Jurnal Pendidikan Indonesia:
Teori, Penelitian dan Inovasi
ISSN (Online): 2807-3878
DOI: 10.59818/jpi.v5i1.1368
Vol. 5, No. 1, Januari 2024

Enhancing Research Methodologies in Maritime Education: A Qualitative Analysis of Final Project Processing

Ramayanti
Akademi Maritim Nasional Jakarta Raya (AMAN JAYA), North Jakarta 14240, Indonesia
Telp: (021) 4533953
E-mail: ramayancity27@gmail.com

RIWAYAT ARTIKEL
Received: 2025-01-23
Revised : 2025-01-28
Accepted: 2025-01-30

KEYWORD
Final Project Processing, Maritime Education, Qualitative Analysis, Research Methodology, Transportation Research

KATA KUNCI
Pengolahan Tugas Akhir, Pendidikan Kemaritiman, Analisis Kualitatif, Metodologi Penelitian, Penelitian Transportasi

ABSTRACT
This research examines the effectiveness of methodological approaches in maritime education, with a focus on the processing of final projects. Using qualitative research and descriptive analysis, the study evaluates the research competencies of 100 cadets across multiple maritime institutes. Key findings indicate that while maritime curricula align with international standards, gaps exist in research methodology training, data analysis competency, digital tool integration, and alignment of research projects with industry needs. The study highlights that inconsistencies in faculty expertise, limited exposure to AI and big data analytics, and insufficient institutional research support hinder the development of high-quality cadet research. The research underscores the need for structured research training, the adoption of modern research tools, and enhanced faculty development to improve research supervision. Additionally, strengthening industry-academic collaboration will ensure final projects address real-world maritime challenges. The study proposes reforms in research education to bridge the gap between academic learning and industry applications, ultimately preparing cadets with the analytical skills necessary for careers in transportation, logistics, and port management. By implementing these improvements, maritime education institutions can enhance their research capabilities and contribute to industry innovation.

ABSTRAK
Penelitian ini menguji efektivitas pendekatan metodologis dalam pendidikan maritim, dengan fokus pada proses pengerjaan tugas akhir. Dengan menggunakan penelitian kualitatif dan analisis deskriptif, penelitian ini mengevaluasi kompetensi penelitian 100 taruna di berbagai lembaga maritim. Temuan utama menunjukkan bahwa meskipun kurikulum maritim telah sesuai dengan standar internasional, terdapat kesenjangan dalam pelatihan metodologi penelitian, kompetensi analisis data, integrasi alat digital, dan penyelarasan proyek penelitian dengan kebutuhan industri. Penelitian ini menyoroti bahwa ketidakkonsistenan dalam keahlian fakultas, paparan yang terbatas pada AI dan analitik data besar, dan dukungan penelitian institusional yang tidak memadai menghambat pengembangan penelitian taruna yang berkualitas tinggi. Penelitian ini menggarisbawahi perlunya pelatihan penelitian yang terstruktur, adopsi alat penelitian modern, dan pengembangan fakultas yang lebih baik untuk meningkatkan pengawasan penelitian. Selain itu, memperkuat kolaborasi industri-akademik akan memastikan proyek akhir dapat menjawab tantangan maritim di dunia nyata. Studi ini mengusulkan reformasi dalam pendidikan penelitian untuk menjembatani kesenjangan

antara pembelajaran akademis dan aplikasi industri, yang pada akhirnya mempersiapkan taruna dengan keterampilan analitis yang diperlukan untuk berkarir di bidang transportasi, logistik, dan manajemen pelabuhan. Dengan menerapkan perbaikan ini, institusi pendidikan maritim dapat meningkatkan kemampuan penelitian mereka dan berkontribusi pada inovasi industri.

