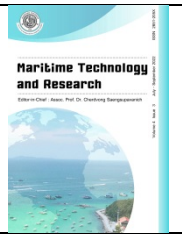
Maritime Technology and Research

https://so04.tci-thaijo.org/index.php/MTR



Research Article

Authentic assessment and academic performance of Marine Engineering students: A correlational study

Peter Ralph B. Galicia*

Faculty of Maritime, University of Antique, Main Campus Lotilla St., Sibalom, Antique 5713, Philippines

Article information

Received: October 14, 2021
Revised: February 27, 2022
Accepted: March 27, 2022

Keywords
Authentic assessment,
Academic performance,
Marine Engineering students,
University of Antique,
Philippines

Abstract

Authentic assessment can validate Marine Engineering students' competency in academe to be fully equipped with knowledge, understanding, and skills needed onboard ship. This descriptive-correlational study aimed to ascertain Marine Engineering students' authentic assessment and academic performance on professional courses and their relationships to formulate an intervention program. Utilized for data gathering was a self-administered structured questionnaire on Authentic Assessment aligned to the course syllabus of three (3) major courses. The computer-processed statistics used were mean, frequency, and rank for descriptive analysis; and Pearson Product-Moment Correlation or Pearson r for inferential analysis. Alpha level was set at 0.05. The study found that Marine Engineering students recalled lessons and performed well during validation of skills. In addition, there was a significant relationship between the authentic assessment results and the academic performance shown on professional courses. The performance of Marine Engineering students in the classroom is likely to affect their performance during skill validation in authentic assessment. Therefore, well-performing students in the classroom are likely to pass authentic assessment. Finally, an intervention program, "bUligAnay Kita: A Peer Tutoring Program," aims to improve Marine Engineering students' basic knowledge, understanding, and skills in all major courses in preparation for onboard ship training.

1. Introduction

The human factor is critical in ensuring the safety of life onboard ships and is a contributing factor in most shipping-related fatalities (International Maritime Organization, 2019). In 2021, 89.5 % of events reported by safety investigations were due to human factors (Annual Overview of Marine Casualties and Incidents, 2021).

Emphasizing the human element can improve maritime and navigational safety (IMO, 2019). In response to this, the European Maritime Safety Agency (EMSA) has been conducting inspections for over 15 years, assessing the level of compliance with the requirements of the IMO's Convention on Standards of Training, Certification, and Watchkeeping (the STCW Convention) to ensure crew members working on European Union (EU) registered ships are appropriately educated and trained.

Producing quality education and training can avoid a serious shortage of officers with technical experience by 2026 (Seafarer Workforce Report, 2021). Thus, maritime education has

*Corresponding author: Faculty of Maritime, University of Antique, Sibalom, Antique 5713, Philippines
E-mail address: antique_1985@yahoo.com.ph

contributed to producing the quality of graduates that supply the shipping industry, both locally and abroad.

According to Galicia (2021a), competent seafarers attract better job opportunities and promotions. The study also revealed that students excel in authentic assessment and academic performance, which is essential to harnessing their skills onboard ship. To be safe, they also need to teach students the importance of medical exams (Galicia, 2019b) and safety awareness for seafarers (Galicia, 2019c).

Ghosh's (2017) study revealed that the effectiveness of authentic assessment could develop the skills of seafarers, as it is considered an essential factor for employment opportunities. Another study by Rogin (2020) affirmed that a series of assessments must be implemented to validate the knowledge of a potential officer. Authentic assessment serves as evidence of competence in real-world scenarios and as a basis for improvement in education and training (Ghosh & Ruggunan, 2015).

2. Theoretical framework of the study

This study was anchored on the work of Koh et al. (2014), who used authentic assessment to drive curricular and instructional changes in the context of global educational reforms. Using authentic or performance assessment tasks engages students in in-depth subject learning and promotes mastery of 21st-century competencies. As a result, to prepare for onboard training, Marine Engineering students must complete a series of assessments to validate their knowledge and skills in academe.

