant 5 expresses her feedback on course length and course objectives in these words:

“Review the courses for appropriate time allocation/contact hours per week... Neonatal/Pedia. Cardiopulmonary Pathophysiology, Research (evidence-based) contain learning objectives not particularly relevant to the course/program”

Participant 6 suggests that rationale of courses for the program in BS Respiratory Therapy be revised to reflect the changing, more relevant role of respiratory therapist in health care system. Participant further suggests to place more emphasis on professional subjects that he considers as important. These are the comments of Participant 6 on courses in the curriculum:

“Subject Area inclusion and/or emphasis: RT Specific: Rationale – to address growing role of RT’s...Cardiac diagnostics procedure...Analgesia and Sedation (Anesthesia)...Neonatal and Pediatric PFT not just Spirometry...ECMO and Perfusion...”

Suggestions are made by Participant 2 as to the more appropriate time allocations for some of the course offerings in the program. Participant 3 further suggests that the course Thesis Writing, with insufficient time allocation, be split into two (2) courses where the first of the two (2) courses serves as introduction to Thesis Writing requiring students to make a proposal for study as output of the first course. Meanwhile, the second course in Thesis Writing can be on actual implementation of the students’ research plan or program as they work towards the completion of their study. Participant 2 has the following suggestions to improve lengths of courses in the program:

“Microbiology–too long for lecture Suggest: 2 hours. Pulmonary rehab–too long; 2 hours. ICU Crisis–inadequate; 2 hours. Thesis Writing–inadequate, at least with Intro before the Implementation.”

On the qualification of instructors who will be responsible for quality teaching as they deliver the contents of the courses offered in the program, Participants 3 and 5 both agree that

instructors should have at least an appropriate master's degree to ensure that those handling classes the expertise in their field of specialization. In addition to master's degree, both Participants 3 and 5 also suggest that clinical experience be a requirement that instructors applying for teaching in respiratory therapy should satisfy.

It does not matter how long the instructor-applicant has had experience in the clinical setting, but it suffices that the clinical instructor has had some exposure in an actual hospital setting where real patients are given respiratory health care. This is for the instructors to better relate the theoretical part of teaching the course contents in actual applications in real-life situations in clinical, or hospital, setting. It is essential that BS Respiratory Therapy students understand both the theories and practices in respiratory care, and that they can distinguish the difference and discrepancy between the two (2). They should likewise realize that theories are irrelevant without applications in practice and that professional practice is never possible without background on theories involved in the practice. Only instructors with expertise in the field of respiratory therapy and experience in clinical setting can best deliver the course contents by achieving the balance in teaching between theory and practice. Participant 5 also suggests that for better teaching of skills to BS Respiratory Therapy students, a rearrangement of the order in which the courses are to be taken by students is vital, and that there should be an improvement in the number of contact hours for each course for the teaching of skills to students. Suggestions of Participant 5 are as follows:

“...there's a need to arrange and improve the course placement and number of contact hours... at least master's degree graduate relevant to the profession with clinical exposure should be required for potential instructors...”

For Participant 3, teaching of skills to BS Respiratory Therapy students will be more effective and will most likely produce better results if more appropriate number of hours is allotted for specific courses in the program. Hence, Participant 5 suggests that time allotted for the courses be modified to better teach the skills to learners and suit the relevance and importance of each in relation to the program for BS Respiratory Therapy.

Participant 3 further says that more than years of work experience, (whether in hospital setting as licensed respiratory therapist or in the academe as classroom instructor), it will be beneficial for the BS Respiratory Therapy students if teachers to be hired are familiar with the utilization of technology in the provision of respiratory care. It is also good to hire teachers who are knowledgeable with the recent developments and practices in the field of respiratory therapy, and are aware of the newer ways of processing things in the health care system that require 21st century skills and competencies from the members of the health team including the respiratory therapists. These are the suggestions of Participant 3 on the teaching of skills to learners and on the attributes of ideal instructor to teach in the:

“...I suggest some modifications with regard to the number of hours allotted for specific courses... with Master’s degree, clinical exposure not necessarily years of experience, but at least updated with new modalities in RT as well as new/updated practices should be required for potential instructors...”

Participant 1 specifies that the master’s degree of potential instructor to teach in the program should be in the Health Sciences. Simply put, the educational qualifications of potential instructor should be aligned with the program for it increases the chances of quality instruction delivery with expertise. Students are more likely to learn fast from instructors who explain lessons extensively with certainty, utmost clarity, and elaboration. Participant 1 has these words to say about the qualifications of instructor who should teach in the program:

“A graduate and master’s program preferably in Health Sciences Education, or the like...should be required form potential instructors...”

Administrators of schools offering the program should make sure that they have the best qualified instructors to handle the courses in the program to teach well the 21st century skills and competencies in respiratory care practice to students. Having the best and the most qualified instructors also ensure that program objectives and course learning objectives are attained.

According to Participants 2 and 5, there are major courses in the program that are highly specialized. These Participants mean that for teaching these highly specialized major courses, specialists are needed to handle them. One of the participants even mentions that a physician, or a specialized medical doctor, should teach such courses as Neonatal and Pediatric

Respiratory Care. Thus, a really competent instructor should be carefully selected for teaching a specific course whose specialty, knowledge, and skills are those that are needed to be taught in the course. The following are the comments of Participants 2 and 5, respectively:

“Principles of Neonatal/Pedia Resp care-lecture-Pulmonologist Doctor require a different combination of training and experience than that held by potential instructors... clinical experience should be required for potential instructors.”

“Neonatal and Pediatric, Bronchoscopy, Pulmonary Function test, Anaesthesia. Please add specialty areas like sleep studies, bronchoscopy, ECMO, etc. require a different combination of training and experience than that held by potential instructors hired to teach core competencies/courses.”

Participant 7 commends the practice of one of the for hiring part-time instructors with clinical experience. Participant 7 thinks that this practice would be good for students, both for the theoretical and practical aspects of learning. These are the words of Participant 7 on teaching students the competencies they need for practice of the profession in respiratory therapy:

“My immediate concern is to get a professor who has a clinical experience and exposed to hospitals with wide scope of practice. Hindi yung hiring a professor na kaka- graduate lang na nag- internship program sa isang hospital na ang ginagawa ay puro nebulization lang. Wala syang magiging contribution kundi puro theoretical lang. What EAC is doing now is good kasi they tap part time professor who are in clinical practice to better educate the students not only in theory but in clinical experience as well.”

Educational resources should be procured by the school management and be made available for use of both the students and instructors for the delivery of the course contents and for teaching of 21st century skills and competencies to BS Respiratory Therapy students. Schools have to provide these for the provision of quality instruction, for the practice of skills students need to have excellent competence, and for fully implementing the curriculum for BS Respiratory Therapy,

References are usually listed down at the end of the course syllabus. School library should have these references in their bookshelves so that they may be accessible to both teachers and students when they need to look for something in these references. However,

Participant 1 finds that some of the references listed in the course syllabus are nowhere to be found in the library; some are not even available at the bookstore, and some are not in the free resources in the internet. It could be that the books are published centuries ago so that they are no longer available for use. But even if they are still available, they may not be as useful in the present context, situation, setting, and circumstances as they have been in the past. Hence, Participant 2 specifically suggests that there be more but newer references and more recently published books that may be used for teaching and learning the courses in the program. Participant 1 also makes comments on a variety of educational and learning resources that should be available for use of students in their activities:

“Some textbooks listed... are not available. Some are not even current-some references are dated/copyrighted 1970... learning resources (i.e. printed media, audio-visual materials, etc.) provided for the program delivery and to actively engage the students.”

Participant 2 makes concise comment on references and books, but they are what schools need to procure if they are dedicated in bringing quality education to their students and if they really want to keep up with the standards of other schools that offer the same program. The brief comment of Participant 2 is expressed in these words:

“...add more references. Updated books.”

Learning resources come in limited supply as observed by Participants 3 and 5. Not only are the learning resources insufficient, they are mostly outdated also. Newer equipment and respiratory therapy devices are available in the market, and schools that offer the program for BS Respiratory Therapy need to have these equipment and devices for the use of teachers for more effective and quality instruction as well as for the use of students for their practice and more engaged learning experiences. Without these learning resources, it will be extremely difficult, or even impossible, to implement the curriculum with success and to teach the 21st century skills and competencies to students. Furthermore, without the learning resources, students do not really learn the skills and competencies by simply being told the purposes of

those equipment and devices and how they work. Students have to operate those equipment and devices to learn on their own how they work and how they facilitate the work of a health care provider. The following are the comments and suggestions of Participants 3 and 5 on learning resources:

“Additional learning resources is needed like Anatomage and other RT equipment.”

“...learning resources (i.e. printed media, audio-visual materials, etc.) provided for the program delivery and to actively engage the students are inadequate.”

Teachers also need instructional resources that include the use of information and communication technology for facilitating their teaching, for efficiency of teaching that allows them to cover lessons with both depth and breadth, and for presenting their lessons that require their students to use multiple sense modalities rather than hearing everything straight from the instructors. Participant 3 implies that there are instructional resources for use of teachers, but they may no longer be relevant when so much has changed in the health care system where advance technology is integrated in every single unit in hospitals that meet international standards on provision of quality medical and health care. Participant 3 has these words to say about instructional resources:

“...instructional materials model are not so appropriate work habits in industry... since we now have advanced/modern machines in pulmonary units in hospital.”

It does not suffice that the curriculum is implemented and the courses are taught to students. That is, teaching is not the end of the teaching-learning process. There should be some indications of success of the implementation of curriculum as well as indications of the quality of learning and level of competence attained by students at the end of the teaching-learning process. Indicators of success, quality of learning, and level of competence can all be produced through assessment and evaluation of learning. Hence, it is only proper that this should be a part of the curriculum for the program. Particularly, the modes of assessments of student learning should be explicitly specified for each course.

Modes of assessments and evaluation may differ from one course to another, for there are modes of assessments more appropriate for a course; but they may not produce reliable and valid indications of quality of learning achieved by students when utilized for another course. Instruments for assessment and evaluation of learning should, then, be chosen meticulously or constructed to ensure that they measure what the assessors really want to measure. Participant 3 comments that outcomes-based assessment and evaluation is more appropriate to utilize for the course in the program for they require students to demonstrate the skills they are expected to perform with proficiency in real work environment. These are the actual words of Participant 3:

“The evaluation should be in OBE or measures what actually needs to be measured especially in skills expected at work environment.”

Majority of the participants have all made comments based on their observations and experiences on the assessment and evaluation of performance of BS Respiratory Therapy interns in and during their internship program. As Participant 1 has said, there is lack of uniformity in evaluating the performance of interns in different areas of their internship among affiliated hospitals that accommodate BS Respiratory Therapy interns. Some hospitals do not even have existing system of assessing and evaluating the performance of their interns, says Participant 1. These are the own words of Participant 1 on assessment and evaluation of student performance in internship:

“...the affiliated centers has its own evaluation for the internship/training and some doesn't have.”

Hence, there is a need to review the assessment methods and evaluation tools presently utilized by affiliated hospitals in determining the level and quality of performances of BS Respiratory Therapy interns. According to Participant 4, the methods and tools assessment and evaluation of student-interns' performance in their internship are inappropriate since the weights assigned for the performances of interns in different areas of their internship are inappropriate. These weights should be determined in accordance to the number of hours that interns are required to render in a given department. They could be based also on the difficulty of tasks,

skills, and competencies that interns need to perform and master in a given department, and on the bearing of the training in a given department on licensure examination for BS Respiratory Therapy graduates.

A review of the modes and methods of assessment and evaluation tools used in assessment and evaluation of performances of BS Respiratory Therapy student-interns should be undertaken. This review could include re-consideration of the criteria used in assessment and evaluation, an assessment of the appropriateness and relevance of the criteria in the light of the recent developments and practices in respiratory care internship. Then there is also an assessment of whether modes of assessment and evaluation tools produce accurate indications of the competence attained by student-interns during the times that they train in performing skills in respiratory care and applications of therapeutics to respiratory care practice. In her own words, these are the comments of Participant 4:

“...evaluation methods utilized for the internship/training are not appropriate but we can enhance to give appropriate weight to each area and how they are being evaluated.”

For improving the assessment and evaluation of performances of BS Respiratory Therapy student-interns, Participants 2 and 5 have made recommendations. For Participant 2, performances of student-interns should be assessed by more than one assessor which is usually the clinical instructor or the supervising hospital staff in the department, or area, where the student-intern has had training for certain number of hours. In other cases, the assessment of the clinical instructor from the school where the student-interns are enrolled officially and the assessment of the supervising hospital staff are combined to form the overall assessment of the performances of student-interns. The results are then converted to grades of student-interns for the internship program. Participant 2 recommends that student-interns themselves participate in the assessment and evaluation of their performance in each area of their internship program. That is, there should be self-assessment and peer assessment. This is to give the student-interns chance to express how well they did in their internship and to rate the performance of their peers according to their perception of how well their peers performs during the times when

they needed to work together as a team and during the times when they have to accomplish a task cooperatively and collaboratively. The weights given to self-assessment, peer-assessment, clinical instructor's assessment, and assessment of the supervising hospital staff are to be determined through consultation with school administrators, representative officials from the affiliated hospitals, clinical instructors, faculty, and BS Respiratory Therapy students. These are recommendations of Participant 2 in her own words:

"...evaluation for the internship/training is not based subjectively... recommend Peer/Self-assessment."