1. Introduction

The maritime industry is a critical component of global trade and logistics, serving as the backbone of multimodal transportation networks that connect economies and facilitate the movement of goods and people (Munim et al., 2020; Toriia et al., 2023). As the industry evolves, maritime education institutions play a pivotal role in preparing cadets with the knowledge and skills required to operate effectively within this dynamic sector. The training of cadets encompasses various aspects of transportation management, port and shipping logistics, and maritime safety, ensuring they develop competencies aligned with international standards (Bergheim et al., 2015; Oldenburg et al., 2010). However, despite the structured frameworks governing maritime education, challenges persist in the application of research methodologies, particularly in the processing of final projects. These projects serve as a crucial measure of a cadet's ability to apply theoretical knowledge to real-world maritime issues, yet methodological inconsistencies and gaps in research training hinder the effectiveness of this assessment.

Maritime education institutions follow international frameworks such as the Standards of Training, Certification, and Watchkeeping (STCW) and International Maritime Organization (IMO) regulations to ensure that cadets meet industry requirements (Chircop, 2015; Harrison, 2009). These frameworks establish a foundation for competency-based training, emphasizing the development of skills necessary for ship operations, port logistics, and transportation safety. However, while these regulatory guidelines provide a structured curriculum, they often do not account for the dynamic research methodologies required in academic and professional problem-solving. The ability to conduct rigorous research, analyze data, and present evidence-based solutions is becoming increasingly essential in modern maritime education. The final project, as a capstone assessment, is designed to integrate these skills, yet current training approaches often fail to equip cadets with the necessary research tools and methodological frameworks. This gap raises concerns about the effectiveness of maritime education in preparing cadets for analytical roles within the industry.

The methodological aspect of maritime education is often overlooked in favor of practical training, resulting in a disconnect between academic research and industry applications. While practical training is essential for hands-on skill development, the absence of strong research methodologies in maritime education limits cadets' ability to critically evaluate operational challenges, propose data-driven solutions, and contribute to industry innovations. Unlike engineering or business disciplines, where research methodologies are extensively taught, maritime studies often lack structured research training programs that emphasize data analysis, qualitative and quantitative methodologies, and systematic problem-solving techniques. This deficiency not only affects the quality of final projects but also impacts the long-term professional development of maritime graduates, limiting their ability to engage in research-driven decision-making within the industry.

The primary objective of this research is to examine the methodological approaches used in maritime education, particularly in processing final projects, and to identify areas for improvement. This study seeks to evaluate the effectiveness of current research training programs, explore gaps in methodological instruction, and propose strategies to enhance the quality of maritime research. By employing qualitative research with descriptive analysis, this study investigates how cadets develop their final projects, the challenges they encounter in applying research methodologies, and the extent to which their work aligns with industry expectations. The findings of this study aim to provide insights that can inform curriculum development, enhance research training, and improve the overall effectiveness of maritime education programs.

One of the key gaps identified in maritime education is the lack of structured research training in final project development. Unlike disciplines such as engineering or social sciences, where students are required to undergo rigorous methodological training, maritime education often treats research projects as secondary to operational training. As a result, cadets may struggle with

structuring their research, selecting appropriate methodologies, and analyzing data effectively. This gap limits the ability of cadets to contribute to evidence-based decision-making and industry innovation. Additionally, the reliance on traditional assessment methods, such as written exams and competency tests, further reduces the emphasis on research-driven learning. To address this issue, it is essential to integrate systematic research training into maritime curricula, ensuring that cadets develop strong analytical and methodological skills that complement their technical competencies.

Another significant gap in maritime education pertains to the integration of digital tools and emerging technologies in research training. The maritime industry is undergoing rapid digital transformation, with advancements in artificial intelligence (AI), big data analytics, and automation reshaping port operations, logistics management, and safety protocols. However, the application of these technologies in maritime education remains limited, particularly in the context of research methodologies. Many cadets lack exposure to digital research tools, data visualization techniques, and computational methods that are becoming increasingly relevant in industry analysis. This gap restricts the ability of cadets to conduct advanced research and limits their capacity to engage with modern data-driven decision-making processes. Addressing this issue requires a more interdisciplinary approach to research training, incorporating elements of data science, statistical analysis, and computational modeling into maritime education.

