The Problem and Its Setting

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Introduction

The pursuit for quality improvement in education service delivery obliged the utilization of quality system standards in the education sector. In fact, representatives of the international community agreed that all countries should pay greater attention towards improving all aspects of the quality of education and ensuring excellence of all (UNESCO, 2002). This is to ensure substantial achievement of recognized and measurable learning outcomes in schools,, especially in literacy, numeracy and essential life skills (UNESCO, 2002). For this reason, quality assurance is considered as one of the most critical tasks facing every nation's educational institutions, so that the societal demands for improved education service delivery would achieve the best learning outcomes that enhance the quality of life of the citizenry (Ayeni, 2010).

In order to catch up with these overwhelming changes, it has become obligatory for countries to support one another, besides, to cooperate and interact with each other in their attempts to rearrange their educational systems. As a matter of fact, the European Union encourages its member countries, to foster cooperation with third countries and with the competent international organizations in the field of education in order to produce qualified workforce (Yüksel & Adıgüzel, 2011). However, recent assessment on the learning outcomes of maritime students in the United States revealed that about 19% of students are not meeting the expectations (SUNY Maritime College, 2008). In the

same way, the study conducted by Interreg IVB funded NMU project (2010) stated that the level of competence in the European Maritime Industry is declining, and this is the case at sea and ashore

Philippines as an Archipelago, is populated by people involved in seafaring and other sea related activities. Hence, as the ASEAN 2015 looms, more workforce is needed in maritime industry. As a matter of fact, Filipino seamen constitute an estimated 30 percent of the world's maritime manpower (Ronda, 2013). However, the recent assessment for seafarer students showed that only 3, 508 students passed the Maritime School Assessment Program (MSAP) out of 11, 783 actual exam takers with 30% passing rate of the total examinees. Moreover, the Philippines-Japan Maritime Consultative Council (PJMCC) has noted a lack of any action to upgrade the quality of the curriculum in maritime schools despite the threat of the European Union to ban Filipino seafarers from boarding EU-registered sea vessels (Ronda, 2013). Nevertheless, the study of JITI and Nippon Foundation (2010) revealed that majority (72.6%) of students seemed to hope to become seafarers before entering their institutes.

The importance of ensuring academic quality is a necessity in order to produce competitive workforce. Thus, the study of Caguimbal et al., (2013) revealed that the school must strongly implement OBE program to the maritime students to greatly improve the quality education for the students to enhance their knowledge and skills. With this, the investigation of interrelationship between academic quality and learning outcomes of students will help explore

problematic areas of maritime education, which can be used as basis for the improvement of educational quality assurance among schools.

Statement of the Problem

This study determined the relationship between academic quality and learning outcomes of maritime students. More specifically, it seeks to answer the following questions:

1. What is the level of academic quality among maritime schools in terms of:

   1.1 instruction

   1.2 facilities

   1.3 curriculum?

2. What is the level of learning outcomes of maritime students in terms of:

   2.1 deck practical assessment scores

   2.2 engine practical assessment scores?

3. To what extent does the canonical model have to explain in terms of:

   3.1 strength of correlation between the variable sets of academic quality and learning outcomes

   3.2 amount of loadings and cross loadings among the variable sets of academic quality and learning outcomes

   3.3 amount of variance explained by the model?

4. Based on the findings, what educational quality improvement can be proposed?

Hypothesis

1. There is no significant relationship between academic quality and learning outcomes of students

Theoretical Framework

This study is anchored to the Learning Theory of Gagne (1965) and Systems theory by Wubbels and Levy (1993).

The learning theory distinguishes between two types of conditions, internal and external. The internal conditions can be described as "states" and include attention, motivation and recall. The external conditions can be thought of as factors surrounding one's behavior, and include the arrangement and timing of stimulus events. Gagne's work has made significant contributions to the scientific knowledge base in the field of instructional technology particularly in the area of instructional design. He emphasize that identifying the learning outcomes is one that is very important in designing instruction. Hence, this theory is supported by Cormier and Hagman (1987) as he stated that transfer of learning occurs whenever prior learned knowledge and skills affect the way in which new knowledge and skills are learned and performed; thus the end goals of education and training are not achieved unless this transfer takes place (Cormier & Hagman, 1987).

Meanwhile, the conceptualization of institutional interaction is based on systems theory (Wubbels & Levy, 1993). The core idea of this theory rests on the notion of circularity which implies that all aspects of the system are linked. It denotes that system-environment interactions can be defined as input (quality

assurance) and output (learning outcomes) of matter, thus, any changes in one part of the system lead to changes in other parts of the system that influence the first part, and so on (Wubbels & Levy, 1993). Moreover, the goal directed behavior characterizes the changes observed in the state of the system; hence, a system is seen to be organized in terms of the goal which can be understood to exhibit reverse causality.

An educational system is described by the relationships among its components (teachers, students, content, and contexts) and the relationship this system has with its environment (Frick, 1991). When changes are made in an educational system, one or more of these relationships can be affected. Systemic change, however, is a comprehensive process where “a fundamental change in one aspect of a system requires fundamental changes in other aspects in order for it to be successful (Reigeluth, 1992).