To achieve uniformity among affiliated hospitals where BS Respiratory Therapy students are having their clinical training and completing their internship, Participant 5 recommends the standardization of assessment and evaluation tools for both the effectiveness of the clinical training and internship program and the performances of student-interns. This entails the utilization of common criteria for assessment in a common assessment tool. The criteria serve as standards for all BS Respiratory Therapy students, complying with at least satisfactorily meeting the criteria before they can be declared as having successfully completed the internship program as part of the requirements.

Furthermore, the use of common tool for assessing and evaluating performances of student-interns greatly helps clinical instructors and affiliated hospitals and their staff on identifying precisely the competencies and skills in respiratory care. Student-interns should be trained on these, be given a lot of opportunities to practice for, and be given emphasis and importance within the duration of the internship program because graduates of the program BS Respiratory Therapy will sooner or later be assessed again in the same competencies when they take board examination for licensing purposes. Participant 5 has these words to say about having a standardized tool for use in assessment and evaluation of student-interns' performance in clinical training or internship:

"Use or improve the evaluation of the clinical training and use a standardized tool... recommend Actual skills evaluation."

Participants have already said that there is a need to review and enhance, or even modify, the methods and tools used in the assessment and evaluation of student-interns' performances in internship program. A common assessment method and evaluation tool can be devised and implemented to standardize the assessment of competencies across all affiliated hospitals during internship.

As shown in *Table 12*, the comments and recommendations of participants on the implementation of internship program, the practical component of the curriculum for the program in BS Respiratory Therapy, as well as their comments on the clinical exposure of BS Respiratory Therapy students are presented.

Table 12*Practical Component of Curriculum, Internship, and Clinical Exposure*

Area	Comments	
Practical Component of Curriculum/Internship	"...requires a lot of medical gas cylinders which I think is not necessary. I think two sizes of O2 cylinder is enough."	P1
	"...tools, equipment and/or supplies are not enough...program should adjust to the changing current educational expectations especially in health care... Suggest to add a Community Outreach Work"	P2
	"...some tools are not readily available, especially with the cost of equipment, institutions cannot afford the cost. Necessary provisions in the internship program must be outlined to help institutions with lacking equipment/tools."	P4
	"...clinical internship/training should be placed in the terminal year after all the major professional courses have been taught... objectives of the clinical internship/training are clear and sufficient to further build on the students' knowledge and skill... however implementation is difficult."	P1
	"...with a 10-month internship with different hospitals, student knowledge, skills and attitude will level up."	P2
	"Internship: Rationale - to address growing role of RT's; to put life to the definition of RT working in CARDIO-PULMO, as enshrined in RA10024... Should include: Anesthesia and Perfusion Department, Cardiac Rehab, Non-invasive Cardiology, Etc."	P6
	"...maybe we can start exposure of students during/starting the 2nd year level to the hospital... objectives of the clinical internship/training are clear and sufficient but can be enhanced."	P4
Clinical Exposure	"In theory perhaps, but in practice I'm not sure since some RT modalities were not practiced in the internship (esp. Bronchoscopy)."	P1
	"...based on the feedback from previous interns, their internship were not maximize by some centers."	P1
	"...according to some graduates we interviewed, they were not able to practice in the field what they learn in classroom... clinical internship/training is adequate to reinforce and allow students to make practical applications of, the theoretical concepts... however not all RT modalities are performed during internship (ex. Bronchoscopy) by the interns."	P1
	"... suggest exposure of students to tertiary hospitals. Searching and presenting audio-visuals to students."	P3
	"Needs an improvement in this area... suggest Hospital exposure particularly in pulmonary department... minimum of 1,000 hours."	P5
	"I believe in order to realize or achieve the learning objectives, theories learned must be applied in practice... Enhancement of clinical internship/training should be made to include in supervisory training and specialized area training"	P4

As is the case of most paramedical and non-paramedical programs, internship program commences at the year when students have successfully completed all the academic courses in the curriculum for their program. The reasoning given for this is that student-interns need to focus their attention on the competencies and skills through their clinical exposure in their

internship. Since internship is implemented on rotation basis where student-interns take turns in spending times in different areas of several affiliated hospitals, difficulty in scheduling of hospital rotation as well as area rotation is partly resolved when student-interns do not have to attend classes in their schools for some academic courses. Participant 1 has these words to say about internship:

“...clinical internship/training should be placed in the terminal year after all the major professional courses have been taught... objectives of the clinical internship/training are clear and sufficient to further build on the students’ knowledge and skill... however implementation is difficult.”

As Participant 1 has mentioned in her comments, it is most appropriate for students in BS Respiratory Therapy to have their internship during their last year in the program for by then they will have strong knowledge background, skills, and competencies that will also be strengthened and reinforced during their internship.

However, Participant 4 expresses an opinion for internship that is different from those expressed by other participants. These are the words that express the perception of Participant 4:

“...maybe we can start exposure of students during/starting the 2nd year level to the hospital... objectives of the clinical internship/training are clear and sufficient but can be enhanced.”

Participant 4 suggests an early exposure of students to clinical practice to lower year level and a need to enhance the statement of objectives of internship program. These need to be more relevant at present times and responsive to the needs of clients and patients, with the possibility of integrating the new practices in the delivery of respiratory care to clients and patients.

Most of the participants express concern with inadequacy, and lack or absence of modern equipment and tools in affiliated hospitals where BS Respiratory Therapy students are having their internship. Participant 4 also observes that there are equipment not readily available in schools that offer program in BS Respiratory Therapy. These are the comments of

Participant 4 in her own words on equipment and tools that should be present in both schools and affiliated hospitals:

“...some tools are not readily available, especially with the cost of equipment, institutions cannot afford the cost. Necessary provisions in the internship program must be outlined to help institutions with lacking equipment/tools.”

It may be a fact that modern equipment in use for respiratory care are costly, but BS Respiratory Therapy students will never learn to use and be proficient in the use of these equipment and tools if the schools do not make an effort to procure them. Schools need to have them installed in their laboratory for the use of clinical instructors in their teaching and for the use of students in their practices as preparation for their internship in actual hospital setting. Participant 4 suggests that schools identify these as necessary for the teaching of specialty, or major, courses in the program for BS Respiratory Therapy. They should also acquire these equipment and tools, regardless of how costly they are, if the school management and administrators are sincerely dedicated to providing their students with quality education and in developing among their students the 21st century competencies. These help them to be globally competitive and live up to the expectations of health care systems in international setting.

In addition to tools and modern equipment that schools and affiliated hospitals lack, Participant 2 observes the lack of supplies. There are supplies but they do not suffice for the use of all students. Participant 2 also justifies the need for schools to have the modern equipment and to have the complete set of tools and supplies to keep up with the changes that transpire in the ways respiratory care is provided in hospitals world-wide. Participant 2 means to say that schools have to constantly upgrade their laboratory and facilities to meet the challenges that the changes in the real world pose. Schools have to simply meet the needs of industries. Students in paramedical courses such as BS Respiratory Therapy have to be trained in performing those skills and competencies currently practiced in hospitals to increase the likelihood of graduates getting employed by hospitals that offer attractive compensation, benefits, and opportunities for professional advance and growth in the field of respiratory care and respiratory therapy. Not all

individuals who need respiratory care are in the hospitals; some are in the community health centers. These are the words of Participant, 2 who also suggests that Community Outreach Work be part of the internship program:

“...tools, equipment and/or supplies are not enough...program should adjust to the changing current educational expectations especially in health care... Suggest to add a Community Outreach Work”

Participant 1 is more specific in her observation about the practical component of the curriculum for the program in BS Respiratory Therapy. The comments of Participant 1 on the use of too many medical gas cylinders required for student-interns needs investigation to confirm the validity of the claim of Participant 1.

It may be worthwhile also to look into the practices not only in medical therapy in training the student-interns in affiliated hospitals but also in all areas of respiratory care to determine discrepancies in practices among them. Another could be to determine the areas where there are insufficiency of training, and to determine the areas where there are repetitions of activities that train student-interns on the same skill or competency. The following are the comments of Participant 1:

“...requires a lot of medical gas cylinders which I think is not necessary. I think two sizes of O2 cylinder is enough.”

Participant 2 makes a comment on the duration of internship program and she thinks that ten (10) months for internship is enough for student-interns to complete this in different affiliated hospitals. Ten (10) months is enough time for student-interns to learn the knowledge and skills and develop the proper attitude within the span of ten (10) years. Participant 2 has these words to say about internship program, particularly its time allotment:

“...with a 10-month internship with different hospitals, student knowledge, skills and attitude will level up.”

For improving the practical component of the program in BS Respiratory Therapy, Participant 6 suggests that student-interns be exposed to other departments where they could also acquire clinical experience. These are the suggestions of Participant 6:

“Internship: Rationale - to address growing role of RT’s; to put life to the definition of RT working in CARDIO-PULMO, as enshrined in RA10024...Should include:Anesthesia and Perfusion Department, Cardiac Rehab, Non-invasive Cardiology, Etc.”

From the feedback that came from BS Respiratory Therapy students who have completed their internship program and already graduated from the program, Participant 1 says that there is inconsistency between theories that are taught in classroom setting and practices that are implemented in clinical setting. Graduates with BS Respiratory Therapy degree did not have the opportunities in affiliated hospitals to practice what they were taught in classroom lectures. Moreover, student-interns did not have the opportunities to try on their own and practice on their own all the respiratory therapy modalities such as Bronchoscopy. Nevertheless, Participant 1 says that the training that BS Respiratory Therapy students receive in their internship program reinforces the understanding of students of some theoretical concepts. Student-interns also get to see practical applications of what they have learned theoretically in class. Still, training that is given to student-interns during their clinical exposure needs improvement to ensure that there is greater alignment between theories and practices that student-interns learn in classroom setting and clinical setting, respectively. These are the assessments of Participant 1 of the practical part of the curriculum for BS Respiratory Therapy:

“...according to some graduates we interviewed, they were not able to practice in the field what they learn in classroom... clinical internship/ training is adequate to reinforce and allow students to make practical applications of, the theoretical concepts... however not all RT modalities are performed during internship (ex. Bronchoscopy) by the interns.”

“In theory perhaps, but in practice I’m not sure since some RT modalities were not practiced in the internship (esp. Bronchoscopy).”

“...based on the feedback from previous interns, their internship were not maximize by some centers.”

The last comment above made by Participant 1 has to be confirmed to be valid. Nevertheless, it is worth investigating to determine if there really is an affiliated hospital that is not maximizing the use of clinical training of BS Respiratory Therapy students to teach and train student-interns all the skills and competencies they need to learn from the different areas of the

hospitals where respiratory care is given to client-patients. A way to ensure that the time allotted for student-interns to serve and train in a given department is to have a definite plan of activities and a listing of all skills and competencies that student-interns have to receive in a given area of the hospital for their clinical training.

Somehow, to remedy the shortcomings of internship program, Participant 4 recommends enhancement of clinical training be provided to student-interns, allowing them to have both supervised training and independent training in affiliated hospitals. There are certain skills and competencies that student-interns can only learn when they have exposure in high specialized areas in respiratory care practice, and Participant 4 says that this should be taken, too, into account for enhancement of internship program. It occurs that student-interns have either very limited training in specialized areas or they get nothing at all. In this case, there will be some learning objectives not realized. Thus, this matter needs to be looked into for curriculum enhancement. These are the comments and suggestions of Participant 4:

"I believe in order to realize or achieve the learning objectives, theories learned must be applied in practice... Enhancement of clinical internship/training should be made to include in supervisory training and specialized area training."

It is normal that student-interns are given, first and foremost, an orientation by the staff of affiliated hospitals to familiarize them with the policies and regulations of hospitals. Yet, more importantly, to make the objective of internship program clear to interns, orientation can focus on discussing about the stay in the hospitals for clinical training. In actual training in any areas of the hospital, student-interns are also given lectures to prevent untoward events from occurring due to student-interns' carelessness, lack of confidence and competence in what they are supposed to do during their training. Participant 3 suggests that in teaching student-interns in the hospital setting through short lectures, visual aids can be used to facilitate that teaching such as powerpoint presentation. Participant 3 suggests that clinical instructors and hospital staff also employ some teaching strategies and instructional materials and devices to make the

instructions they have to give to student-interns motivating and more interesting. These are the actual comments of Participant 3 regarding this matter:

“... suggest exposure of students to tertiary hospitals. Searching and presenting audio-visuals to students.”

Considering the level of competencies of BS Respiratory students and alumni-respondents and the comments based on observations, experiences and on what actually transpires in the internship and clinical training of student-interns in hospital setting, the internship program needs to be improved. Participant 5 particularly suggests that clinical training of BS Respiratory Therapy student-interns provide for longer exposure in pulmonary department. Participant 5 even goes further as to recommend a thousand hours for internship program. The words, comments and suggestions of Participant 5 are as follows:

“Needs an improvement in this area... suggest Hospital exposure particularly in pulmonary department... minimum of 1,000 hours.”

Table 13 summarizes and presents the highlights of the comments and suggestions of co-researchers based on their own personal observations and experiences as faculty-clinical instructor, administrator, dean, and chair from the schools that offer the program in BS Respiratory Therapy. The comments and suggestions pertain to the prospect of graduates of the program in BS Respiratory Therapy being globally competitive. Global competitiveness should be one of the attributes of 21st century graduate of the program, who is knowledgeable and proficient in applying 21st century skills and competencies for respiratory care practice.

Also shown in the table are the comments and suggestions of co-researchers on enhancement in the curriculum for the program in BS Respiratory Therapy that they honestly think will bring about the improvements that faculty, administrators and students alike want to see in the model curriculum for the program in BS Respiratory Therapy.