Furthermore, the research-to-practice gap in maritime education presents another critical challenge. While final projects are intended to serve as a bridge between academic learning and industry application, many cadets struggle to translate their research findings into practical recommendations. This disconnect is partly due to the lack of collaboration between maritime institutions and industry stakeholders. In many cases, final projects are conducted in isolation, without direct engagement with real-world maritime challenges. As a result, cadets may produce research that lacks practical relevance or fails to address pressing industry issues. Strengthening industry-academic partnerships can help bridge this gap by ensuring that research projects are designed to solve real problems faced by maritime companies, port authorities, and logistics providers (Barston & Birnie, 2024; Mandaraka-Sheppard, 2014). Industry collaboration can also provide cadets with access to real data, case studies, and expert mentorship, enhancing the quality and applicability of their research.

The urgency of improving research methodologies in maritime education cannot be overstated. As the industry faces increasing complexity due to globalization, environmental regulations, and technological disruptions, the need for well-trained maritime professionals with strong research capabilities is more critical than ever (Baylon & Santos, 2011; Nalupa, 2022). The ability to conduct systematic research, analyze data, and generate actionable insights will be essential for addressing challenges such as port congestion, maritime safety risks, and supply chain disruptions. By strengthening research training in maritime education, institutions can better prepare cadets to contribute to industry problem-solving, policy development, and technological innovation (Manuel, 2017).

Additionally, improving research methodologies can enhance the overall academic reputation of maritime education institutions. Many maritime academies and training centers focus primarily on vocational training, with limited emphasis on academic research. By integrating research-driven learning into their programs, these institutions can position themselves as leaders in maritime knowledge production, attract research funding, and contribute to policy discussions on global maritime issues. This shift will not only benefit cadets but also elevate the standing of maritime education as a discipline that combines theoretical knowledge with practical application.

This research highlights the critical need for methodological improvements in maritime education, particularly in the processing of final projects. The study identifies key gaps in research training, technological integration, and industry collaboration, which hinder the effectiveness of maritime education in preparing cadets for analytical and research-driven roles. To address these challenges, institutions must adopt a more structured approach to research methodology instruction, integrate digital tools into research training, and strengthen partnerships with industry stakeholders. By doing so, maritime education can evolve to meet the demands of a rapidly changing industry, ensuring that cadets develop the analytical skills necessary for success in global transportation and logistics (Berg, 2013). This research aims to contribute to ongoing discussions on educational reform in maritime studies, providing practical recommendations for enhancing methodological

training and bridging the gap between academic learning and industry application. Through these efforts, maritime institutions can produce graduates who are not only skilled in operational competencies but also capable of engaging in high-quality research that drives innovation and problem-solving in the maritime sector.

2. Research Method

This research employs a qualitative approach with descriptive analysis to examine the methodologies used in maritime education, particularly in processing cadet final projects. The study focuses on understanding how research methodologies are integrated into maritime training, the challenges cadets face in developing structured research, and the extent to which their final projects align with industry expectations. By assessing the methodological aspects of maritime education, this research aims to propose improvements that enhance academic rigor, analytical skills, and the practical applicability of cadet research.

The study is conducted across multiple maritime institutes and transportation academies that follow international educational frameworks. These institutions provide training for cadets in multimodal transportation, logistics, transportation safety, and port and shipping management. The research involves 100 cadets, selected based on their engagement in final project development, to evaluate their understanding of research methodologies, data processing techniques, and academic writing skills.

A qualitative research design is chosen due to its ability to provide an in-depth analysis of cadet experiences, institutional research practices, and methodological challenges (Darlington & Scott, 2020; Merriam & Grenier, 2019; Padgett, 2016). Unlike quantitative studies that focus on numerical data, qualitative research allows for a deeper exploration of how maritime education fosters research competencies and what improvements can be made to strengthen methodological training. The study employs multiple data collection techniques, including:

1) Structured and Semi-Structured Interviews – Interviews with cadets, faculty members, and academic supervisors to assess their perceptions of research methodologies, identify difficulties faced in processing final projects, and gather insights on how research training can be improved.
2) Observational Analysis – Direct observation of classroom activities, research workshops, and academic mentoring sessions to analyze how research skills are taught, supported, and applied in final projects.
3) Document Analysis – Review of cadet final projects, academic guidelines, and institutional research policies to assess the depth of research methodologies, the effectiveness of academic support, and alignment with global maritime education standards.
4) Focus Group Discussions (FGDs) – Engagements with cadets and instructors to encourage open discussions on research training challenges and potential solutions for improving methodological approaches in maritime education.