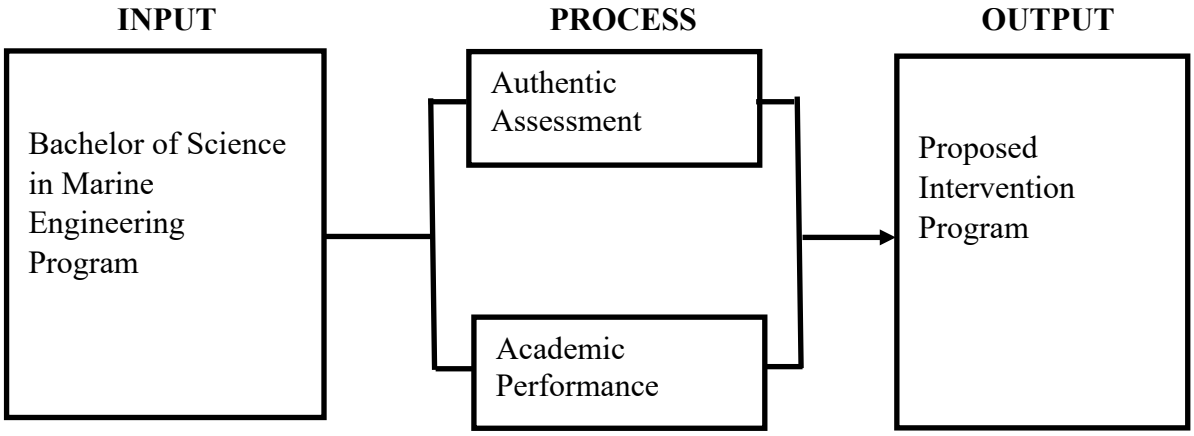


Figure 1 Paradigm of the study.

3. Objective of the study

The study sought to ascertain the authentic assessment and academic performance of Marine Engineering students at the University of Antique during the Academic Year First Semester 2019 - 2020. Also, it sought to ascertain the relationship between their authentic assessment and academic performance in the three (3) professional courses, namely, Hands & Measuring Tools, Basic Electricity, and Maritime Drawing & Diagrams. Furthermore, it sought to provide the basic knowledge, understanding, and skills in all major courses to prepare students for more difficult ship tasks.

4. Methodology

4.1 Research design

This descriptive-correlational study aims to determine the relationship between authentic assessment and academic performance of Marine Engineering students.

According to Gay et al. (2002), descriptive research entails gathering data to test hypotheses or answer questions about current conditions. In other words, descriptive research determines and reports the current state of affairs.

On the other hand, correlation research seeks to determine whether, and to what extent, a relationship exists between two or more quantifiable variables. The goal of correlation research could be to establish relationships (or not) or use relationships to make predictions. Relationship studies typically look at several variables related to a major and complex variable (Gay et al., 2002).

4.2 Participants

Participants in this study were 173 enrolled first-year Bachelor of Science in Marine Engineering (BSMarE) students at the University of Antique, one of the only State Universities and Colleges (SUCs) in Region VI, Philippines, that offers a BSMarE program. Data was obtained from the University of Antique's Office of the Registrar in December 2019.

4.3 Instrument

The data for this study is derived from a structured questionnaire developed by the Head of the Maritime Assessment Unit (MAU) and validated by the Dean, the Program Head, and the Maritime Assessors for authentic assessment under the STCW 1978 Code, as amended. Basic Electricity (Electro 1M), Maritime Drawing and Diagrams (Draw), and Hand and Measuring Tools (Mach 1) were among the major courses used to collect data for the Bachelor of Science in Marine Engineering (BSMarE) program. Simultaneously, the data needed for Marine Engineering students' academic performance was drawn from the Registrar's Office at the University of Antique in December 2019.

4.4 Procedure

The researcher requested permission from the Office of Maritime Assessment Unit at the University of Antique to retrieve the authentic assessment results of the first-year BSMarE students in three (3) major courses. The data to be included were the authentic assessment results of first-year BSMArE students in Academic Year 2019 - 2020, which included Basic Electricity (Electro 1M), Maritime Drawing and Diagrams (Draw), and Hand and Measuring Tools (Mach 1).

The request letter was forwarded to the Dean's Office to obtain the authentic assessment results of the three (3) professional courses from the BSMArE program and the Registrar's Office to obtain the grades of the Marine Engineering students.

4.5 Data analysis

The needed data was treated and subjected to appropriate computer-processed statistics using the Statistical Package for the Social Sciences (SPSS) software version 23. Mean, frequency, and rank were the descriptive statistical tools employed in the study, and Pearson Product-Moment Correlation or Pearson r was the inferential tool used. Alpha level was set at 0.05

5. Results and discussion

5.1 Descriptive data analysis

5.1.1 Marine Engineering students' academic performance on professional courses

Table 1 presents Marine Engineering students' academic achievements on the professional courses.