Table 13*Global Competitiveness and Curriculum Enhancement*

Area	Comments	
Global Competencies	"...I could not tell 100% if the graduates under this CMO (CMO 9 s.2007) are really competent enough to perform some RT modalities."	P1
	"...there were objectives stated... which I think is not enough to show that we aim to produce globally competent RTs."	P1
	"CHED CMO No. 9 (2007): Is responsive to local practice and competencies, but provide poor or lack thereof with competencies required for global, or internationally recognized practice... CHED CMO No. 53 (2017): While, I recognized the shift to outcomes based education, the program outcomes and minimum performance indicators seem to be "too generalized" and is non-specific to BSRT (even if it states, "Specific to BSRT"). This is in contrast to other CMO's. ex. Nursing - - - this is as well in cognizance of the fact that RT schools can "enhance" their program offering --- when the enhancement becomes subjective, this may possibly provide a gray area on the recognition of specific outcomes needed for RT's..."	P6
	"...working overseas is much different than working locally which the graduate is more prepare..."	P2
	"...The course objectives provided in CMO 9 s 2007, in some major professional courses, does not show necessary competencies for RT graduates. For instance, in Neonatal, the objectives are just to discuss anatomic/physiologic characteristics discuss roles and functions of RT and perform RT procedures. But it wasn't stated about learning the different diseases of neonates/pediatrics. Objectives are so shallow that it don't measure competitiveness of graduates."	P1
	"...Not sufficient to meet global or international standards for RT."	P3
	"Not all competencies are included. Not sufficient... No longer address the global standards or international expectations for an RT"	P5
Curriculum Enhancement	"...I hope that modifications or revisions will be based on research and not subjective. For instance, what is the basis for adding laboratory for Neo and pedia... I hope it was not based on "hearsay" but on research, example, research on the board exam."	P1
	"...Other competencies in Neonatal/Pedia, Bronchoscopy, Anasthesia, ECMO, Polysomnography, etc. should be included... Research is a weakness."	P3
	"...add Tobacco Education, so that RT student is well equipped with knowledge to educate patients about the importance of smoking prevention and cessation... Research is a weakness."	P2
	"...additional subjects/areas to match the competencies expected of RT (specialty subjects)."	P5

The Philippines does not exist in itself and for itself alone; hence, it chooses to form partnerships with international organizations and to actively participate in world-wide endeavors that aim for the advancement of qualified professionals in the fields of economics, commerce and business, education, and in the promotion of health, well-being, and safety of people. Government agencies and departments, companies, social organizations, and educational institutions are dedicated to bringing the best services to people. Towards this end, they employ the utilization of their resources to keep up with the latest developments in the provision of services, to keep up with the most recent trends in customer and health care, to upgrade their facilities with innovations in technology that may be integrated into their systems, and to measure up with new national and international standards by providing human resource with trainings for professional advancement and growth and by training students to be globally competitive.

It is thus the intention of participants that the curriculum for the program in BS Respiratory Therapy be enhanced in every aspect where there is room for improvement. Consequently, graduates of the program in BS Respiratory Therapy can perform in their work environment in accordance to standards that are acceptable globally, and that they acquire and master the 21st century competencies that never fall short of international standards.

The sad reality with the implementation of the curriculum for the program in BS Respiratory Therapy is that there is no certainty whether the graduates under the implementation of the curriculum by CHED Memorandum Order Number 9, series of 2007, are equipped with skills and competencies to be called globally competitive. There are even reservations whether the graduates of the program can actually perform on the job some of the more specialized modalities in respiratory care practice. Participant 1 has these words to say about the global competencies of BS Respiratory graduates:

“...I could not tell 100% if the graduates under this CMO (CMO 9 s.2007) are really competent enough to perform some RT modalities.”

Participant 1 proceeds to say that though there may be program objectives to become globally competitive, these objectives do not present evidence that graduates are truly globally competitive. Feedbacks from graduates of the program in BS Respiratory Therapy, from their clinical instructors, and school administrators all seem to disprove the claim of globally competitiveness. That is what Participant 1 implies with these words:

“...there were objectives stated... which I think is not enough to show that we aim to produce globally competent RTs.”

Being globally competitive means that a graduate of BS Respiratory Therapy can very well demonstrate the competencies with excellence in respiratory care if this graduate is hired to work in a world-class hospital, in some hospitals anywhere in the world, and in hospitals that strictly adhere to international standards in the provision of medical and health care. However, Participant 2 observes that graduates of BS Respiratory Therapy in the Philippines are trained to work locally. That is, they have been prepared to work in the hospitals in the Philippines. They have not been trained and prepared to work overseas where working as respiratory therapist is entirely different from working in a hospital in the Philippines. Working overseas as respiratory therapist requires 21st century competencies that graduates of BS Respiratory Therapy in the Philippines lack. This has been the observation of Participant 2, and these are her own words that express her observations:

“...working overseas is much different than working locally which the graduate is more prepare...”

Generally, Participants 3 and 5 consider the curriculum for BS Respiratory Therapy implemented based on CMO Number 9, series of 2007 , as not aiming for global competitiveness of its graduates. Participant 3 says that contents of the curriculum and curriculum itself for BS Respiratory Therapy do not meet international standards; while Participant 5 says that the curriculum for BS Respiratory Therapy in the Philippines does not measure up to global standards and the skills and competencies taught to BS Respiratory Therapy students can be considered as antiquated. There are better ways of providing

respiratory care, practices and services that integrate the use of technology, modern equipment, devices, and tools implemented in hospitals around world. Yet these are not reflected in curriculum for BS Respiratory Therapy. For this reason, Participant 5 says that there are competencies that are not there in the curriculum for BS Respiratory Therapy under CMO Number 9, series of 2007. These are the assessments of Participants 3 and 5 with regard to the curriculum for BS Respiratory Therapy for training and preparing students to become globally competitive:

“...Not sufficient to meet global or international standards for RT.”

“Not all competencies are included. Not sufficient... No longer address the global standards or international expectations for an RT.”

Participant 6 identifies what seems to be the weaknesses of the curriculum for the program in BS Respiratory Therapy. His comments are more specific with these words:

“CHED CMO No. 9 (2007): Is responsive to local practice and competencies, but provide poor or lack thereof with competencies required for global, or internationally recognized practice... CHED CMO No. 53 (2017): While, I recognized the shift to outcomes based education, the program outcomes and minimum performance indicators seem to be “too generalized” and is non-specific to BSRT (even if it states, “Specific to BSRT”). This is in contrast to other CMO’s. ex. Nursing - - - this is as well in cognizance of the fact that RT schools can “enhance” their program offering --- when the enhancement becomes subjective, this may possibly provide a gray area on the recognition of specific outcomes needed for RT’s...”

Participant 6 recognizes that the curriculum for BS Respiratory Therapy is good enough to meet the needs of local clients and patients for it sufficiently equips graduates of the program with competencies and skills that address those needs of persons from local communities. But, Participant 6 has big doubts about the responsiveness of the present curriculum to the needs of health care system in the international and even global community. Even though the curriculum for the program institutionalized by CMO No. 9, series of 2007 was revised to incorporate outcomes-based education in the program as mandated by CMO No.53, series of 2017, Participant 6 says that competencies therein are too broad and non-specific for the profession in respiratory therapy.

Participant 1 provides more details to support her assessment of the curriculum for BS Respiratory Therapy as not meeting international standards and cannot sufficiently train prepare BS Respiratory Therapy students for global market and competitiveness. For Participant 1, the objectives of the courses in the program for BS Respiratory Therapy, especially those in major, or professional, courses, have to be more specific on the competencies that BS Respiratory Therapy students need to develop in each course. It should all contribute to developing a globally competitive respiratory therapist. These are the assessment of Participant 1 on the capability of the curriculum for BS Respiratory Therapy to develop a respiratory therapist with global competitiveness:

“...The course objectives provided in CMO 9 s 2007, in some major professional courses, does not show necessary competencies for RT graduates. For instance, in Neonatal, the objectives are just to discuss anatomic/physiologic characteristics discuss roles and functions of RT and perform RT procedures. But it wasn’t stated about learning the different diseases of neonates/pediatrics. Objectives are so shallow that it don’t measure competitiveness of graduates.”

Suggestions on enhancement of the curriculum for BS Respiratory Therapy are made by Participant 1. They are logical, realistic and practical. It is true, though, that there are areas in the licensure examination for graduates of BS Respiratory Therapy that are given heavier weights in the overall board rating, but they have not been given emphasis in the curriculum. It is, thus, only proper that this should be taken into account when enhancing the curriculum for BS Respiratory Therapy. Participant 1 says that areas included in the board examination as well as particular topics, subjects and items included in the board examination should be there in the curriculum. Instructors should make certain that students learn them both in class and in their clinical exposure. These are the words of Participant 1 on curriculum enhancement for the program in BS Respiratory Therapy:

“...I hope that modifications or revisions will be based on research and not subjective. For instance, what is the basis for adding laboratory for Neo and pedia... I hope it was not based on “hearsay” but on research, example, research on the board exam.”

Participant 5 recommends that additional courses be added in the program for BS Respiratory Therapy for developing the 21st century competencies among BS Respiratory Therapy students. Participant 3 identifies some of the courses that are not in the curriculum and recommends that they should be included to develop the competence of students in specialized area in respiratory care and practice. The following are the recommendations of Participants 5 and 3:

“...additional subjects/areas to match the competencies expected of RT (specialty subjects).”

“...Other competencies in Neonatal/Pedia, Bronchoscopy, Anasthesia, ECMO, Polysomnography, etc. should be included... Research is a weakness.”

Participant 2 agrees with participant 3 to say that the course Research in the curriculum has to be given some attention to enhance it, revise it, improve it, and make it more useful, relevant for the program in BS Respiratory Therapy. Participant 2, moreover, says that adding a course on Tobacco Education will be beneficial for BS Respiratory Therapy students whose knowledge on prevention of risks to health of smoking will be greatly strengthened that they may even influence their patents to stop smoking eventually. The suggestions and comments of Participant 2 are the following:

“...add Tobacco Education, so that RT student is well equipped with knowledge to educate patients about the importance of smoking prevention and cessation... Research is a weakness.”

Participant 7 recognizes the significance of aligning education to clinical practice and role of schools in producing globally competent graduates, which were all included in the country's current context and thrust in education and health system:

“....the PQF Law which was recently enacted has set the standards for us to aim for competency development and career progression that is comparable with our ASEAN counterparts in order to facilitate mobility of professionals. Thus, attaining the objective of ASEAN MRAs, and MRPQs with other countries, to name a few. Health profession is fast evolving. Its challenges must be met assertively by a professional in the healthcare team. Such competencies must be properly brewed during

their tertiary education. It is the responsibility of every HEI to ensure that its graduates are able to compete and cope with the requirements of the industry. It should be more proactive in providing the required facilities and equipments to ensure that the competencies needed in clinical practice have been addressed. It is the responsibility of every HEI to equip its educators , as well, that they continuously evolve in carrying out their responsibilities to bridge theories and clinical practice. Skills of students must be properly assessed for readiness in the workplace. Training institutions and other healthcare facilities must also be consulted by HEIs for their students to have proper exposure on different areas of specialization....”

“...it will definitely be of great help if such can be instituted per health program to be able to address specific concerns in clinical practice of each profession.”

“....It will definitely ensure that the needed competencies in the industry have been acquired, while in school prior to practice of profession.”

Thus, academic institutions that continuously revise their curricula should consider a strong partnership with hospitals and other institutional providers to reflect market dynamic and that embody the competencies globally.

Assessment of Clinical Practitioners and RT Faculty of the Curriculum for BS Respiratory Therapy Specific RT Professional Courses

Clinical practitioners are those licensed respiratory therapists who work in hospitals, and together with other respiratory therapists, work as faculty members and clinical instructors. They assessed the curriculum for the program in BS Respiratory Therapy. As shown in *Table 14*, the assessment of twenty-seven (27) clinical practitioners and faculty members on the adequacy of the curriculum to equip graduates of BS Respiratory Therapy with competencies for their entry in the clinical practice are summarized.

Table 14*Adequacy of Curriculum for the Program in BS Respiratory Therapy*

Adequacy of Curriculum	Frequency (f)	Percentage (%)
Yes, curriculum is sufficient to equip a graduate.	4	14.81
To a large extent the curriculum has sufficient breadth, but lacking in some degree/aspects.	15	55.56
To some extent the curriculum is responsive but scarcely sufficient and lacking in a lot of aspects.	8	29.63
No, curriculum is insufficient.	0	0.00
Total	27	100.00

None of the twenty-seven (27) respondents said that the curriculum for the program in BS Respiratory Therapy is entirely inadequate to equip BS Respiratory Therapy students with competencies and prepare them for clinical practice. However, majority of the twenty-seven (27) respondents said that the curriculum for the program in BS Respiratory Therapy is sufficient to a large extent to equip graduates of the said program with competencies they need in clinical practice. Moreover, for these respondents, the curriculum for the program in BS Respiratory Therapy has sufficient breadth but it has to be improved because it is lacking in some degrees or aspects. In particular, there are fifteen (15) respondents, representing 55.56% of the sample of twenty-seven (27) respondents, who assessed the curriculum as being sufficient to a large extent; but it has to be improved because it is lacking in some degrees or aspects.