The descriptive analysis method is used to systematically interpret and categorize the collected data (Cascetta, 2013). By identifying key themes, patterns, and gaps in research training, the study evaluates how maritime education institutions approach research methodology instruction and how these approaches impact cadet competency in academic research. A key aspect of this study is the assessment of research methodology application in final projects (Mohamed Shaffril et al., 2021; Padgett, 2016). The research examines how cadets select and apply qualitative or quantitative methodologies, the effectiveness of their data processing techniques, and the level of critical analysis demonstrated in their final reports. The study also evaluates the use of digital research tools in maritime education, investigating whether cadets have access to software for data analysis, visualization, and simulation-based research.

By focusing on methodological gaps in maritime education, this research provides a framework for improving research training programs. The findings will inform curriculum reforms, faculty development initiatives, and industry-academic collaborations to ensure cadets develop strong analytical, problem-solving, and research-driven decision-making skills that align with industry expectations.

3. Research Results and Analysis

This research investigates the methodological approaches in maritime education, particularly in the processing of final projects. The study aims to assess the effectiveness of research methodology training, cadet competency in applying systematic research methods, and the alignment of final projects with industry requirements. Through qualitative research and descriptive analysis, key

indicators were evaluated based on their significance in enhancing the research capabilities of cadets. The data were systematically categorized into critical research indicators, valuation techniques, relevant parameters, weight, intensity of importance, score, and percentage of significance.

1) Summary of Research Findings

The following table presents a structured evaluation of the key research indicators analyzed in this study.

Table 1: Research Results Summary

Indicator	Valuation Technique	Parameter	Weight	Value of Intensity of Importance	Score	Percentage
Effectiveness of Research Methodology Training	Survey & Faculty Interviews	Coverage of research methodologies in curriculum	16	4	64	16.93%
Integration of Research Methodologies in Final Projects	Project Review & Case Studies	Application of systematic methodologies in final projects	14	1	14	3.70%
Cadet Competency in Data Analysis	Cadet Testing & Surveys	Proficiency in using statistical and analytical methods	16	2	32	8.47%
Use of Digital Tools in Research Training	Technology Audit & Cadet Feedback	Use of AI, Big Data, and simulation tools in research	17	2	34	8.99%
Alignment of Final Projects with Industry Needs	Industry Review & Research Analysis	Practical relevance of final projects to maritime challenges	13	4	52	13.76%
Institutional Support for Research Development	Institutional Policy Review	Investment in research facilities and funding	15	3	45	11.90%
Faculty Competency in Teaching Research Methods	Faculty Competency Assessment	Faculty expertise in guiding research methodology training	18	3	54	14.29%
Cadet Understanding of Qualitative & Quantitative Approaches	Survey & Written Assessments	Cadet ability to differentiate and apply research methods	14	2	28	7.41%
Effectiveness of Research Supervision & Mentorship	Focus Group Discussions	Quality of academic supervision and research mentoring	13	2	26	6.88%
Adoption of Modern Research Practices in Maritime Education	Curriculum Review & Benchmarking	Use of updated, modern approaches in maritime research	15	2	30	7.93%

4. Discussion of Research Findings

1) Effectiveness of Research Methodology Training

The study found that research methodology training plays a fundamental role in enhancing cadets' ability to conduct structured research, with this indicator receiving the highest percentage weight of 16.93%. The qualitative assessment from faculty interviews and surveys revealed that while research methodologies are included in the curriculum, the depth of instruction varies significantly across institutions. Some academies emphasize theoretical knowledge without providing practical research exercises, limiting cadets' ability to apply methodologies in real-world scenarios. The findings suggest that maritime institutions need to incorporate more hands-on research training, including workshops on data analysis, structured research design, and case study development.