The academic quality involves curriculum, facilities, and instruction which are very important elements for the students to achieve their desired goals (Pitiyanuwut, 2005). Furthermore, Clausen (2002) highlights that students’ perceptions aggregated at the school are valid indicators of teaching behaviors and are highly related to students’ learning outcomes.

Conceptual Framework

The model displayed two latent constructs namely: academic quality (exogenous) and learning outcomes (endogenous). Because latent variables will not be observed directly, it follows that they cannot be measured directly. With this, each latent constructs will be associated with multiple measures or observed

variables. Thus, the extent of the paths from the latent variable to the observed variables is one of the primary interests of this study.

The academic quality has three observed variables, namely curriculum, facility, and instruction.

Curriculum refers to the planned interaction of pupils with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives.

Facilities are the availability of equipment's and materials that will serve as a medium to enhance the learning of maritime students in school. This includes laboratories to simulate similar conditions in the sea operations.

Instruction is defined as the education and strategy that is performed by teachers in major subjects of maritime education.

The learning outcome variable has two observed variables, namely deck and engine assessment. These two subjects are the core areas that students should be competent.

Deck refers to maritime assessment pertaining to the course and speed, maneuver to avoid hazards, and continuously monitor the vessels position using charts and navigational aids.

Engine is an assessment about the operation of the propulsion plants and support systems on board crew, passengers and cargo seafaring vessels.

The canonical model could be decomposed into two submodels: a measurement model, and a structural model. The measurement model defines relations between the observed and unobserved variables. In other words, it

provides the link between scores on a measuring instrument (i.e., the observed indicator variables) and the underlying constructs they are designed to measure (i.e., the unobserved latent variables). The measurement model, then, represents the measure loads on each factor to their latent constructs. In contrast, the structural model defines relations among the latent variables.

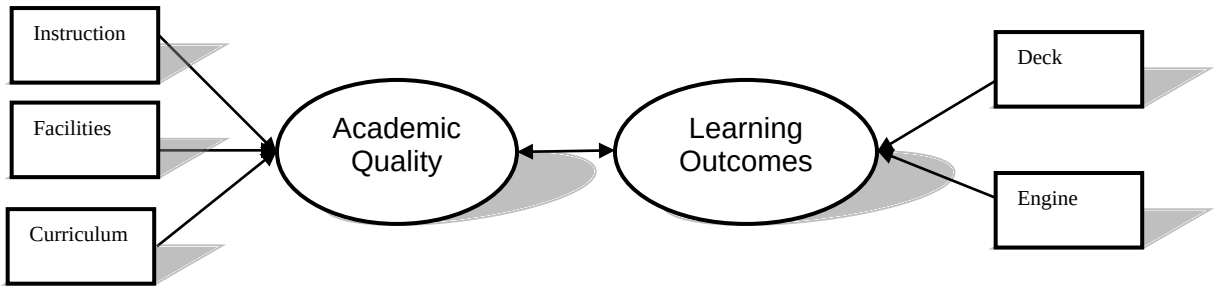


Figure 1. A Canonical Model Showing the Relationship Between Academic Quality and Learning Outcomes

Significance of the Study

This study would contribute to the body of knowledge about the interlinkage between academic quality and learning outcomes of maritime students. Moreover, this would be of great help to the following:

School Administrators. This study could give them an idea if the appropriate standards are being met in accordance to the outcomes expected for maritime students. Moreover, this can also be a basis for the improvement of academic standards especially in the aspect of curriculum, instruction, and facilities of the school that will supplement the instructional and training needs of the maritime students.

Faculty. This would give them awareness on what subject areas the students find difficulties which can be used as basis in providing targetted instructional interventions.

Students. This would promote learning by providing feedback on their performance in the major areas of maritime education and help students to identify their strengths and weaknesses.

Future Researchers. The results of the study could be use as a secondary data for future related researches.

Scope and Limitations

This study was limited to the interrelationship between academic quality and learning outcomes of students. The observed variables of academic quality only involve the views of the students on curriculum, facilities, and instruction. On

the other hand, the learning outcomes is mainly focus on deck and engine assessment.

Meanwhile, the study was conducted in the school year 2013-2014, involving the graduating students in higher education institutions in Region XI that offers Maritime Education.

Definition of Terms

To make this research more comprehensive to the readers, the following terms are operationally defined:

Academic quality refers to results associated with teaching, learning, and services of the Maritime Schools in Region XI

Learning outcomes is defined as the cognitive achievement of maritime students in two competency areas (deck and engine)

Canonical correlation analysis is a way of measuring the linear relationship the two multidimensional variables, namely academic quality and learning outcomes.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter presents the review of related research of the components of the canonical model of academic quality of schools and learning outcomes of students. The chapter includes the concept and definition of the different variables of the study and as well as the findings of researchers showing the relationship between variables.