There are eight (8) respondents, representing 29.63% of the sample of twenty-seven (27) respondents, who assessed the curriculum for the program in BS Respiratory Therapy as being responsive to some extent; but it is scarcely sufficient and is lacking in a lot of aspects that need to be improved. There are four (4) respondents who represent 14.81% of the sample of twenty-seven (27) respondents who found the program as sufficient to equip the students with competencies for their entry to the clinical practice.

Table 15 summarizes and presents the assessment of twenty-seven (27) respondents of the professional courses in the program whether they need to be given more emphasis in the curriculum for the program in BS Respiratory Therapy.

Table 15

Professional Courses in the Curriculum for the Program in BS Respiratory Therapy that should be Given More Emphasis

Professional Course	Frequency (f)	Percentage (%)	Rank
Cardiopulmonary Anatomy and Pathophysiology	19	70.37	9
Fundamentals of RT	15	55.56	11.5
Mechanical Ventilation	24	88.89	4
Neuromuscular Anatomy and Pathophysiology	14	51.85	13.5
Microbiology	11	40.74	16
Neonatal/Pediatric Respiratory Care	26	96.30	1.5
ICU Crisis Management	20	74.07	7
Management and Health Care Ethics	8	29.63	17
Pharmacology	14	51.85	13.5
Pulmonary Rehabilitation	15	55.56	11.5
Airway Management and Cardiopulmonary Resuscitation	25	92.59	3
Patient Assessment	20	74.07	7
Ventilation and Gas Exchange Monitoring	20	74.07	7
Hemodynamic Monitoring	12	44.44	15
Test of Pulmonary Function and Structure	20	70.07	10
Advanced Mechanical Ventilation Principles	26	96.30	1.5
Principles of Pulmonary Physiology in ICU	22	81.48	5

There are seventeen (17) professional courses listed, and there are only three (3) of them that the respondents assessed should not be given more emphasis in the curriculum. That, is majority of the twenty-seven (27) respondents assessed that majority of the seventeen (17) professional courses for the program in BS Respiratory Therapy, or fourteen (14) of them, should be given more emphasis in the curriculum for the program in BS Respiratory Therapy.

Among the professional courses that should be given more emphasis in the curriculum for BS Respiratory Therapy, the professional courses “Neonatal/Pediatric Respiratory Care” and “Advanced Mechanical Ventilation Principles” have the greatest number of respondents suggesting more emphasis in the curriculum. In particular, there are twenty six (26) respondents, representing 96.30% of the sample of twenty-seven (27) respondents saying that

“Neonatal/Pediatric Respiratory Care” and “Advanced Mechanical Ventilation Principles” should be given more emphasis in the curriculum.

‘Airway Management and Cardiopulmonary Resuscitation’ has the second greatest number of respondents suggesting more emphasis in the curriculum. Specifically, twenty-five (25) respondents, representing 92.59% of the sample of twenty-seven (27) respondents, assessed that ‘Airway Management and Cardiopulmonary Resuscitation’ be given more emphasis in the curriculum.

There are twenty-four (24) respondents, representing 88.89% of the sample of twenty-seven (27) respondents, who assessed that the professional course ‘Mechanical Ventilation’ be given more emphasis in the curriculum for the program in BS Respiratory Therapy. There are twenty-two (22) respondents, representing 81.48% of the sample of twenty-seven (27) respondents, who assessed that the professional course ‘Principles of Pulmonary Physiology in ICU’ be given also more emphasis in the curriculum.

Moreover, twenty (20) or 74.07% respondents assessed that the professional courses ‘ICU Crisis Management,’ ‘Patient Assessment,’ ‘Ventilation and Gas Exchange Monitoring,’ and ‘Test of Pulmonary Function and Structure’ all be given more emphasis in the curriculum for the program in BS Respiratory Therapy.

In addition, majority of respondents, nineteen (19) or 70.37% of the respondents assessed that the professional course ‘Cardiopulmonary Anatomy and Pathophysiology’ should also be given more emphasis in the curriculum for the program in BS Respiratory Therapy. This is followed by the professional courses ‘Fundamentals of RT’ and ‘Pulmonary Rehabilitation’ with fifteen (15) or 55.56% respondents, who assessed that these professional courses be given more emphasis in the curriculum for the program in BS Respiratory Therapy.

Furthermore, fourteen (14) or 51.85% respondents assessed that the professional courses ‘Neuromuscular Anatomy and Pathophysiology’ and ‘Pharmacology’ be given more emphasis in the curriculum for the program in BS Respiratory Therapy. There are twelve (12) or 44.44% respondents who assessed that the professional course ‘Hemodynamic Monitoring’ be

given more emphasis in the curriculum. There are eleven (11) or 40.74% respondents who assessed that the professional course 'Microbiology' be given more emphasis in the curriculum for the program in BS Respiratory Therapy. The professional course 'Management and Health Care Ethics' have the least number of respondents, eight (8) or 29.63% of them who assessed that the professional course 'Management and Health Care Ethics' be given more emphasis in the curriculum for the program in BS Respiratory Therapy.

Table 16 shows the professional courses that respondents suggested be included in the curriculum for the program in BS Respiratory Therapy.

Table 16

Professional Courses for Inclusion in the Curriculum for the Program in BS Respiratory Therapy

Professional Course To be Included	Frequency (f)	Percentage (%)	Rank
Anesthesiology	11	40.74	14
Perfusion	6	22.22	25.5
Sleep Medicine/Polysomnography with EEG	26	96.30	1
ECMO and Hyperbaric O2 Therapy	24	88.89	2
Cardiovascular Care and Management	15	55.56	11
Bronchoscopy	19	70.37	9
Professional Ethics and Medico-legal practice Respiratory	8	29.63	20.5
Pharmacology	13	48.15	13
Evidenced-Based Medicine (Practice)	9	33.33	17.5
Documentation	9	33.33	17.5
Patient Assessment, Examination and Monitoring and RT Protocols	20	74.07	7
ECG and other Cardiac Diagnostic Testing	20	74.07	7
Hemodynamic Monitoring	7	25.93	23
Perinatal and Neonatal Respiratory Care and Management	22	81.48	3.5
Advanced Mechanical Ventillation	21	77.78	5
Pediatric Respiratory Care and Management	22	81.48	3.5
Epidemiology	2	7.41	31
Community (Rural) Health Respiratory Care	5	18.52	28
Respiratory Microbiology	9	33.33	17.5
Respiratory Care Quality/Assurance and Monitoring	10	37.04	15
Geriatric Respiratory Care	8	29.63	20.5
Palliative and End -of Life Respiratory Care	7	25.93	23
CPET/CPEX	7	25.93	23
Trauma and Emergency Respiratory Care	17	62.96	10
Indirect Calorimeter	3	11.11	30
Evidence-based Research/Clinical Research	9	33.33	17.5
ACLS, PALS and NRP	20	74.07	7
Basic Healthcare System Management	5	18.52	28
Cardiac Catherization	5	18.52	28
Interventional Respiratory Care	14	51.85	12
Healthcare Informatics	6	22.22	25.5

The greatest number of respondents, twenty-six (26) or 96.30% of the sample of twenty-nine (29) respondents said that 'Sleep Medicine/Polysomnography with EEG' should be included in the curriculum for the program in BS Respiratory Therapy. This is followed by twenty-four (24) or 88.89% respondents who said that 'CMO and Hyperbaric O₂ Therapy' should be included in the curriculum as well. The third largest number of respondents, twenty-two (22) or 81.48 respondents said that 'Perinatal and Neonatal Respiratory Care and Management' and 'Pediatric Respiratory Care and Management' should both be included in the curriculum. This is followed by twenty-one (21) or 77.78% respondents who said that 'Advanced Mechanical Ventilation' should be included in the curriculum for the program in BS Respiratory Therapy.

There are twenty (20) or 74.07% respondents who said that 'Patient Assessment, Examination and Monitoring and RT Protocols,' 'ECG and other Cardiac Diagnostic Testing,' and 'ACLS, PALS and NRP' should all be included in the curriculum. There are nineteen (19) or 70.37% respondents who assessed that 'Bronchoscopy' should be included and emphasized in the curriculum for the program in BS Respiratory Therapy.

Moreover, seventeen (17) or 62.96% respondents assessed that 'Trauma and Emergency Respiratory Care' be included and emphasized in the curriculum. Fourteen (14) or 51.85% respondents assessed that 'Interventional Respiratory Care' be included and should be emphasized in the curriculum.

Additionally, 'Pharmacology' should be included and emphasized in the curriculum for the program in BS Respiratory Therapy as assessed by thirteen (13) or 48.15% respondents. 'Anesthesiology' should also be included and emphasized in the curriculum as assessed by eleven (11) or 40.74% respondents. Likewise, 'Respiratory Care Quality/Assurance and Monitoring' should be included and emphasized in the curriculum according to ten (10) or 37.04% respondents.

Furthermore, 'Evidenced-Based Medicine (Practice),' 'Documentation,' 'Respiratory Microbiology,' and 'Evidence-based Research/Clinical Research' should be included and

emphasized in the curriculum for the program in BS Respiratory Therapy according to nine (9) or 33.33% respondents. There are eight (8) or 29.63% respondents who assessed that 'Professional Ethics and Medico-legal practice Respiratory' and 'Geriatric Respiratory Care' be included and emphasized in the curriculum for the program in BS Respiratory Therapy.

There are seven (7) respondents, representing 25.93% of the sample of twenty-seven (27), who assessed that 'Hemodynamic Monitoring,' 'Palliative and End -of Life Respiratory Care,' and 'CPET/CPEX' should all be included and emphasized in the curriculum for the program in BS Respiratory Therapy. 'Perfusion' and 'Healthcare Informatics' should both be included and emphasized in the curriculum according to six (6) or 22.22% respondents.

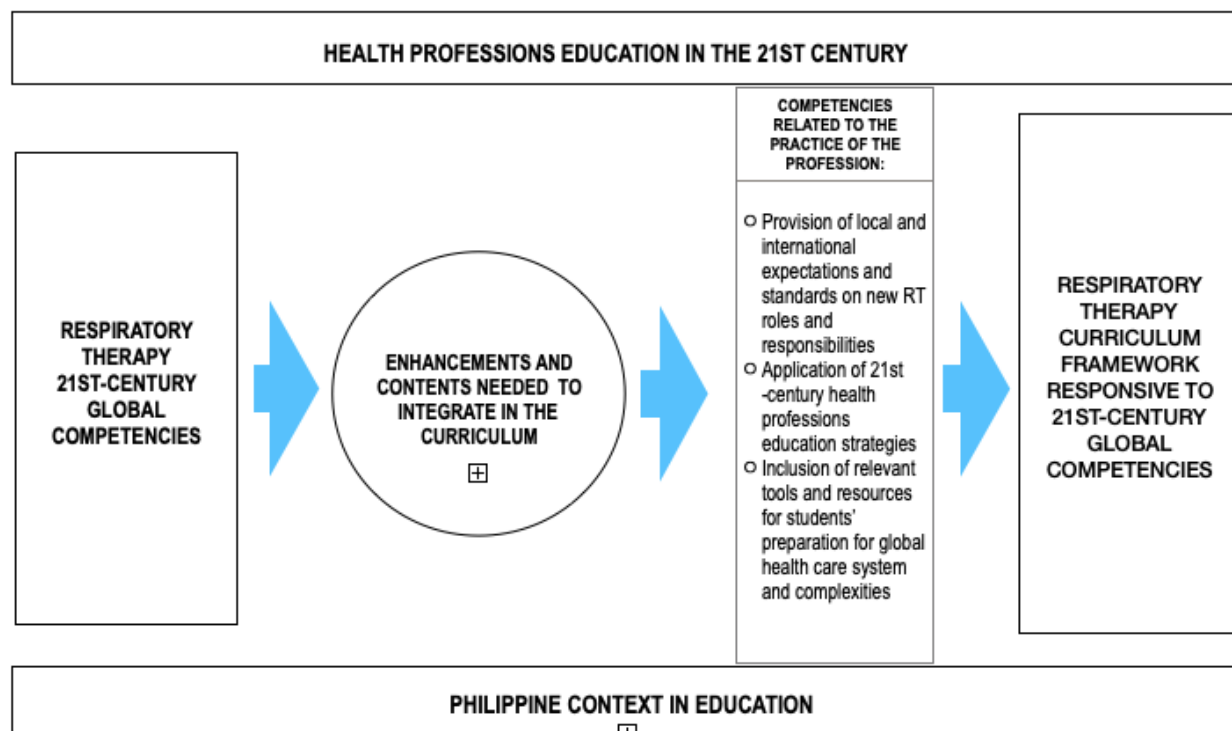
Among the sample of twenty-seven (27) respondents, five (5) or 18.52% assessed that 'Community (Rural) Health Respiratory Care,' 'Basic Healthcare System Management,' and 'Cardiac Catherization' should be included and emphasized in the curriculum. Three (3) or 11.11% respondents who assessed that 'Indirect Calorimeter' should also be included and emphasized in the curriculum. There are two (2) or 7.41% respondents who assessed that 'Epidemiology' should likewise be included and emphasized in the curriculum for the program in BS Respiratory Therapy.