2) Integration of Research Methodologies in Final Projects

The application of systematic research methodologies in cadet final projects received a low percentage of 3.70%, highlighting a significant gap in the practical implementation of research training. Faculty members observed that while cadets are introduced to research methodologies, they struggle to effectively integrate these techniques into their final projects. The review of cadet research projects revealed inconsistencies in problem formulation, research design, and data interpretation. This finding suggests the need for structured guidelines and assessment rubrics that reinforce systematic research processes in final projects.

3) Cadet Competency in Data Analysis

Data analysis proficiency was identified as a moderate concern, with a percentage weight of 8.47%. While some cadets demonstrated competency in using statistical tools and analytical methods, many lacked practical training in handling data relevant to maritime operations. The study suggests increased exposure to statistical software and analytical frameworks in research training to bridge this gap.

4) Use of Digital Tools in Research Training

The research found that the use of digital research tools, including AI, big data, and simulation technologies, is still underutilized in maritime education, despite its growing relevance in the industry. With a percentage weight of 8.99%, this finding emphasizes the importance of integrating digital tools into research training. Maritime institutions should invest in technology-driven research programs that enable cadets to explore automation, predictive analytics, and simulation-based studies.

5) Alignment of Final Projects with Industry Needs

Final projects must align with industry challenges to provide practical solutions. The research found that cadet projects often lacked direct industry relevance, with this indicator receiving a percentage weight of 13.76%. Maritime institutions must establish stronger collaborations with industry stakeholders to ensure that research projects address real-world maritime issues such as logistics optimization, transportation safety, and environmental sustainability.

6) Institutional Support for Research Development

The study found that institutional support for research initiatives varies across maritime academies, with a percentage weight of 11.90%. Some institutions provide funding for faculty research and cadet projects, while others lack dedicated research infrastructure. The findings suggest that institutions must prioritize investment in research facilities, access to academic journals, and funding for applied research projects.

7) Faculty Competency in Teaching Research Methods

Faculty competency in teaching research methodologies was identified as a key factor influencing cadet research skills, with a percentage weight of 14.29%. The research found that many instructors lack formal training in advanced research methodologies, limiting their ability to guide cadets effectively. Maritime institutions should introduce faculty development programs focusing on research training to improve academic mentoring.

8) Cadet Understanding of Qualitative & Quantitative Approaches

The ability to differentiate between qualitative and quantitative research approaches is a critical research competency. However, with a percentage weight of 7.41%, the findings suggest that many cadets struggle with selecting appropriate methodologies for their projects. This gap highlights the need for comprehensive methodological training that strengthens cadets' understanding of when and how to use different research techniques.

9) Effectiveness of Research Supervision & Mentorship

The research found that cadets benefit significantly from structured research mentorship, but inconsistencies in supervision limit its effectiveness, with a percentage weight of 6.88%. Institutions should implement standardized research mentoring programs where faculty members provide structured guidance to ensure cadets meet academic and industry expectations.

10) Adoption of Modern Research Practices in Maritime Education

Modern research practices, such as interdisciplinary research and technology-driven studies, remain underdeveloped in maritime education, with a percentage weight of 7.93%. The study suggests that maritime institutions should incorporate modern research methodologies, including predictive analytics and simulation-based studies, into their curricula to ensure cadets are well-equipped for the evolving industry landscape.

The findings of this study underscore the need for reform in maritime research methodologies, particularly in the training and application of research methods in cadet final projects. The study highlights critical gaps in research competency, digital tool integration, and industry alignment, suggesting the following key recommendations:

a. Strengthen Research Training – Introduce structured research methodology courses and practical workshops to improve cadet research skills.
b. Integrate Digital Tools – Invest in AI-driven analytics, big data tools, and simulation technologies to modernize research training.
c. Enhance Faculty Competency – Implement research training programs for instructors to improve academic mentorship.
d. Improve Industry Collaboration – Align final projects with industry challenges to ensure research has practical applications.
e. Increase Institutional Research Support – Provide funding, access to academic resources, and dedicated research infrastructure to strengthen research initiatives.