ACADEMIC QUALITY

The Quality Assurance Agency for Higher Education (2014) defined academic quality as something that is concerned with how well the learning opportunities made available to students enable them to achieve their award. According to IACBE. org. (2014), one approach to measuring academic quality is to focus on resource measures which can be on inputs into the educational process such as faculty qualifications, faculty publications, faculty deployment, teaching loads, student and faculty ratios, financial resources, library resources, facilities and equipment, and other similar inputs.

In other words, quality is not a static, but a dynamic concept, over time, which is treated differently depending on the current specifications and the particular objects concerned (Anand, 1997; Ruşevieius & Makijovaite, 1998). The focus is on the value of various academic resources to the institution's stakeholders in terms of their ability to generate measurable results or outcomes pertaining to student learning (IACBE. Org., 2014).

Watty (2003) suggests that the dimension of quality as perfection can be removed, since higher education does not aim to produce defect-free graduates. Lomas (2001) suggests that fitness for purpose and transformation seem to be the two most appropriate definitions of quality. In this case, Dill (2007) mentioned that academic quality as equivalent to academic standards is consistent with the emerging focus in higher education policies on student learning outcomes specifically on the specific levels of knowledge, skills, and abilities that students achieve as a consequence of their engagement in a particular education program.

According to Hunt (2014) that the pursuit of the principle of quality means maintaining and applying academic and educational standards, both in the sense of specific expectations and requirements that should be complied with and in the sense of ideals of excellence that should be aimed at. As opined by Reinecke (2006) that quality is a concept that we all believe we understand and practice, but few people can explain what they are doing to continuously improve quality in their area of work. Hunt (2014) added that applying the principle of quality entails evaluating services and products against set standards, with a view to improvement, renewal or progress.

In this study, academic quality is determined by its three indicators namely: instruction, facilities and curriculum. The interplay of these three key components are necessary for the academic institution's achievement and assurance of academic quality.

Instruction

The concept of academic quality has long been explored by many researchers. Nevertheless, the meaning of quality is not agreed on due to the obscurity and extensiveness of quality as a concept (Liu, 2009).

According to Glendale Unified School District (2014), the student's total education is a contribution of teaching the "Three Rs" leads to a broad spectrum of learning experiences, including language, spelling, handwriting, science and social science, art, music, physical education, and other subject areas such as computer literacy, health and safety, and substance abuse awareness and prevention. In short, as opined by Sherman (2002), instruction refers to the arrangement of an environment in an effort to maximize the probability that learners interacting with this environment will learn what the instruction intends.

La Salle University (2014) defined learning instruction as something that focuses on the learning process, the "how" of learning; assesses the reading, time management, organizational, goal setting, note-taking, test-taking, and study habits that students currently have; instructs students on strategies that will enhance their learning; and helps students devise a plan for their future success. Moreover, Newmann, F. and Wehlage, G. (1993) identified five standards of authentic instruction which are: higher-order thinking, depth of knowledge, connectedness to the world beyond the classroom, substantive conversation, and social support for student achievement.

Canadian Language and Literacy Research Network (2009) describe the elements that should be included in effective instruction which are as follows:

excellent classroom management based on positive reinforcement and cooperation; balanced teaching of skills, literature, and writing; scaffolding and matching of task demands to student competence (e.g., vocabulary level in texts being decodable using the skills the student has learned); encouragement of student; self-regulation (e.g., students actively, through meta-cognitive behaviors, monitor their learning); strong cross-curricular connections (e.g., bringing reading and writing instruction into all subjects); and breaking down lessons into multiple components that are clearly related to one another.

Instructional quality conceptualizes learning as a self-determined, constructive, and self-regulated process of conceptual growth, which is supported or undermined by perceived learning conditions and shaped by a dynamic interplay among personal, behavioral, and environmental factors (Schunk and F. Pajares, 2009). Thus, a high level of instructional quality of learning environments is seen as a prerequisite to enhanced learning outcomes depending on students' subjective perceptions, preknowledge, and internal structures of cognitive processing (Cobb and Bowers, 1999).

Since student learning is the primary function of the schools, Fischer (2014) emphasized that effective supervision of instruction is one of the most critical functions of the administrator. If schools are to provide equal access to quality educational programs for all students, administrators must hold teachers accountable for providing an appropriate and well-planned program. Lastly, instructionaldesign.org (2014) cited that one of the most important issues in the application of learning theory is sequencing of instruction. The order and

organization of learning activities affects the way information is processed and retained.

Facilities

School facilities are a collection of buildings used to provide educational programs for students. These facilities provide students or pupils with a place to learn that is under the direction of teachers. Homeschooling or home based learning is the education of children at home (Ask.com, 2014). School facilities have the ability to play a powerful role in a student's academic success. (Reinisch, 2006).

A statement from Akande (1985), learning can occur through one's interaction with one's environment. Environment here refers to facilities that are available to facilitate students learning outcome. It includes books, audio-visual, software and hardware of educational technology; so also, size of classroom, sitting position and arrangement, availability of tables, chairs, chalkboards, shelves on which instruments for practicals are arranged (Farrant, 1991 and Farombi, 1998).