The results reveal that, among the professional courses taken by Marine Engineering students for the first semester of the academic year 2019 - 2020, Hand & Measuring Tools ranked number 1 (84.94 %), described as "very good," followed by Basic Electricity, ranked number 2 (82.39 %), and Maritime Drawing & Diagrams, ranked number 3 (82.26 %), both described as

"good,". This means that Marine Engineering students recalled the lessons and performed well during the entire semester duration.

Table 1 Marine Engineering students' academic performance on professional courses.

Course	Mean	Description	Rank
Basic Electricity (Electro 1M)	82.39	GOOD	2
Maritime Drawing & Diagrams (Draw)	82.26	GOOD	3
Hand & Measuring Tools (Mach 1)	84.94	VERY GOOD	1

(Scale: 95 = Excellent, 94 to 90 = Superior, 89 to 85 = Very Good, 84 to 80 = Good, 79 to 75 = Fair)

5.1.2 Marine Engineering students' performance on authentic assessment of professional courses

Table 2 presents Marine Engineering students' performance on the authentic assessment of professional courses.

The results reveal that, among the professional courses taken by Marine Engineering students for the first semester of the academic year 2019 - 2020, Hand & Measuring Tools ranked number 1 (84.55 %), Maritime Drawing & Diagrams ranked number 2 (81.33 %), and Basic Electricity ranked number 3 (80.72 %), respectively. This means that Marine Engineering students were familiar with using different hand and measuring tools, identifying various piping systems, and performing basic electrical installation and maintenance needed onboard ship.

Table 2 Marine Engineering students' performance on authentic assessment of professional courses.

Professional courses	Mean	Description	Rank
Basic Electricity (Electro 1M)	80.72	PASSED	3
Maritime Drawing & Diagrams (Draw)	81.30	PASSED	2
Hand & Measuring Tools (Mach 1)	84.55	PASSED	1

(Scale: below 80 - failed; 80 and above - passed)

5.2 Inferential data analysis

5.2.1 Relationship between Marine Engineering students' authentic assessment of and academic performance on professional courses

To ascertain the significance of the relationship between Marine Engineering students' authentic assessment of and academic performance on professional courses, the Pearson Product Moment Correlation (Pearson r) was used. Alpha level was set at 0.05.

As shown in **Table 3**, the Pearson r results reveal that there is a "very weak negative" and significant ($r = -0.114$, $p < 0.05$) relationship between Marine Engineering students' authentic assessment of and academic performance on professional courses. There was a "very weak negative" and significant relationship for Maritime Drawing & Diagrams ($r = -0.169$, $p < 0.05$). On the other hand, there was a "very weak positive" and significant relationship between Maritime Drawing & Diagrams and Hand & Measuring Tools ($r = 0.175$, $p < 0.05$); for Basic Electricity ($r = 0.193$, $p < 0.05$); and between Basic Electricity and Hand & Measuring Tools ($r = 0.182$, $p < 0.05$).

This means that the performance of Marine Engineering students in the classroom is likely to affect their performance during skill validation in authentic assessment. Therefore, well-performing students in the classroom are likely to get higher grades in authentic assessment.

Table 3 Pearson r results on the relationship between Marine Engineering students' authentic assessment of and academic performance on professional courses.

	Items	Authentic Assessment of Professional Courses		
		Basic Electricity (Electro 1M)	**Maritime Drawing & Diagrams (Draw)**	**Hand & Measuring Tools (Mach 1)**
Academic Performance on Professional Courses	**Basic Electricity (Electro 1M)**	0.193*	-0.154	0.182*
	Maritime Drawing & Diagrams (Draw)	-0.078	-0.169*	0.175*
	Hand & Measuring Tools (Mach 1)	0.136	-0.072	0.085
Total Rating between Authentic Assessment and Academic Performance			-0.114	

*Correlation is significant at the 0.05 level (2-tailed)

5.3 Proposed intervention program

5.3.1 bUligAnay Kita: A peer tutoring program

A proposed intervention program of the University of Antique - College of Maritime Studies improves maritime students' authentic assessment of and academic performance on professional courses (**Table 4**). It aims to organize peer tutoring assistance among students who performed poorly after their classmates helped them. In addition, maritime instructors will serve as facilitators of learning only. Aside from improving Marine Engineering students' authentic assessment and academic performance, this also establishes a good relationship among the students needed onboard ship.

In the next three years, from 2020 to 2023, a peer tutoring program will achieve the specific objectives by improving Marine Engineering students' authentic assessment of and academic performance on professional courses at the University of Antique - College of Maritime Studies.

Table 4 Proposed intervention program.