Research Problem No. 2:

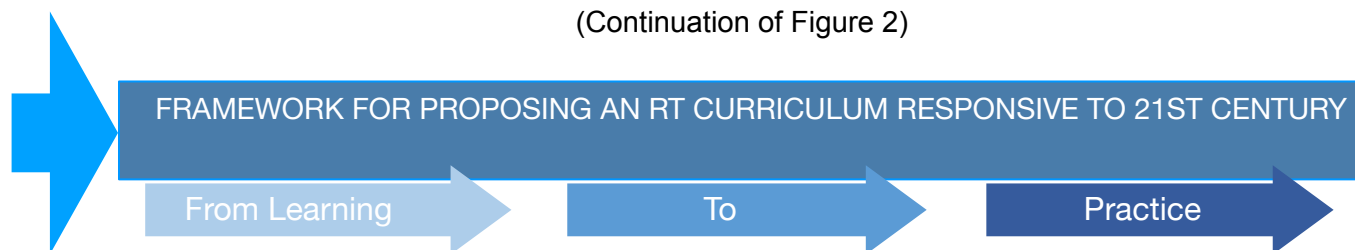
Based on the findings, what curriculum framework could be developed in conceptualizing the contents of a responsive RT curriculum in the 21st-century global competencies?

Figure 2

RT Curriculum Framework



(Continuation of Figure 2)



Based on the actual data and competencies related by the RT professional organizations, the following measures should be applied in making the curriculum responsive to 21st century:	Inclusion of the following elements in the RT Curriculum Model that is responsive to train and produce a globally competent and competitive RT:	Attributes of globally competent and competitive RT Graduates (stated as Performance Outcomes and Indicators in the Curriculum Model)
A. Sufficient provision of local and international expectations and standards on the new RT roles and responsibilities	RT Global Roles and Responsibilities: Diagnostics, Disease Management, Evidence-Based Medicine and Respiratory Care Protocols, Patient Assessment, Leadership, Emergency and Critical Care' Medical Gas Therapy, Humidity Therapy, Aerosol Therapy, Hyperinflation Therapy, Bronchial Hygiene Therapy, Airway Management, Mechanical Ventilation, EBM/ Research, Pulmonary Rehabilitation, Geriatric Respiratory Care, Anesthesiology, Bronchoscopy, Metacholine Challenge Test, Hypoxic Altitude Simulation Test (HAST), Indirect Calorimetry, Oxygen Challenge Test, Lung Diffusion Test, ECMO, Polysomnography/Sleep Studies, Critical Care, Education, ECG, Chest X-Ray in various settings and populations.	<u>Applies to both local and international health care delivery system:</u> Apply knowledge of physical sciences, social sciences, health sciences and natural sciences to the practice of RT. Competent in conducting a comprehensive examination, evaluation and assessment of patients across the lifespan within a broad continuum of care. Proficient in planning and implementing appropriate RT interventions for patients across the lifespan within a broad continuum of care.

B. Proficient application of the 21st century health professions education strategies	Health Professions Education in the 21st Century: Provide patient-centered care Ability to work in interdisciplinary teams Utilizing research results for evidence-based practice Apply quality improvement to identify errors and hazards in care Engage basic supervisory skills Utilizing informatics Engage in lifelong learning Effective utilization of communication	Skillful in application of the teaching-learning principles in different learning environments. Practice beginning management and leadership skills in various practice settings. Demonstrate research-related skills in the application of best practice evidence in the performance of various roles in different practice settings. Promote health and improve quality of life through the practice of the profession. Actively engage in lifelong learning activities. Work effectively in an inter-professional collaborative setting. Proficient in oral and written communication skills as well as reading and listening. Practice professional, social, and ethical responsibilities.
C. Adequate inclusion of relevant tools and resources for students' preparation for global health care system and complexities	Updated books, modern laboratory equipment, learning technology, other tools and resources.	Maximize the use of innovative technology in the practice of the profession.

The proposed framework for the creation of BS Respiratory Therapy curriculum model is depicted in *Figure 2*, on the basis of data gathered from the participants that include the BS Respiratory Therapy students and alumni, and the professional participants. Other inputs for the proposed framework came from the reviews of documents and sources on respiratory therapy, and from the researcher's own analysis of data gathered and personal experiences as licensed respiratory therapist and extensive involvement in respiratory therapy education. Documents provided a means of tracking change and development. The researcher compared them to identify changes. The document reviews were designed to identify the agencies that played a role in supporting respiratory therapy school improvement programs. This helped the researcher develop understanding and discover insights relevant to the research problem. Reviews/analysis of documents has also served mostly as complement to other research methods used in the study.

Assessment of the curriculum of BS Respiratory Therapy by the respondents provided information on the strengths and weaknesses of the curriculum in its provision of the competencies BS Respiratory Therapy students need to acquire. Later on, they can skillfully apply these in the real practical hospital setting as they work as professionals in the field of respiratory therapy. Their levels of competencies in performing the skills in different areas and modalities of respiratory care are determined based on standards set by American Association of Respiratory Care (AARC), the International Council for Respiratory Care (ICRC), the Canadian Society of Respiratory Therapists (CSRT), the National Competency Framework for the Profession of Respiratory Therapy (National Alliance of RT Regulatory Bodies) and by the Commission on Accreditation for Respiratory Care. These international standards are presented to BS Respiratory Therapy students and alumni-respondents in the form of researcher-made questionnaire that is utilized for assessment of said curriculum.

The questionnaire has items and indicators on all competencies that students/graduates of the program in BS Respiratory Therapy have to be proficient in when doing actual practice to demonstrate satisfactorily without flaw when dealing with patients or lives of patients. These

indicators of competence are rated by BS Respiratory Therapy students and alumni-respondents themselves based on their level of inclusion or provision in the curriculum or courses.

Assessments of BS Respiratory students and alumni-respondents greatly helped the researcher to identify those competencies in respiratory care and practice based on international standards that the existing curriculum does not actually develop among BS Respiratory Therapy students. The reasons for these have also been described by students and participants.

Among these reasons is the lack of clarity and emphasis in program and learning outcomes in professional courses in the curriculum. Where BS Respiratory Therapy students should be able to demonstrate these competencies in their clinical exposure during the internship and work as licensed respiratory therapist and globally competitive in the future.

The identified weaknesses in the present curriculum are taken as major input for enhancement of the program. These provide concepts for the framework and its vital role in proposing a curriculum model for BS Respiratory Therapy. Instruction as well as student learning activities in classroom setting, laboratory setting, and clinical or hospital setting focus on and aim at developing the 21st-century competencies among BS Respiratory Therapy students, providing quality respiratory care with the utilization of technology and modern equipment, devices and tools that have become the trend and practices in hospitals around the world.

Observations and comments on the curriculum currently implemented in schools, and suggestions and recommendations by faculty-clinical instructor, clinical practitioners, deans and chairs, have provided the researcher with valuable information incorporated in conceptualizing the proposed framework for the curriculum model for the program. Additionally, feedbacks from students, alumni, faculty, and school heads/deans are given attention to form the basis for alignment to the demands of the 21st century for which the curriculum model evolves.

Generally, criticisms of the present curriculum by faculty-instructors and school deans/ heads from the Department of Respiratory Therapy point out the non-inclusion of some vital components in the present curriculum (pertaining to two CMOs) in BS Respiratory Therapy to the current system in the provision of medical and health care especially in the care of cardiopulmonary system. There are doubts among the participants about the effectiveness of the present curriculum, even on the CMO No. 53 series of 2017 to produce graduates of the program who can measure up with international standards, and more importantly, who can be called as globally competitive.

Participants unanimously assess the present curriculum as needing improvements in several aspects to be called a program whose chief goal is global competitiveness. Moreover, for the participants the present curriculum does not address the needs of hospitals for BS Respiratory Therapy graduates possessing traits of health workers who are globally competent and have the potentials to work with proficiency, expertise and competence in the most specialized areas of tertiary and world-class hospitals where client-patients need respiratory care. For them, the present curriculum is inadequate to produce graduates with qualities that suit the needs of world-class hospitals-- graduates who can respond confidently and sufficiently to the needs of client-patients with respiratory-related problems, and who can participate actively in global activities for the promotion of the best respiratory care and practice. Subsequently, all these are taken into account in the formulation of the proposed framework for the curriculum model for the program in BS Respiratory Therapy.

Much of the review of related literature form the legal bases and profession's standards of proposed framework for the curriculum model for the program in BS Respiratory Therapy, based on and revolves around Republic Act No. 10024 (Philippine Respiratory Therapy Act of 2009); CHED Memorandum Orders No.9, Series of 2007, and No.53, Series of 2017; Philippine Qualifications Reference Framework; ASEAN Qualifications Reference Framework; Accreditation Standards of CoARC; Education of Health Professionals for the 21st Century; and the AARC, ICRC and CSRT Standards.

Thus, the ultimate aim of this proposed Model is to reform or enhance the respiratory therapy curriculum addressing all the challenges mentioned. Its main purpose is to produce trained and globally competent and competitive respiratory therapists, meeting the needs of patients in providing quality health care for a strengthened health system in the 21st century.

Philippine Context in RT Education: Context, Legal Bases, and Profession Standards

The proposed framework for the curriculum model for the BS Respiratory Therapy is developed within a combination of local, national, and international contexts. Graduates of BS Respiratory Therapy program in the Philippines are expected to render services in the area of respiratory care for Filipino patients, and it is only proper that they should be educated within the context of the health system in Philippine setting. They should be made aware of the laws, rules and regulations that govern the practice of health professions in the Philippines for the provision of medical and health care to Filipino patients. Graduates of BS Respiratory Therapy program in the Philippines should; moreover, they need to possess and practice values that are universal as well as values that are uniquely Filipino.

To be able to provide quality respiratory care to Filipino patients, graduates of the program in BS Respiratory Therapy should have the right attitude towards serving their fellow Filipinos with dedication, sincerity, compassion, and the same quality care and attention they would provide to patients of different nationalities. The proposed framework for the curriculum model for the BS Respiratory Therapy also takes into account the impact of international standards and trends in health system worldwide. These continuously evolve to incorporate new and better ways of processing and serving patients, and to integrate innovative technology in every aspect of health care from diagnosis of patients to educating patients for the maintenance of their well-being and health after they have received medical attention to restore their health to best condition. Thus, the researcher used recent developments in health system, in education of health professionals, in integration of modern technologies in different areas of hospital trainings, and in the new required competencies for graduates of health profession programs

most especially of the respiratory therapy for them to join the health team of globally competent health care providers.

There were identified legal bases and different standards for the proposed framework for BS Respiratory Therapy Curriculum model.

The professionalization of the graduates of BS Respiratory Therapy through administration of licensure examination was institutionalized by Republic Act No. 10024, otherwise known as the Philippine Respiratory Therapy Act of 2009.

The implementation of common curriculum for the program in BS Respiratory Therapy is made compulsory with the issuance of directive from the Commission on Higher Education (CHED) of CHED Memorandum Order (CMO) No. 9, series of 2007. This order standardized the courses in the program for BS Respiratory Therapy, and it mandated the implementing policies, standards and rules for the delivery of the program and professional courses in accordance to program objectives and learning objectives for each professional course. CMO Order No.53 was issued in 2017 with the revised policies, standards and guidelines for the program in BS Respiratory Therapy that provided the minimum required courses for general education and the specified required professional courses. However, the emphasis of this order is on the shift to competency-based standard, or outcomes-based learning, which makes learning of knowledge, skills and behavior more measurable in terms of learner's competence to demonstrate evidences of learning.

Specifically, CMO No.9, series of 2007 stipulates that among the program objectives, developing knowledge, attitudes, and skills in the performance of clinical pulmonary care procedures essential to the practice of Respiratory Therapy should be given priority. These are needed by graduates of the program in order to assist physician expertly in the proper diagnosis, treatment and prevention of diseases. For the advancement of knowledge and promotion of excellence in respiratory care and practices, said CMO also stipulates that leadership skills, competence in critical and analytical thinking are vital for graduates of the program. These equip them to meet sufficiently the challenges and to contribute significantly to

the profession of respiratory therapy. Since respiratory therapists remain to deal with human-patients, the curriculum should strengthen the structure of their value-system and help them build consistency in upholding moral and ethical standards for the practice of profession in respiratory therapy.

Although the standardization of competencies is made possible for accreditation purposes, Commission on Accreditation for Respiratory Care (CoARC) stipulates what graduates of the program in BS Respiratory Therapy should be able to do after completion of the program. Such paves the way for competency-based education that focuses on student learning outcomes rather on what students are expect to learn while they are on their program. CoARC explicitly translates program and learning objectives into precise observable and measurable learning outcomes and results that at the end of instruction, learners, student-learning activity, course, and program should be able to achieve, possess, and perform. The same competencies become the standards to assess the effectiveness of the program in BS Respiratory Therapy.

The American Association for Respiratory Care (AARC), International Council for Respiratory Care (ICRC), the National Competency Framework for the Profession of Respiratory Therapy (National Alliance of RT Regulatory Bodies) and the Canadian Society of Respiratory Therapists (CSRT) established sets of competencies that graduates of the program in BS Respiratory Therapy need. These organizations pioneered the standardization of global competencies needed for the practice of the profession in respiratory therapy and should, therefore, be developed among BS Respiratory Therapy students through the duration of their program. But more importantly, these standardized competencies should be reflected in all aspects of the curriculum from the statement of program objectives and learning objectives for the professional courses, selection of appropriate instructional strategy, outcomes and evidences of student learning, to assessment and evaluation of student learning of both knowledge and competencies.

Particularly, with high rate of approval, AARC identified the core competencies that graduates of the program in BS Respiratory Therapy should be able to show as evidences of proficiency through demonstration during their internship in hospital setting. These competencies include diagnostics, disease management, evidence-based medicine and respiratory care protocols, patient assessment, leadership, emergency and critical care, and therapeutics and its applications to respiratory care practice. These are the same competencies in the survey conducted to determine the level of competence of BS Respiratory Therapy students and alumni taught using the current curriculum in BS Respiratory Therapy. The Canadian Society of Respiratory Therapists (CSRT) emphasizes the importance of the role of respiratory therapists in bronchoscopy and anesthesiology.