Moreover, Reinisch (2006) cited that quality learning environments are not only healthier, but also help students feel more safe, secure, and valued. As a result, self-esteem increases and students are more motivated to engage in the learning process. Research indicates that the condition and design of school facilities measurably impact test scores, attendance, and graduation rates.

Branham (2004) revealed that students are less likely to attend school and more likely to drop out of school when school facilities have inadequate custodial

services, need more structural repairs, and rely on temporary structures. As cited by UNESCO (2014), the quality of a school's environment and its facilities has a strong influence on students' learning. Besides regular use in organizing and managing a school's activities, records of a school's physical facilities and material resources such as furniture and equipment can provide data to derive many indicators for assessing the quality of education in a school.

Similarly, Earthman (2002) mentioned that the condition of school facilities has an important impact on student performance and teacher effectiveness. In particular, research demonstrates that comfortable classroom temperature and noise level are very important to efficient student performance. As cited by Vandiver (2011, citing Organization for Economic Co-operation and Development, 2000), research had demonstrated that there was a relationship between student performance (achievement and behavior) and the condition of the built environment.

PEB working group identified five principles of quality in terms of educational facilities which includes the following: The facility is fit for purpose in relation to the users' needs; fit for purpose in relation to operational layout; visually pleasing and educational, and the design offers symbolic meaning; provides a healthy and safe environment; and environmentally sustainable (OECD. Org., 2014).

Moreover, Fielding (2006) also presented six essential elements that support the requirements of any contemporary educational framework. These includes supporting teaching and learning, maximizing physical comfort and

wellbeing, demonstrating environmental responsibility, serving the community, establishing design principles that make buildings work better, last longer, cost less to renovate and maintain, and inspire and adapt to changing needs and applying open, transparent and collaborative processes that allows the school and community assume ownership of planning and design.

In conclusion, Kuuskorpi,M. and González, N.C. (2011) opined that when physical learning environments offer resources and possibilities that support new teaching methods and learning goals, schools are much more prompt to change their operational culture. In other words, they are important when developing school operational culture, as well as work environments.

Curriculum

Wikipedia (2014) defined curriculum as the planned interaction of pupils with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives. For Ebert, Ebert, and Bentley (2013), curriculum refers to the means and materials with which students will interact for the purpose of achieving identified educational outcomes.

The curriculum aims to ensure that all children and young people in develop the knowledge, skills and attributes they will need if they are to flourish in life, learning and work, now and in the future (EducationScotland.gov.uk., 2014). Moreover, The University of Manchester (2014) cited that the aims of the curriculum are the reasons for undertaking the learning journey. For example, a degree program may aim to prepare students for employment in a particular

profession. Likewise a unit within the program may aim to provide an understanding of descriptive statistics.

Additionally, EducationScotland.gov.uk. (2014) cited that the purpose of the curriculum is encapsulated in the four capacities, to mention: to enable each child or young person to be a successful learner, a confident individual, a responsible citizen and an effective contributor. AllinBrownsville (2014) cited that teachers, educational advisers and program coordinators collaborate to develop the curriculum and ensure there are no gaps that may impede academic progress.

A curriculum offers teachers a guideline for assessing student progress in addition to giving students an understanding of what is required in order to obtain a degree or any other qualification. Curriculum also prepare students to be confident and responsible citizens (Ask.com, 2014). The teacher is required to achieve the aims of education. For that purpose he has to employ suitable instructional methods and procedures. In other words, he should know the content of curriculum which consists of subjects, activities and experiences in the properly graded form (Dushi, 2012).

Finally, among the many functions curriculum plays in the schools beyond a representation of the approved culture and perspectives adopted by the state and the groups that are in power within the state is that it is the sanctified content to be taught and as such, becomes the platform for subsequent testing (Sagepub.com, 2014). An effective curriculum offers the accomplishment of anything worthwhile, whether large or small, depends on the completion of goals,

activities and milestones. It provides administrators, teachers and students with structure and a sense of progression. Therefore, the importance and impact of curriculum cannot be overstated (Glenn, 2014).

LEARNING OUTCOMES

Learning outcomes are statements of a learning achievement and are expressed in terms of what the learner is expected to know, understand and be able to do on completion of the award or module. They may also include attitudes, behaviors, values and ethics (uarctic.org, 2014). It is a particular knowledge, skill or behavior that a student is expected to exhibit after a period of study (WHO, 2000). Moreover, Suskie (2004) described learning outcomes as specific knowledge, practical skills, areas of professional development, attitudes, higher-order thinking skills, etc. that faculty members expect students to develop, learn, or master during a course.

Several authors defined learning outcomes as broad, yet direct statements that describe the competences that students should possess like what students should know and be able to demonstrate, upon completion of a course or program (Harden, 2002; Kennedy et al., 2006). Thus, learning outcomes may be presented separately to represent the cognitive, psychomotor and affective domains, but often cover a range of interacting knowledge, skills and attitudes that reflect the complexities inherent to the process of learning, and represent the essential, enduring and integrated learning that a graduate of a course or programme should possess (Harden, 2002; Soulsby, 2009).