By adopting these strategies, maritime education can evolve into a more research-driven and technologically advanced discipline, ensuring that cadets develop the necessary analytical skills to contribute to the industry's growth and innovation.

5. Conclusion

This research highlights the significance of methodological approaches in maritime education, specifically in the processing of final projects. The findings indicate that while maritime curricula align with international standards, critical gaps exist in research methodology training, cadet competency in data analysis, integration of digital research tools, and the alignment of final projects with industry needs. The study emphasizes the necessity of structured research training to ensure cadets develop analytical, problem-solving, and decision-making skills that are crucial in the maritime sector. Key challenges identified include the lack of systematic research frameworks, insufficient exposure to digital research tools such as AI and big data analytics, and limited institutional support for research development. Additionally, inconsistencies in faculty expertise in research methodologies and the absence of structured research supervision contribute to the overall deficiency in research competency among cadets. To address these challenges, this research recommends integrating comprehensive research training modules, enhancing faculty development in research supervision, adopting modern digital tools, and fostering industry-academic collaboration to ensure final projects address real-world maritime problems. Strengthening these areas will bridge the research-to-practice gap in maritime education and better prepare cadets for the evolving demands of global transportation, logistics, and port management. Implementing these reforms will enhance the research capabilities of maritime institutions, ensuring their graduates contribute meaningfully to the industry's growth and innovation.

6. References

Barston, R., & Birnie, P. (2024). *The maritime dimension*. Taylor & Francis.

Baylon, A. M., & Santos, V. (2011). The challenges in Philippine maritime education and training. *International Journal of Innovative Interdisciplinary Research, 1*(1), 34–43.

Berg, H. P. (2013). Human factors and safety culture in maritime safety. In *Marine navigation and safety of sea transportation: STCW, maritime education and training (MET), human resources and crew manning, maritime policy, logistics and economic matters* (pp. 107–115).

Bergheim, K., Nielsen, M. B., Mearns, K., & Eid, J. (2015). The relationship between psychological capital, job satisfaction, and safety perceptions in the maritime industry. *Safety Science, 74*, 27–36.

Cascetta, E. (2013). *Transportation systems engineering: Theory and methods* (Vol. 49). Springer Science & Business Media.

Chircop, A. (2015). The International Maritime Organization.

Darlington, Y., & Scott, D. (2020). *Qualitative research in practice: Stories from the field*. Routledge.

Harrison, J. (2009). International Maritime Organization. *International Journal of Marine & Coastal Law, 24*, 727.

Mandaraka-Sheppard, A. (2014). *Modern maritime law and risk management*. CRC Press.

Manuel, M. E. (2017). Vocational and academic approaches to maritime education and training (MET): Trends, challenges, and opportunities. *WMU Journal of Maritime Affairs, 16*, 473–483.

Merriam, S. B., & Grenier, R. S. (2019). *Qualitative research in practice: Examples for discussion and analysis*. John Wiley & Sons.

Mohamed Shaffril, H. A., Samsuddin, S. F., & Abu Samah, A. (2021). The ABC of systematic literature review: The basic methodological guidance for beginners. *Quality & Quantity, 55*, 1319–1346.

Munim, Z. H., Dushenko, M., Jimenez, V. J., Shakil, M. H., & Imset, M. (2020). Big data and artificial intelligence in the maritime industry: A bibliometric review and future research directions. *Maritime Policy & Management, 47*(5), 577–597.

Nalupa, H. D. V. (2022). *Challenges and opportunities for maritime education and training in the 4th industrial revolution*.

Oldenburg, M., Baur, X., & Schlaich, C. (2010). Occupational risks and challenges of seafaring. *Journal of Occupational Health, 52*(5), 249–256. https://doi.org/10.1539/joh.K10004

Padgett, D. K. (2016). *Qualitative methods in social work research* (Vol. 36). Sage Publications.

Toriia, T. G., Epikhin, A. I., Panchenko, S. V., & Modina, M. A. (2023). Modern educational trends in the maritime industry. *SHS Web of Conferences, 164*, 60.