Health Professions Education in the 21st Century

The framework includes the standards of the health professions education (HPE), an anchorage in transforming the RT curriculum. In addressing the findings of the study, the framework presents the full inclusion of the vital features in HPE in the curriculum model.

At the heart of the “Health Professions Education for the 21st Century” are the core competencies should be developed among students with intention of joining the health system that the program objectives, learning objectives, instruction, student-learning activities, assessment, student learning outcomes, and internship program all reflected in the curriculum for the program in BS Respiratory Therapy. It helps achieve an approach to education that better prepares clinicians to meet both the needs of patients and the requirements of a changing health care system.

Health professionals have made enormous contributions to health and development over the past century, but complacency only perpetuates the ineffective application of 20th century educational strategies unfit to tackle 21st century challenges. This part of the framework was derived from concepts to further reform the respiratory therapy program in order to enhance quality and patient safety. These are the parameters: First are Provide patient-centered care to

identify, respect and care about patients differences, values, preferences, and expressed needs; relieve pain and suffering, coordinate continuous care; listen to, clearly inform, communicate with and educate patients; share decision making and management; continuously advocate disease prevention, wellness and promotion of healthy lifestyles, including a focus on population health. Second are Apply quality improvement to identify errors and hazards in care; understand and implement basic safety design principles, such as standardization and simplification; continually understand and measure quality of care in terms of structure, process and outcomes in relation to patient and community needs; design and test interventions to change processes and systems of care, with the objective of improving quality; demonstrate consistent competence in the following areas: planning diagnostic, therapeutic and supportive respiratory interventions; developing diagnostic, therapeutic and supportive respiratory interventions; conducting diagnostic, therapeutic and supportive respiratory interventions. Third is Engage lifelong learning. Fourth are Utilizing informatics to communicate, manage knowledge, mitigate error and support decision making using information technology. Fifth is Utilize effective communication orally and in writing both English and Filipino. Sixth is Work in interdisciplinary to ensure that care is continuous and reliable. Seventh is Employ evidence-base practice to integrate best research with clinical expertise and patient values for optimum care and participate in learning and research activities to the extent feasible. Eight is Engage practice in professional, social, ethical responsibilities; and, Ninth is engage basic supervisory skills practice in the management of the respiratory therapy department.

21st Century Respiratory Therapists Global Competencies

Based from the findings, the curriculum framework includes the new roles, responsibilities and attributes or global competencies of respiratory therapists in providing patient care, as an essential source in transforming the curriculum. The framework presents the full inclusion of those competencies in the RT curriculum model.

CHED recognizes the importance of aligning higher education to international standards, national priorities and local needs to be able to ensure highly employable and skilled Filipino respiratory therapists meeting the demands of 21st century. In that regard, this study should uphold the formation of global competitiveness among the 21st century respiratory therapy graduates. RT competencies are based on international standards on the practice of the profession set by globally recognized organizations such as the American Association for Respiratory Care (AARC), the International Council for Respiratory Care (ICRC), the National Competency Framework for the Profession of Respiratory Therapy (National Alliance of RT Regulatory Bodies), the Canadian Society of Respiratory Therapy (CSRT) and the Commission on Accreditation of Respiratory Care (CoARC). The competencies of the profession are based on the different local needs and international expectations and standards on the new roles and responsibilities of respiratory therapist providing care in the 21st century. These include competencies in Diagnostics, Disease Management, Evidence-Based Medicine and Respiratory Care Protocols, Patient Assessment, Leadership, Emergency and Critical Care' Medical Gas Therapy, Humidity Therapy, Aerosol Therapy, Hyperinflation Therapy, Bronchial Hygiene Therapy, Airway Management, Mechanical Ventilation, Evidence-Based Medicine Research, Pulmonary Rehabilitation, Bronchoscopy, Metacholine Challenge Test, Hypoxic Altitude Simulation Test (HAST), Indirect Calorimetry, Oxygen Challenge Test, Lung Diffusion Test, ECMO, Polysomnography/Sleep Studies, Critical Care, ECG, Chest X-Ray, various settings and populations (adult, pediatric and neonates). These roles and responsibilities are included in the professional courses of the curriculum model making the Respiratory Therapy education more responsive to the demands of 21st century.

Enhancements and Contents Needed to Integrated in the Curriculum in Response to 21st Century RT Global Competencies

Based on the findings, it was noted that the curriculum needs enhancements thus the following measures were applied in designing of the curriculum model: Strengthen areas in

diagnostics (pulmonary function testing, sleep, invasive diagnostic procedure, disease management, physical examination, and physical examination; Strengthen areas on emergency care, critical care, and evaluation therapy); Improvement of the program description statements, consistent with the health professions education standards and fit to tackle the RT global competencies in the 21st century; Emphasis on neonatal and pediatric respiratory care (medical gas delivery, humidity therapy, aerosol therapy, hyperinflation therapy, bronchial hygiene therapy, airway management and mechanical ventilation); Inclusion of new and relevant courses in the curriculum; Strengthen and standardize the clinical internship program; Upgrade the different tools, resources, and the delivery of learning suitable for skills development to prepare the learners; Maximize utilization of innovative technologies in the development of psychomotor skills; Reinforcement of the leadership skills as a contributing member of the health care system; and, Reinforcement of the employment of evidence-based medicine in respiratory care practice.

A curriculum model was proposed based from the framework that is responding to the different areas that needs improvement in the current curriculum. Accordingly, a curriculum should constitute the elements identified in the framework to produce a globally competent and competitive RT graduates in the 21st century. The attributes of RT graduates are reflected in the BSRT curriculum model described in the Performance Outcomes and Indicators that is also adhering to the CHED's Memorandum Order No.46 s. 2012 on Outcomes-Based Education, stated as follows: Apply knowledge of physical sciences, social sciences, health sciences and natural sciences to the practice of RT; Demonstrate consistent competence in conducting a comprehensive examination, evaluation and assessment of patients across the lifespan within a broad continuum of care; Demonstrate consistent competence in planning and implementing appropriate RT interventions for patients across the lifespan within a broad continuum of care; Apply teaching-learning principles in different learning environments; Practice beginning management and leadership skills in various practice settings; Demonstrate research-related skills in the application of best practice evidence in the performance of various roles in different

practice settings; Promote health and improve quality of life through the practice of the profession; Actively engage in lifelong learning activities; Work effectively in an inter-professional collaborative setting; Demonstrate proficiency in oral and written communication skills as well as reading and listening; Practice professional, social, and ethical responsibilities; and, Maximize the use of innovative technology in the practice of the profession.

Research Problem No. 3:

After utilizing the framework, what enhancements and contents are needed to integrate in a BS Respiratory Therapy Curriculum Model?

The Respiratory Therapy Curriculum Model (See Appendix A).

The Curriculum Model for BS Respiratory Therapy is an enhanced curriculum, the main output of this study. After utilizing the framework, the recommended enhancements or contents were integrated in the curriculum that satisfactory responds to the national and international standards of the practice of the profession, producing a globally competitive Filipino respiratory therapy graduates in the 21st century.

The Curriculum Model presents the following general features:

- Sufficient provision in the curriculum of the different local and international expectations and standards on the new roles and responsibilities or 'global competencies' of Respiratory Therapists in providing care, within the Philippine context in RT education.
- Proficient application of the 21st century health professions education strategies consistent to tackle the challenges in RT education and global practice; and,
- Adequate inclusion of the relevant tools and resources to satisfactory train and prepare students for today's and tomorrow's complexities in health care system globally.

To fulfill the above-mentioned features, strategies for 'enhancement' were integrated in the design of the curriculum. These include the different elements or contents to train and produce a globally competent and competitive RT:

1. Improve the program description statements, consistent with the health professions education standards and fit to tackle the RT global competencies in the 21st century.
 - Inclusion in the program goals and performance outcomes/indicators the new roles and responsibilities of RT in the 21st century.
 - Incorporates many areas of inter-related knowledge and skills that should be developed over the duration of the BSRT program through a wide range of courses and experiences.
 - The level outcomes the students are expected to learn per year level are clearly specified.
 - The course descriptions and the learning outcomes clearly describe the specific types and level of new learning students will have achieved and reliably demonstrate by the end of the course.

2. Strengthen the following areas in diagnostics: pulmonary function testing, sleep, invasive diagnostic procedure, disease management, physical examination, and physical examination.
 - Improved the learning outcomes expected from learners after completion of the course, consistent with global competencies in the 21st century.

3. Strengthen areas on emergency care, critical care, and evaluation therapy.
 - Improve the learning outcomes expected from learners after completion of the course, consistent with global competencies in the 21st century.

4. Emphasize the neonatal and pediatric respiratory care in medical gas delivery, humidity therapy, aerosol therapy, hyperinflation therapy, bronchial hygiene therapy, airway management, and mechanical ventilation.

- Improve the learning outcomes expected from learners after completion of the course, consistent with global competencies in the 21st century.

5. Include new and relevant courses in the curriculum.

- Inclusion of the new and relevant courses based on international standards and realities of the health care system: Bronchoscopy, Sleep Studies with EEG, Chest X-ray, ECG and other Cardiac Diagnostic Testing, Trauma and Emergency Respiratory Care, Health Informatics, Anesthesiology, Metacholine Challenge Test, Hypoxic Altitude Simulation Test (HAST), Indirect Calorimetry, Oxygen Challenge Test, Lung Diffusion Test, EBM, ECMO and Hyperbaric Oxygen Therapy and courses related to Pandemic and Emergency Global Health Crisis.

6. Strengthen and standardize the clinical internship program.

Internship Program:

- Enhance vision, mission, description and purpose
- Specify the practice areas including inter-disciplinary health teams
- Learning outcomes for practice areas
- Inclusion of intern's rotation in Community/primary care, geriatric care, sleep studies, bronchoscopy, anesthetic procedure, Chest X-ray, EMS and other practice areas
- More practical exposure in neonatal and pediatric respiratory care patients
- Creation of standardized assessment/evaluation of learning based on practice areas (Inclusion of case loads in final assessment)

7. Upgrade the different tools, resources, and the delivery of learning suitable for skills development to prepare the learners.

- Provide a list of Updated/appropriate textbooks and references used for the core courses subscriptions

- Provide a list Updated RT laboratory equipment; additional equipment/devices for specialty areas/ simulators for specialty/practice areas
- Incorporate simulation and modeling in professional courses particularly in specialized areas in hospitals where clinical exposure of students may be limited or none at all or
- Maximize the use of Virtual RT Skills Laboratory to supplement and complement the attainment of learning outcomes prior to actual experience.
- T-L process includes the employment of 21st century skills required by health professions education.

8. Maximize utilization of innovative technologies in the development of psychomotor skills

- RT laboratory rooms: RT Skills Laboratory classified and divided into specialty areas
- Teaching-learning activities, an innovation and various learning technology in the classroom/ instruction; provision of instructional audio and/or video facilities; on-line database
- Utilize more appropriate and innovative instructional strategies and resources for the teaching-learning: Simulation

9. Reinforce the leadership skills as a contributing member of the health care system

- Include the role of being a contributing member and a team leader of organizational team as it relates to planning, collaborative bedside decision making and health care team functions.

10. Reinforce the employment of evidence-based medicine

- Include this course and integrate the evidence-based medicine to respiratory care practice.

CHAPTER IV

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the study and the findings, the conclusions drawn from the findings, and the recommendations of the researcher.

Summary of the Study

As the twenty-first century hits its stride, different literature and evidences suggest that 21st century competencies demand significant changes in the curriculum. Health professionals in the new century called for a change and need to transform education, to strengthen widespread health systems internationally and to train health professionals that meet the needs of society. The identified driving forces of conducting this study are the country's current context and thrusts in education and health care systems, and the demands of health professions education and global competencies expected of RT graduates in the 21st century. Confirmation of the above statements and impact to RT program ensued during the focus group discussions between the researcher and group of professionals, both in academe and clinical practice.

Philippine HEIs are particularly challenged to produce Filipino graduates who can engage meaningfully in their communities and in building the nation, productive and competitive, especially in the context of ASEAN 2015 and the globalization of professional practice. To be globally competitive, there is a need to ensure that Filipino respiratory therapists have the right competencies and attitudes through excellent quality education at all levels.

To gather needed data, the researcher combined quantitative and qualitative approaches to assess and evaluate the curriculum currently implemented in more than twenty (20) schools nationwide that offer the program in BS Respiratory Therapy. There are two (2) CMOs for BS Respiratory Therapy - CMO Orders No. 9, series of 2007, and No. 53, series of 2017. After gathering the data, strengths and weaknesses of the curriculum were identified and were used as basis in the design of a framework as a conceptual structure intended to support and guide for building the proposed curriculum model. The framework was created embracing the local

context and thrust in education and health care system that includes the following essential components: impact and trends of international standards for health professions education, global competitiveness, and expected competencies of RT graduates in providing respiratory care for the 21st century.