Measuring learning outcomes provides information on what particular knowledge (cognitive), skill or behavior (affective) students have gained after instruction is completed (WHO, 2000). Learning outcomes should state the specific knowledge, skills and attitudes that an ideal graduate should demonstrate, and the depth of learning that is expected. In fact, Harden (2002) argued that learning outcome is one of the most challenging, yet important tasks a curriculum committee can undertake.

More so, in recognizing learning outcomes, three domains of learning were recognized which includes the cognitive domain which defines the knowledge classification; the psychomotor domain which defines the physical skills or tasks classification; and the affective domain which defines the behaviors that correspond to attitudes and values. Orlich et al. (2004) cited that within the domains, learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels.

Finally, The University of Manchester (2014) cited that learning outcomes are what students will learn if they follow the curriculum successfully. In framing learning outcomes it is good practice to express each outcome in terms of what successful students will be able to do and include different kinds of outcome. The most common are cognitive objectives which refer to learning facts, theories, formulae, principles etc. and performance outcomes which refer to earning how to carry out procedures, calculations and processes, which typically include gathering information and communicating results. In some contexts, affective outcomes are important too in developing attitudes or values, specifically those

required for a particular profession. The interplay of the three components in the teaching learning process becomes very important since it develops holistically every student.

Deck Practical Assessment Scores

A deck is a structure of planks or plates, approximately horizontal, extending across a ship or boat at any of various levels, esp. one of those at the highest level and open to the weather. According to Wikipedia (2014), a deck is a permanent covering over a compartment or a hull of a ship. On a boat or ship, the primary or upper deck is the horizontal structure which forms the 'roof' for the hull, which both strengthens the hull and serves as the primary working surface.

Moreover, the purpose of the upper or primary deck is structural, and only secondarily to provide weather-tightness, and to support people and equipment. The deck serves as the lid to the complex box girder which is the hull. It resists tension, compression, and racking forces.

The deck practical assessment scoring is a performance based simulation technique for the students to be assessed in terms of their competence. This is to prepare them for the licensure examinations conducted by the Philippine Regulatory Commission (PRC).

As described by Etolle (2000), the rules state that all marine deck officers of the operational and management levels shall be required to take the practical examination/assessment on subjects where such examination/ assessment with the use of simulators is appropriate. Only officers who passed the written technical examination in the operational and management levels, obtaining a

general average rating of at least 70 percent in all the subjects of the written technical examination with no grade lower than 60 percent in any subject shall be allowed to take the practical examination/assessment.

According to US Coast Guard National Maritime Center (2011) in its guidance on the Evaluation of Competence, the Seafarers Training, Certification, and Watchkeeping Code (STCW) states: “Recognizing the importance of establishing detailed mandatory standards of competence and other mandatory provisions necessary to ensure that all seafarers shall be properly educated and trained, adequately experienced, skilled and competent to perform their duties in a manner which provides for the safety of life and property at sea and the protection of the marine environment.”

Engine Practical Assessment Scores

On a ship, the engine room, or ER, is the propulsion machinery spaces of the vessel. To increase the safety and damage survivability of a vessel, the machinery necessary for operations may be segregated into various spaces. The engine room is one of these spaces, and is generally the largest physical compartment of the machinery space. The engine room houses the vessel's prime mover, usually some variations of a heat engine - diesel engine, gas or steam turbine. On some ships, the machinery space may comprise more than one engine room, such as forward and aft, or port or starboard engine rooms, or may be simply numbered (Wikipedia, 2014).

Marineinsight.com (2014) cited that the propulsion engine or the main engine is what drives the ship. The biggest machine in the engine room, the main

propulsion engine makes a major part of marine engineering learning. Coming to marine engineer's main job, which require them to operate and maintain ship's machinery, learning the basics of marine engineering is as much important as understanding advanced concepts of ship's engine room through experience and practical knowledge.

The engine practical assessment is used by marine institutions to assess student's practical performance in order to measure the students' competence. According to Wikipedia (2014), an e-testing system designed to focus on lower level associations comprises two components: (1) an assessment engine; and (2) an item bank. An assessment engine comprises the hardware and software required to create and deliver a test. Most e-testing engines run on standard hardware so the key characteristic is the software's functionality. There is a wide range of software packages. The software does not include the questions themselves; these are provided by an item bank. Once created, the engine uses the item bank to generate a test.

Moreover, traditional paper-and-pencil testing is similar, but the test is pulled from the bank at only one time, when it is sent to publishing. An e-assessment system designed to focus on more sophisticated forms of knowledge requires some sort of interactive activity and a system for inviting students to reason or solve problems around that activity.

SYNTHESIS

The academic quality has significant impact on students' academic performance (Ayeni, 2010). This key factor among others determines the extent

to which the school can achieve the national education objectives in the process of implementing the curricula. The challenges facing the teachers and the administrators in the school setting mostly lies on how to enhance quality assurance through systematic management and assessment of procedure adopted to monitor students' learning outcomes against objectives, and to ensure achievement of quality outputs and quality improvements in education (Harman, 2000; Ayeni, 2010).