Program/Components	Name of agency	Key responsibilities
1. bUligAnay Kita: A Peer Tutoring Plan	College of Maritime Studies University of Antique Maritime Industry Authority	Improve Marine Engineering students' authentic assessment and academic performance on professional courses
2. United Nations' Sustainable Development Goals (SDGs) 2030: SDG 4 - Quality Education	National Government Local Government Unit Maritime Industry Authority University of Antique	Produce quality maritime graduates
3. AmBisyon Natin 2040: Education Services	National Government Local Government Unit Maritime Industry Authority University of Antique	AmBisyon Natin 2040: Education Services

6. Conclusions

Marine Engineering students recalled the lessons and performed well when validating knowledge and skills in authentic assessment. In addition, there was a significant relationship between authentic assessment results and academic performance on professional courses. The performance of Marine Engineering students in the classroom is likely to affect their performance during skill validation in authentic assessment. Therefore, well-performing students in the classroom are likely to pass authentic assessment. Finally, an intervention program, "bUligAnay Kita: A Peer Tutoring Program," aims to improve Marine Engineering students' basic knowledge, understanding, and skills in all major courses in preparation for onboard ship training.

7. Recommendations

The concerned agencies should help facilitate the proposed intervention program to improve Marine Engineering students' competency in all major courses. The Maritime faculty should review the syllabus and ensure the delivery of the course outcomes. In addition, the unit head may organize Marine Engineering students according to their cognitive abilities and provide tutor assistance to those who lack interest and have poor study habits in class. They may also encourage students to attend class regularly and use their free time to study. These recommendations align with the national and international policies outlined in AmBisyon Natin and the United Nations' Sustainable Development Goals (SDG) 2030, which are essential to Marine Engineering students' quality of education for employment opportunities.

References

European Maritime Safety Agency. (2021a). *Annual overview of marine casualties and incidents 2022.* Lisboa, Portugal. Retrieved from http://www.emsa.europa.eu/publications/item/4266-annual-overview-of-marine-casualties-and-incidents-2020.html

European Maritime Safety Agency. (2021b). *EMSA outlook 2022 on Seafarers' training and certification*. Lisboa, Portugal. Retrieved from http://www.emsa.europa.eu/publications/item/4621-emsa-outlook-2022.html

Galicia, P. R. B. (2019b). Awareness and relevance of pre-employment medical examinations of seafarers among maritime students at the University of Antique: The basis for a health intervention program. *International Journal of Innovation, Creativity and Change, 8*(7), 250-260.

Galicia, P. R. B. (2019c). Safety awareness among fisherfolks in the province of antique: Basis for safety awareness program. *Research and Education Journal, 12*, 24-30.

Galicia, P. R. B. (2021a). Authentic assessment and academic performance of marine engineering students at the University of Antique, Philippines. *Australian Journal of Maritime & Ocean Affairs.* https://doi.org/10.1080/18366503.2021.1962081

Gay, L. R., Mills, G. E., & Airasian, P. W. (2009). *Educational research: Competencies for analysis and applications (with MyLab Education)*. 9th eds. Pearson Education.

Ghosh, S. (2017). Can authentic assessment find its place in seafarer education and training? *Australian Journal of Maritime & Ocean Affairs, 9*(4), 213-226. https://doi.org/10.1080/18366503.2017.1320828

Ghosh, S., & Ruggunan, S. (2015). *The implications of outsourcing seafarer employees globally: The possible impact of authentic assessment* (pp. 85-91). In Proceedings of the 16th International Association of Maritime Universities Annual General Assembly. Croatia: University of Rijeka.

International Maritime Organization. (2019). *Human element*. London, United Kingdom. Retrieved from https://www.imo.org/en/OurWork/HumanElement/Pages/Default.aspx

Koh, K. (2014). *Authentic assessment, teacher judgment and moderation in a context of high accountability*. In Wyatt-Smith, C., Klenowski, V., & Colbert, P. (Eds.), Designing assessment for quality learning (pp. 249-264). Dordrecht, The Netherlands: Springer.

Seafarer Workforce Report. (2021). *The global supply and demand for seafarers in 2021.* Singapore: EW Liner Charts & Publication.

Srinivasan, A. (2021). *New bimco/ics seafarer workforce report warns of serious potential officer shortage*. Retrieved from https://www.bimco.org/news/priority-news/20210728---bimco-ics-seafarer-workforce-report#:~:text=The%202021%20Seafarer%20Workforce%20Report%20delivers%20detailed%20information,recruitment%20and%20retention%20trends%20and%20their%20potential%20consequences