On the basis of statistical and qualitative analysis of data, it was found out that the curriculum needs to be more responsive to the demands of the 21st century. Findings served as basis in proposing a model recognizing the essential indicators and parameters on 'the how and the what' of RT curriculum that is more relevant and responsive to the needs and requirements for 21st century health professions education and competencies. Recognized weaknesses of the current curriculum include the following: not very specific in aligning the program specifications and learning outcomes to 21st century global competencies; non-inclusion of some specialty courses; non- inclusion or integration of learning outcomes that may produce 21st century competencies of graduates; emphasis not given to some areas; inadequate teaching-learning resources; and, non-standardized clinical internship training program. Heads of schools and accredited professional organizations also articulate the need to enhance further the BSRT curriculum, making it more aggressive and responsive to the demands of 21st century. Based on the design of the framework, the proposed curriculum model thoroughly considers the results of assessment, taking into account the level of competencies in different respiratory care practice areas or professional courses that were labeled as weaknesses of the curriculum needing 'major enhancement'.

As a result, demands of the 21st century were integrated methodically in creating the curriculum model through the proposed framework, taking into account the international standards of providing respiratory care. Legal bases and professional standards such as the Philippine Qualifications Framework, Asean Qualifications Reference Framework, CHED Memorandum Orders for Respiratory Therapy Education, Republic Act No. 10024, American Association of Respiratory Care, International Council for Respiratory Care, Commission on accreditation of Respiratory Care, and Canadian Society of Respiratory Therapist were all

utilized in creating the model. Its goal is to support and ensure the continuous success of RT education in the country, making it at par with other health related professions in the country and its graduates academically prepared in meeting the changing landscape of health care international standards and expectations. The researcher believes that the curriculum model will contribute to the betterment of the Respiratory Therapy program for more enhanced RT education/program, trained health respiratory care provider, and globally competent professional.

Summary of Findings

A total of three hundred twenty-two (322) respondents for quantitative and qualitative method, composed of the deans/heads, faculty members and students of schools and clinical practitioners from hospitals and officers from different professional organizations participated in the study.

Guided by the research problems, the findings of the study are the following: As assessed by the respondents, including the key areas and elements identified by the participants and review of documents by the researcher, there are several weaknesses of the current BS Respiratory Therapy Curriculum:

1. The summary and number of identified weaknesses in specific courses in reference to expected knowledge, skills and attributes of graduates in the 21st century are on Health professions education (7); Diagnostics for pulmonary function testing, sleep, and invasive procedures (5); Disease management for chronic and acute pulmonary diseases (4); Evidence-based medicine (3); Patient assessment (4); Leadership (5); Emergency care (6); Critical care (8); and Basic Therapeutics (2). The identified weaknesses in respiratory therapeutics application are on neonatal and pediatric care: Medical gas therapy (19); Humidity therapy (3); Aerosol therapy (12); Hyperinflation therapy (5); Bronchial hygiene therapy (8); Airway management (9); Mechanical ventilation (4); and Critical thinking skills (6); and, weaknesses on

the following areas: neonatal and pediatric respiratory care courses both for didactic and experiential learning, tools and learning resources, new roles and responsibilities, utilization of innovative technology, application of evidence-based research course to improve patient care outcomes, defining the program description, program learning objectives, resources, courses, instruction, and assessment/evaluation, non-standardization and weakness in clinical internship training program.

2. Based on the findings of the study, including the key areas and elements identified by the participants and review of documents by the researcher, a framework for a responsive curriculum was developed, with the following elements:

- a. Respiratory Therapists New Roles and Responsibilities or RT Global Competencies in the 21st Century
- b. Health Professions Education in the 21st Century
- c. Relevant tools and resources to supplement the training of RT students and prepare for global competencies
- d. Attributes of a globally competent and competitive RT in the 21st century

The elements that comprises the framework aims to train and produce a globally competent and competitive respiratory therapy graduates for a strengthened health care system.

3. After utilizing the framework, enhancements and contents were integrated in the proposed curriculum model for BS Respiratory Therapy making it responsive to the 21st-century global competencies and has the following essential characteristics:

- a. Application of 21st century health professions education strategies, fit to tackle the global challenges in RT education and practice;
- b. Provision of local and international expectations and standards on the new roles and responsibilities in providing care; and,

c. Inclusion of relevant tools and resources for students' preparation for global health care system and complexities.

The ultimate aim of this proposed model is to reform the respiratory therapy curriculum addressing all the challenges mentioned. Its main purpose is to produce trained, globally competent and competitive respiratory therapists, meeting the needs of patients for a strengthened health system in the 21st century.

Scope and Limitations of the Study

This study could have used the Interview method of data gathering; but due to the personal request of respondents (heads and deans of schools, head units of hospitals and officers of professional organizations), an open-ended questionnaire was utilized instead. Another delimitation is the non-inclusion of clinical practitioners working in other countries due to time constraints of this study. Nevertheless, a few of the respondents employed in local hospitals have prior experience of working as respiratory therapists abroad.

Despite the aforementioned delimitations, there was more than enough data for analysis and conclusions. The researcher believed it did not significantly affect the findings of the study. Moreover, there were a lot of meaningful insights and inputs from the group of experts of the profession who are very much knowledgeable of the status of respiratory therapy education and practice in the country.

Conclusion

Based on the findings of the study summarized and presented earlier, the following was the conclusion drawn by the researcher.

As assessed by the respondents, there are weaknesses, interpreted as 'Needing Major Enhancement' in the current curriculum to meet the challenges and demands of 21st-century health professions education and global competencies of respiratory therapy graduates.

The result of the assessment indicates the need for an enhancement in the curriculum. Consequently, this study first involved the creation of a curriculum framework utilized to conceptualize the structure that supports and guides the design of a model. Embracing the local context and thrust in health professions education within the realities of the health care system, the curriculum framework comprises these essential components: impact and trends of international standards for health professions education, global competitiveness, and expected competencies of RT graduates in providing respiratory care for the 21st- century.

Therefore, based on the framework, a proposed curriculum model was methodically crafted integrating the identified enhancements and contents needed to serve as an excellent tool in respiratory therapy education to (future impact) produce trained and globally competent professional respiratory therapists that are meeting the needs of the society (its patients) for a strengthened health system (respiratory care) in the 21st century.

Recommendations

After considering the findings and conclusions, the researcher recommends the following:

With the identified weaknesses of the current RT curriculum in terms of its responsiveness to RT global competencies in the 21st century, it is recommended that schools offering the RT program regularly review and evaluate their curriculum and modify if necessary, making it more appropriate to the current system and realities, thus, reflecting the development of expected 21st-century competencies among respiratory therapy students and graduates. For the professional courses of the program, it should be carefully reviewed to determine their importance and bearing in the light of the recent developments in the health system worldwide and their impact on health professions education and global competencies in the 21st century. The review should be in collaboration with a group of professionals in the industry/hospitals and various stakeholders. A comprehensive review of the internship program is also recommended to determine the adequacy of its duration and for the creation of assessment method and evaluation tools that all affiliate hospitals may utilize for assessing and evaluating the performances of student-interns in different practice areas of their training, to consider the quality of the internship that is dependent on the responsibility and teaching level of the hospitals. So, the clinical training hospitals would meet the students' needs and expected learning outcomes of the program. The researcher recommends that inputs and feedbacks from major stakeholders, which included the alumni, advisory committee, external examiner, faculty, and students, clinical practitioners local and abroad be acquired periodically to be used in the curriculum review process. The researcher acknowledges the limitations in basing an evaluation of a complex, multifaceted curriculum on a single outcome measure. Thus, it recommends that whenever feasible, multiple forms of outcomes/assessments be used to assess the effectiveness of the RT curricular program. Various evaluation/assessment types should be utilized to measure the respiratory therapy skills and competencies the RT students/ graduates

expected to acquire before they enter into clinical practice. Educational tools, resources, and appropriate instructional strategies should be carefully selected and provided to faculty and students of respiratory therapy for the teaching-learning activities for proper training of students.

Based on the findings, it is recommended that a framework of a responsive RT curriculum in the 21st century RT global competencies should comprise the following: First, RT schools should train their faculty in the use of technology in their teaching, and procure the equipment, devices, and technology for the training of respiratory therapy students in the laboratory setting. Such technology should include computerized simulations and modeling of modalities in respiratory care. Second, since this was based on empirical data obtained in the study, it represented confirmation of changes needed in the curriculum for BS Respiratory Therapy. On that account, the researcher recommends that the developed framework be utilized for enhancing a curriculum. Third, the researcher recognizes the importance of the demonstration of evidence of curricular alignment necessary for school decision-makers and should be dependent on the local contexts. Outcome measures should identify how they connect to the current national contexts. To this end, it recommends that a regular evaluation should report, when possible, and relevant, on a curricular program's alignment to systematic factors, particularly in relevance to the dynamic and always changing landscapes in Philippine education and healthcare systems.

In utilizing the framework, enhancements and additional contents were included in the curriculum model that is responsive to RT global competencies in the 21st century. Wherefore, the researcher recommends that the said curriculum be considered for possible reference or guide by the group of practitioners (Association of Respiratory Care Practitioners), group of educators (Philippine Society of Respiratory Therapy Educators), the Professional Regulatory Board for Respiratory Therapy, and the Commission on Higher Education for the advancement of respiratory therapy education and practice in the country. A comprehensive study on the inclusion of curriculum mapping should be considered in future studies to identify and address academic gaps, redundancies, and misalignments for purposes of improving the overall

coherence of a course of study and, by extension, its effectiveness. To determine the effectiveness of the added professional courses in the proposed curriculum model for BS Respiratory Therapy a continuous quality improvement is necessary to ensure that students would graduate with competencies, skills, knowledge, and attitude they all need to meet the current challenges in their chosen profession. To add, due to the COVID-19 Impact to Health Professions Education, curriculum developers should study the need to include mandatory courses or electives on pandemic and emergency responses. The following topics that can be emphasized and integrated further into the curriculum of various health professions: Respiratory disease and infectious disease, Home-based medical and health care, Telemedicine, Vaccination, Community and population health, and Inter-professional education and collaborative practice.

Lastly, increase the replicability of this study by looking for possible grants on policy formulation.

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- <http://www.routledgehandbooks.com>
- Canadian Society of Respiratory Therapists. <https://www.csrt.com>
- Commission on Accreditation of Respiratory Care. <https://www.coarc.com>
- American Association of Respiratory Care. <https://www.aarc.org>

Appendix A

The BS Respiratory Therapy Curriculum Model (Sample only)

Curriculum Model:

BACHELOR OF SCIENCE IN RESPIRATORY THERAPY CURRICULUM RESPONSIVE TO THE 21ST-CENTURY GLOBAL COMPETENCIES

I. PROGRAM DESCRIPTION

A. Degree Name

The degree shall be Bachelor of Science in Respiratory Therapy (BSRT). To ensure the quality of the respiratory therapy graduate, the degree is conferred upon completion of the four-year BSRT program offered by a college, professional institution or university duly recognized by the Commission on Higher Education. In the Philippines, the BSRT degree is equivalent to Level 6 of the Philippine Qualifications Framework.

B. Nature of the Field

The Bachelor of Science in Respiratory Therapy is a four-year program consisting of the general education and professional courses. The first and second semesters of the last level is one thousand and six hundred (1,600) hours of clinical internship program in CHED-DOH accredited training in respiratory laboratory with rotational duties in different sections of one or more affiliate hospitals. Rotation and/or exposure in different clinical areas includes: pulmonary diagnostics, general respiratory care, adult intensive care unit, neonatal intensive care unit, pediatric intensive care unit, critical care unit, sleep laboratory, pulmonary rehabilitation, EMS, bronchoscopy, Chest X-ray and anesthetic procedure units and community/primary health care.

C. Program Goals

The BSRT program aims to produce respiratory therapists who are competent to fulfill professional responsibilities in the following areas:

1. Patient care in various settings for different populations;
2. Education of individuals and groups;
3. Administration and management of respiratory therapy programs, institutions and facilities, including private practice and delivery of home health care services;
4. Lifelong learning for the development of the profession;
5. Health promotion and patient education;
6. Advocacy for the advancement of the profession;
7. Community service and development; and,

Appendix B

Summary of the Strengths and Weaknesses in Different Areas of the BSRT Curriculum (Sample only)

Strengths and Weaknesses in Different Areas and Competencies of the BS Respiratory Therapy Curriculum

AREA	STRENGTHS	WEAKNESSES
Health Professions Education	Provide patient-centered care. Apply quality improvement.	Engage in lifelong learning. Utilize informatics. Utilize effective communication orally and in writing using both English and Filipino. Work in interdisciplinary teams, to ensure that care is continuous and reliable. Employ evidence-based practice. Engage basic supervisory skills practice in the management of the respiratory department. Engage practice in professional, social and ethical responsibilities.
PFT	Perform basic spirometry.	Compare and evaluate indications and contraindications for advanced pulmonary function tests.
Sleep		Compare and evaluate the indications and contraindications for sleep studies Understand results in relation to types of respiratory sleep disorders.
Invasive Diagnostic Procedure	Perform arterial puncture and sampling and blood analysis.	Describe the bronchoscopy procedure and describe the respiratory therapist's role in assisting the physician. Monitor and evaluate the patient's clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices.
Disease Management	Understand the etiology, anatomy, pathophysiology, diagnosis, and treatment of cardiopulmonary diseases (eg, asthma, chronic obstructive pulmonary disease) and comorbidities.	
Chronic Disease Management	Establish specific desired goals and objectives. Evaluate the patient. Apply a working knowledge of the pharmacology of all organ systems.	Communicate and educate to empower and engage patients. Develop, administer, and re-evaluate the care plan.
Acute Disease Management		Develop, administer, evaluate, and modify respiratory care plans in the acute-care setting, using evidence-based medicine, protocols, and clinical practice guidelines. Incorporate the patient/therapist participation principles in chronic disease management.