However, it is argued that changes in learning outcomes are not necessarily linked to quality assurance mechanisms. Where positive changes to the student learning experience have taken place, these are not necessarily directly attributable to the existence of a quality assurance system (Newton, 2000). The literatures have above featured the indicators of academic quality which are instruction, facilities and curriculum. These indicators are crucial to every academic dimension in improving learning outcomes of students.

In fact, many findings confirmed that academic quality is associated with learning outcomes, achievement and competence of students. Hence, the main goal is to produce graduates who are competent to their field. More so, maritime education is a program that should aim for excellent learning outcomes since the graduates will immerse with situations wherein skills and competence is needed for them to be effective in their field.

Chapter 3

METHODOLOGY

This chapter presented the research method, sampling technique, instrumentation, procedure, and statistical treatment of the study.

Research Method

This research utilized the descriptive-correlation design. This was used to determine the relationships that exist between the variables of the study (Given, 2008). Moreover, this design is used to determine the relationship of two variables whether the relationship is perfect, very high, marked or moderate, slight or negligible (Zulueta & Costales, Jr., 2003). In this study, the relationships between academic quality and learning outcomes and as well as their variable sets linkages were investigated.

Research Locale

The study was conducted in selected regions in Region XI. It includes Davao City, Davao del Sur, Davao del Norte, Davao Oriental and Compostela Valley Province. The selected maritime schools in Region XI were situated at Davao City, namely MATS College of Technology, DMMA College of Southern Philippines, and AGRO Foundation College.

Research Respondents

There were a total of 425 respondents in Maritime Schools in Davao Region who participated in this study. These students were selected using

purposive sampling technique. MATS College of Technology has 175 participants, DMMA College of Southern Philippines has 175 participants and AGRO Industrial Foundation College has 75 participants. Each of them was screened using the criteria that they should finish all the competency subjects particularly in deck and engine simulations.

Research Instruments

There are two instruments that were used in this study namely; academic quality scale and Deck and Engine Practical Assessment Tool. The research instruments were subjected to validation for further improvement. The items of the questionnaire were made to suit to the nature and objectives of the institution particularly in areas which measure the implementation of the programs.

The draft of the questionnaire was presented and evaluated by some research experts. An evaluation tool was given to them to rate, comment, and suggest for the improvement and development of the questionnaire. The questionnaire was content validated and each item was carefully selected through the guidance of the expert validators.

The result of the content validation together with the draft of the research instrument was submitted to the research adviser for comments and suggestions. The ambiguous items were deleted; the weak sample items per instrument were strengthened and improved. After correction and refinement, the research instrument was administered.

The academic quality scale is adapted to the quality assurance scale of Ajpru (2005). It is consist of three indicators with 6 items in curriculum, 7 items in

facilities and 9 items in instruction. Scores will be interpreted using a 5-point scale. Below is the interpretation of the results of the academic quality survey.

Range of Mean	Descriptive Level	Interpretation
4.50 – 5.00	Very High Level	This means that the participating schools manifested a very high academic quality.
3.50 – 4.49	High Level	This means that the participating schools manifested a very high academic quality.
2.50 – 3.49	Moderate Level	This means that the participating schools manifested a moderate academic quality.
1.50 – 2.49	Low Level	This means that the participating schools manifested a low academic quality.
1.00 – 1.49	Very Low Level	This means that the participating schools manifested a very low academic quality.

To find out the level of learning outcomes (deck and engine assessment), the test scores was scaled based on Zakaria's (2009) scoring scheme with some modification. Below is the interpretation of the performance – based test scores of the participants.

Range of Mean	Descriptive Level	Interpretation
81 – 100	Very Sufficient	The participant manifested a very satisfactory performance based result.
61– 80	Sufficient	The participant manifested a very satisfactory performance based result.

41 – 60	Substantial	The participant manifested a satisfactory performance based result.
21 – 40	Deficient	The participant manifested a poor performance based result.
1 – 20	Very deficient	The participant manifested a very poor performance based result.

Data Gathering Procedure

The following procedures will be performed in collecting the data.

Permission was requested from the School Heads of the Maritime Schools. After the approval, a schedule was made for the distribution of test questionnaires.

After retrieving all the questionnaires, a data screening was performed to minimize the possible outliers during the analysis. After which, encoding, tabulating, and analyzing were done.

Statistical Tools

The level of academic quality and learning outcomes of students was measured using mean and standard deviation. On the other hand, a canonical correlation analysis was used to measure the multivariate relationship between the variable sets of academic quality and learning outcomes of students particularly: canonical correlation coefficient, canonical loadings, canonical cross loadings, significance of the generated canonical functions, and the redundancy index.

Chapter 4

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter deals with the presentation, analysis, and interpretation of data. The first part describes the level of academic quality and level of learning outcomes of maritime schools. The second part portrays the canonical correlation between the variables of the study.

Level of Academic Quality

Table 1 presents the level of academic quality among maritime schools which are measured by three indicators namely: instruction, facilities and curriculum.

In terms of instruction, the results show that the schools have generated a high level of teaching quality as can be observe by the mean scores of their item constructs. In particular, the highest mean is 3.83 as indicated by the item “Being open to questions or viewpoints from the students” while the lowest mean is 3.74 in the item “Using different types of teaching”. Meanwhile, the sub mean is 3.78, describe as high. This means that instructional quality is oftentimes manifested by the schools.

In the aspect of facilities, the highest mean is 3.72 which is presented by the item “Having available training venue” while the lowest mean is 3.59 in the item “Providing the necessary laboratories for each major and in proportion to the number of students who will require the use of the laboratories”. Moreover, the sub mean is 3.63, describe as high. This means that the facilities for maritime operations are oftentimes manifested among schools.

In the curriculum, the highest mean is 3.88 as indicated by the item “Having theoretical and practical components of the course are substantial” while the lowest mean is 3.70 as revealed by items “Having course contents that are useful in the field” and “Course syllabus and lesson plan is available”. Nevertheless, the submean is 3.76, describe as high. This means that the quality of curriculum is oftetimes manisfested among schools.

Over all, the mean score when the three indicators of academic quality are combined revealed a value of 3.72, describe as high. This denotes that the academic quality is oftentimes manisfested by maritime schools in Region X 1.

Table 1

Level of Academic Quality

	MEAN	SD	Description
Instruction			
Indicating what has to be studied before each teaching session	3.83	0.85	High
Using different types of teaching	3.74	0.87	High
Encouraging student's participation and welcomes questions	3.76	0.86	High
Having good communication Skills (in terms of articulation and comprehensibility).	3.75	0.88	High
Ability to integrate course material with environment/other issues, to provide a broader perspective	3.80	0.90	High
Complying to profession code of conduct	3.75	0.88	High
Providing appropriate teaching material for learning.	3.76	0.83	High
Providing objectives for each subject in the curriculum	3.77	0.90	High
Sub Mean	**3.78**	**0.48**	**High**
Facilities			
Providing the necessary laboratories for each major and in proportion to the number of students who will require the use of the laboratories.	3.59	0.97	High
Having laboratories that are well equipped with the required and up to date instruments.	3.60	0.92	High
Having laboratory technologies that are well calibrated by qualified instructors	3.66	0.97	High
Providing adequate spaces for laboratories.	3.58	0.92	High
Ensuring that lecture rooms are well equipped with the necessary tools for teaching (projectors, video equipments, TV and others).	3.64	0.95	High
Ensuring that the lecture rooms are comfortable for students and the number of students per class is adequate	3.60	0.92	High
Having enough number of conference rooms is available	3.60	0.91	High
Having a venue for extracurricular activity to enhance student's development	3.70	1.00	High
Having a lecture building and classroom is adequate.	3.60	0.91	High
Having available training venue	3.72	0.95	High
Sub mean	**3.63**	**0.60**	**High**
Curriculum			
Having course contents that are useful in the field	3.70	0.88	High
Containing reasonable workload of the course	3.79	0.79	High
Difficulty level of the course is reasonable	3.76	0.87	High
Learning value (in terms of knowledge, concepts, manual skills, analytical abilities and broadening perspectives) are acquired.	3.72	0.85	High
Course syllabus and lesson plan is available	3.70	0.87	High
Course inculcates positive values	3.73	0.85	High
The curriculum promotes good professionalism	3.79	0.88	High
Having theoretical and practical components of the course are substantial.	3.88	0.93	High
Sub mean	**3.76**	**0.47**	**High**
Overall	**3.72**	**0.43**	**High**

Level of Learning Outcomes

Table 2 shows the learning outcomes of students in engine and deck practical applications.

In terms of engine assessment, it can be gleaned in the results that the students have an average rating of 83.01%, describe as very sufficient. This means that the students always demonstrate practical skills in engine operations.

On the other hand, the deck assessment revealed that the students have garnered an average of 80.94%, describe as very sufficient. This means that the students always demonstrate practical skills in deck operations.

The overall rating combining the engine and deck assessment scores generate a mean of 81.98%, describe as very sufficient. This means that the students always demonstrate practical skills in maritime operation.

Table 2

Level of Learning Outcomes

Mean Percentage Interval	Mean (%)	Remarks
ENGINE	83.01	Very Sufficient
DECK	80.94	Very Sufficient
OVERALL	**81.98**	**Very Sufficient**

Tests of Canonical Correlations

Canonical correlation analysis is performed to meet the objective of developing models for academic quality variables as predictors of learning outcomes. The analysis of the data set reveals two canonical models or functions, with only first function being statistically significant (p<005). It can also be noted that the amount of variance that can be explained by the Canonical Function 1 is only 3% as shown by its canonical R-square value of 0.03. Since the derived second canonical function is of no particular significance, further analysis on its statistics is ignored. Table 3 shows the overall fit of the derived canonical functions.