Appendix C

Clearance to Proceed



PHILIPPINE NORMAL UNIVERSITY
The National Center for Teacher Education
RESEARCH ETHICS COMMITTEE (REC)
 Tel No. 317-1768 loc. 750/751/747 E-mail: rec@pnu.edu.ph

Clearance to Proceed

REC Form 4

BASIC INFORMATION

REC Code:	062317-156
Research Proposal Title:	Towards a Responsive Respiratory Therapy Curriculum for the 21st Century Health Professions Education
Researcher / Project Leader and Designation/Affiliation:	Danahlyn D. Evangelista

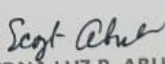
The following items [✓] have been received and reviewed in connection with the above study to be conducted by the above researcher/project leader.

- [✓] Research Proposal in prescribed format
- [✓] Informed Consent Form/s / Assent Form
- [✓] Data Collection Tools

and hereby approved:

- [✓] To proceed to the validation of the data gathering tools
- [✓] To proceed to data collection, organization and write-up

Date of Issuance: **June 23, 2017**


EDNA LUZ R. ABULON
 Regular Member
 Research Ethics Committee

Appendix D

Authenticity Result

	Philippine Normal University <i>The National Center for Teacher Education</i> PUBLICATION OFFICE Taft Avenue, Manila 1000, Philippines	
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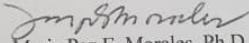
AUTHENTICITY RESULT

Date of Release:	February 26, 2020
Result Code:	2020-0668
Submission ID:	1263829092
Title of Output:	Towards A Responsive Respiratory Therapy Curriculum for The 21st Century Health Professions Education and RT Global Competencies
Author (s):	Danahlyn D. Evangelista

Authenticity Report:

Similarity Report: 22%

- Interpretation: A similarity of 22% means that 22% of the entire paper is similar to sources in Turnitin's (authenticity software) online repository. The colored bibliographical references denote the sources of similarity to previously published work which maybe from internet sources (17%), publications (5%), and student papers (15%) for the remaining similarity percentage.
- Highlighted text in the Manuscript:
 - Red marks and highlights are set of texts directly or exactly copied from online sources.
 - Other color marks and highlights are set of text exactly copied from other sources (student papers and publications).



Marie Paz E. Morales, Ph.D.
Director

PNU-MN-2016-PUB-QM-001
Revision No.: 01

Effective Date: August 10, 2017

Appendix E

Certificate of Compliance

 PHILIPPINE NORMAL UNIVERSITY The National Center for Teacher Education Taft Ave. Cor. Ayala Blvd., Ermita, Manila 1000 Philippines Trunkline: +63-2-317-1768 loc 750/751 eprdc@pnu.edu.ph www.pnu.edu.ph	Index No.	PNU-MN-2016-EPR-FM-020
	Issue No.	01
	Rev. No.	01
	Date:	09-24-2018
	Page	1 of 1
	QAC No.	CC-09242018-027
EPRDC	CERTIFICATE OF COMPLIANCE	

BASIC INFORMATION

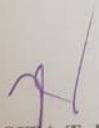
REC Code:	02062020-057
Title of the Research Project/Thesis/Dissertation:	Towards a Responsive Respiratory Therapy Curriculum for the 21st Century Health Professions Education and RT Global Competencies
Researcher/Project Leader and Designation/Affiliation:	Danahlyn D. Evangelista

The following items [v] have been received and reviewed in connection with the above study conducted by the above researcher/principal investigator:

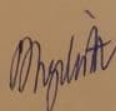
- ☐ Thesis
- ☒ Dissertation
- ☐ Research Article in APA Format

And hereby certified that it has fully complied with the PNU Code of Research Ethics and Guidelines for Review as stipulated in the BOR Resolution No. U-2303 s. 2015.

Date of Issuance: **February 6, 2020**


TERESITA T. RUNGDUIN, Ph.D.
 Secretary
 Research Ethics Committee


RENE R. BELECINA, Ph.D.
 Chair
 Research Ethics Committee

 02.08.2020

(All documents without the PNU QM Stamp or Control Identifier are uncontrolled)

Appendix F

Permission to Conduct the Study - RT School Heads/Deans



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Avenue, Manila

Date: _____

To: _____

RE: Permission to Conduct Research Study

Dear _____:

In partial fulfillment of the requirements for the degree in Doctor of Philosophy in Curriculum and Instruction at Philippine Normal University in Manila, I am conducting a study for my Dissertation entitled, "Towards a More Responsive Respiratory Therapy Curriculum for Health Professions Education for the 21st Century."

The study is in the process of gathering data through the administration of questionnaires. The undersigned has chosen you to be one of the respondents. In this regard, I would like to ask your permission to distribute the questionnaires to RT faculty members and students that will help me obtain the relevant information.

If approval is granted, faculty and student participants will complete the questionnaire in the classroom or any other appropriate setting on the school locale for about thirty (30) minutes. Results will be treated with utmost confidentiality and will remain anonymous. Furthermore, the collected information will be used for academic purposes only. Should this study be published, only pooled results will be documented. No costs will be incurred by either your school or the individual participants.

Attached is an abstract of my study for your reference and guidance.

Your approval to this request is greatly appreciated. I will follow-up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: ddevangelista@yahoo.com.

Respectfully,

DANAHLYN D. EVANGELISTA, MHPED, RTRP
Ph.D. CIN Student
PNU, Manila

DR. DANILO VILLENA
Dissertation Adviser

DR. EDEN EVANGELISTA
Dissertation Adviser

Appendix G

Permission to Conduct the Study - Heads of RT Units in Hospitals



PHILIPPINE NORMAL UNIVERSITY
 College of Graduate Studies and Teacher Education Research
 Taft Avenue, Manila

Date: _____
 To: _____

RE: Permission to Conduct Research Study

Dear _____:

Dear Colleague:

Greetings!

In partial fulfillment of the requirements for the degree in Doctor of Philosophy in Curriculum and Instruction at Philippine Normal University in Manila, I am conducting a study for my dissertation entitled, "Towards a More Responsive Respiratory Therapy Curriculum for Health Professions Education for the 21st Century."

The study is currently in the process of gathering data through the administration of questionnaires in selected schools and professional agencies. The result of this evaluation will serve as bases on the needed parameters in developing the content of the Model Respiratory Therapy Curriculum.

I, therefore, humbly invite you to be one of the respondents to answer the hereto attached questionnaire. Attached is an abstract of my study for your reference and guidance.

May this request merit your positive response and support on the matter. Thank you and more power.

Yours respectfully,

DANAHLYN D. EVANGELISTA, MHPED, RTRP
 Ph.D. CIN Student

DR. DANILO VILLENA
 Dissertation Adviser

DR. EDEN EVANGELISTA
 Dissertation Adviser

Appendix H

Permission to Conduct the Study/ Gather Data thru Interview (Officers of Professional Organizations)



PHILIPPINE NORMAL UNIVERSITY
College of Graduate Studies and Teacher Education Research
Taft Avenue, Manila

Date: _____
To: _____

RE: Permission to Conduct Research Interview

Dear Colleague:

In partial fulfillment of the requirements for the degree in Doctor of Philosophy in Curriculum and Instruction at Philippine Normal University in Manila, I am conducting a study for my Dissertation entitled, "Towards a Responsive Respiratory Therapy Curriculum for Health Professions Education for the 21st Century."

The research study is currently in the process of gathering data through the administration of questionnaires and conduct of interview. The undersigned has chosen your agency and position to be one of the respondents. In this regard, I would like to ask your permission to personally conduct an Interview with you to help me obtain the relevant information.

If approval is granted, I would be glad to schedule an interview during your convenient time in your institution or any appropriate setting on the school locale for about thirty to forty-five (30-45) minutes. The result will be treated with utmost confidentiality and will remain anonymous. Furthermore, all the collected information will be used for academic purposes only and should this study be published, only pooled results will be documented.

Your approval to this request will be greatly appreciated. I will follow-up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: ddevangelista@yahoo.com.

Respectfully,

DANAHLYN D. EVANGELISTA, MHPED, RTRP
Ph.D. CIN Student

DR. DANILO VILLENA
Dissertation Adviser

DR. EDEN EVANGELISTA
Dissertation Adviser

Appendix I

Consent for Participation in Research

Consent for Participation in Research

I volunteer to participate in a research/study conducted by Ms. DANAHLYN D. EVANGELISTA from Philippine Normal University, Manila . I understand that the study is designed to gather information about the BS Respiratory Therapy program/curriculum in this institution.

- 1. My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty.*
- 2. I understand that the researcher will not identify me by name in any reports using information obtained from this study, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.*
- 3. I understand that this research study has been reviewed and approved by the Graduate Research Office of Philippine Normal University.*
- 4. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.*
- 5. I have been given a copy of this consent form.*

_____ *My Signature*
 _____ *My Printed Name*

For further information, please contact:
Ms. DANAHLYN D. EVANGELISTA (Researcher)
Mobile Number: 0920-5597730
Email address: ddevangelista@yahoo.com

_____ *Date*
 _____ *Signature of Researcher*

Appendix J

Permission to Conduct Research Interview

Date: _____

To: PRC- Philippine Regulatory Board for Respiratory Therapy and Continuing Professional Development Council: _____

RE: Permission to Conduct Research Interview

Dear Honorable Colleague:

In partial fulfillment of the requirements for the degree in Doctor of Philosophy in Curriculum and Instruction at Philippine Normal University in Manila, I am conducting a study for my dissertation entitled, "Towards a Responsive Respiratory Therapy Curriculum for Health Professions Education for the 21st Century."

The research study is in the process of gathering data through the administration of questionnaires and conduct of interview. The undersigned has chosen your agency and position to be one of the respondents. In this regard, I would like to ask your permission to personally conduct an Interview with you to help me obtain the relevant information.

If approval is granted, I would be glad to schedule an interview during your convenient time in your institution or any appropriate setting for about thirty to forty-five (30-45) minutes. The result will be treated with utmost confidentiality and will remain anonymous. Furthermore, all the collected information will be used for academic purposes only and should this study be published, only pooled results will be documented.

Your approval to this request will be greatly appreciated. I will follow-up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: ddevangelista@yahoo.com.

Respectfully,

DANAHLYN D. EVANGELISTA, MHPED, RTRP
Ph.D. CIN Student
PNU, Manila

cc: DR. DANILO VILLENA
Dissertation Adviser

DR. EDEN EVANGELISTA
Dissertation Adviser

Appendix K

Declaration of Absence of Conflict of Interest

DECLARATION OF ABSENCE OF CONFLICT OF INTEREST

- (i) I, DANAHLYN D. EVANGELISTA, understand that the Conflict of Interest refers to situations in which financial or other personal considerations may compromise my judgment in evaluating, conducting, or reporting research;
- (ii) I hereby declare that: NO support, financial or otherwise, has been received from any organizations that may have been an interest in the submitted work;
- (iii) Further, there are no other relationships, activities or external factors that could appear to have influenced the submitted work;
- (iv) I understand that I may be held accountable to PNU-EPRDC for any conflict of interest which I have intentionally concealed.

Signature Over Printed Name: DANAHLYN D. EVANGELISTA

Date:

Appendix L

Computed Mean per Area/Competency (Sample only)

Competencies in Diagnostics		
Area	Competencies	Mean
Pulmonary Function Technology	1. Adequate Coaching.	3.64
	2. Recognition of improperly performed maneuvers.	3.64
	3. Corrective actions.	3.65
	4. Interpretation of test results.	3.67
	OVERALL MEAN	3.65
	1. Plethysmography	3.05
	2. Diffusion capacity	3.01
	3. Esophageal pressure	2.96
	4. Metabolic testing	2.93
	5. Diaphragm stimulation	3.00
Sleep	6. Be able to recognize normal/abnormal results.	3.63
	OVERALL MEAN	3.10
	OVERALL MEAN	3.37
	1. Compare and evaluate the indications and contraindications for sleep studies.	2.45
Invasive Diagnostic Procedures	2. Understand results in relation to types of respiratory sleep disorders.	2.45
	OVERALL MEAN	2.45
	1. Explain the indications and contraindications, and general hazards and complications of bronchoscopy.	2.89
	2. Describe the bronchoscopy procedure and describe the respiratory therapist's role in assisting the physician.	2.91
	3. Monitor and evaluate the patient's clinical condition with pulse oximetry, electrocardiogram, exhaled gas analysis, and other related diagnostic devices.	3.23
	4. Perform arterial puncture and sampling and blood analysis.	3.61
	OVERALL MEAN	3.16
OVERALL MEAN		2.99

Interpretation: 1.00-1.50 =The area/descriptor is not present or not provided in the curriculum; 1.51-2.50 =The area/descriptor to some degree or extent is provided in the curriculum; 2.51-3.50= The area/descriptor is provided in the curriculum but needs major enhancement; 3.51-4.50 =The area/descriptor is provided in the curriculum but needs minor enhancement; 4.51-5.00 =The area/descriptor is well provided in the curriculum and no enhancement is needed.

Appendix M

Certification for Language Editing

Philippine Normal University
The National Center for Teacher Education
 College of Graduate Studies and Teacher Education Research
 Taft Avenue, Manila

16 July 2020

CERTIFICATION

This certifies that I have edited the dissertation titled
**“Towards a Responsive Respiratory Therapy
 Curriculum for the 21st Century Health
 Professions Education and RT Global
 Competencies”** by DANAHLYN D. EVANGELISTA,
 a candidate for the degree PhD in Curriculum and
 Instruction.

MERRY RUTH MORAUDA GUTIERREZ
 |CGSTER Faculty