Table 3

Overall Fit of the Derived Canonical Functions

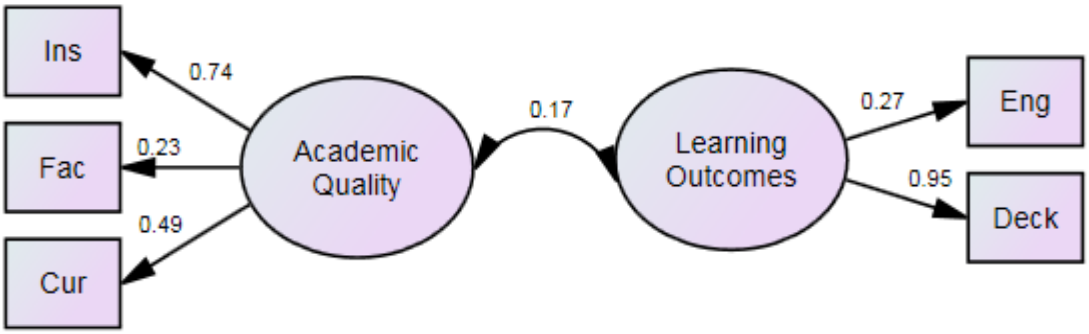
Canonical Function	Canonical Correlation	Canonical R^2	F	df	p-value	Remarks
1	0.17	0.03	2.64	4	0.02	Significant
2	0.09	0.01	1.71	2	0.18	Not Significant

Note: Wilks' lambda = 0.96, Pillai's trace = 0.04, Lawley-Hotelling trace= 0.04, Roy's largest root = .03, P <0.05

The linear combinations for canonical correlations of the first canonical function are presented in Figure 2. In the first canonical variate, it revealed that only the instruction have a significant linear relationship with academic quality (p<0.05). This means that a one unit increase in instruction leads to 0.74 unit increase in academic quality. This implies that instruction contributes best on academic quality.

On the second canonical variate, only the deck performance of students is significant and very strong predictor of learning outcomes (p<0.01). This means

that one standard deviation increase in deck scores leads to a 0.95 standard deviation increase in the learning outcomes. Moreover, it denotes that deck performance greatly contributes to the learning outcomes of students.



Note: Instruction and Deck loading to its canonical variate ($p<0.05$), other variable loadings ($p>0.05$)

Figure 2 Model for the first canonical function illustrating the standardized canonical loadings and correlation

Further examination of the canonical cross loadings shows that the variate of learning outcomes is also influence by academic quality related variables: instruction (0.16), facility (0.06) and curriculum (0.14). It can also be noted that the canonical cross loadings are all positive, implying direct relationship between individual predictors of academic quality and learning outcomes.

Table 4

Canonical cross loadings of the variable sets of academic quality on learning outcomes

Variables	Canonical Function 1	Canonical Function 2
Instruction	0.16	0.02
Facility	0.06	0.08
Curriculum	0.14	0.01

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study attempted to investigate the multivariate relationship between the variable sets of study skills and learning outcomes of students in Maritime schools in Region XI.

The study was conducted among 425 graduating students who have finished all competencies in engine and deck procedures. The data were gathered through the use of survey questionnaires and engine and deck assessment tools. Meanwhile, quantitative analysis of the data made use of appropriate statistical tools. Mean was employed in analyzing the level of academic quality and level of learning outcomes. Pearson-product moment correlation was used to analyze the bivariate relationships that exist among the variables of the study. Moreover, a canonical correlation analysis was used to measure the multivariate associations of the variable sets of study skills and learning outcomes.

The major findings of the study are the following:

1. The overall mean score of academic quality is high with a value of 3.72. In particular, instruction (m=3.78), facilities (m=3.63) and curriculum (m=3.76) exhibit high level.

2. The overall level of learning outcome is very sufficient with a combined score of 81.98%.

3. Tests of canonical correlation reveal two canonical functions with only the first canonical function that exhibit good fit having a significant p-value ($r=0.17$, $p<0.05$).

4. Only the instruction have significant linear relationship with academic quality ($P<0.05$) while facilities and curriculum do not predict its' latent. On the other hand, the deck performance best predict the learning outcomes of students.

5. Canonical cross loadings shows that the variate of learning outcomes is also influence by academic quality related variables: instruction (0.16), facility (0.06) and curriculum (0.14).

Conclusions

1. The academic quality is oftentimes manifested by schools with high level of instruction, facilities and curriculum.

2. The students of maritime schools have sufficient competence in deck and engine operations.

3. There is a significant relationship between academic quality and learning outcomes of students.

4. Instruction component best predict the academic quality of the school while deck competence best contributes to the learning outcomes of students.

Recommendations

1. Since the areas of academic quality is not yet at its optimum state, it is suggested that the school administrators would further improve the instructional

effectiveness, upgrade its facilities and continually update the curriculum aligning to the global standards.

2. The students still need to improve their competence in engine and deck operations.

3. School administrators should focus more on instruction since it's the best predictor of academic quality. However, other academic quality variables such as facility and curriculum should also be improved because they also make contributions to the learning outcomes of students.

4. Deck operations should be concentrated by teachers since it contributes best on the learning outcomes of students.

5. Future researchers may validate the results using other technique of multivariate analysis such as structural equation modeling to confirm its model fit.