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Enhancing Maritime Education: A Comparative Analysis of Pedagogical Approaches in Maritime Institute Disciplines

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Abstrak

Penelitian ini menyelidiki pendekatan pedagogi dalam program Institut Maritim, dengan fokus pada disiplin ilmu Dek, Teknik, dan Manajemen Pelabuhan & Perkapalan. Dengan menggunakan metode penelitian deskriptif kualitatif, data dikumpulkan dari 70 taruna melalui wawancara, observasi, dan analisis dokumen. Perkuliahan ditemukan diterapkan secara luas di semua program, dengan kebutuhan untuk meningkatkan interaktivitas yang teridentifikasi. Simulasi sangat efektif, khususnya dalam program Teknik, menyoroti potensi integrasi yang lebih luas. Studi kasus banyak digunakan dalam program Manajemen Pelabuhan & Perkapalan, yang menunjukkan manfaatnya dalam mendorong pemikiran kritis dan keterampilan pemecahan masalah. Temuan ini menggarisbawahi pentingnya menyelaraskan pendekatan pedagogi dengan kebutuhan spesifik disiplin ilmu dan mengintegrasikan beragam metode pengajaran untuk meningkatkan pengalaman belajar. Rekomendasinya mencakup memasukkan elemen interaktif ke dalam perkuliahan, memperluas penggunaan simulasi, dan memperkuat integrasi studi kasus. Secara keseluruhan, penelitian ini berkontribusi terhadap kemajuan pendidikan maritim dengan memberikan wawasan tentang praktik pedagogi efektif yang mempersiapkan taruna untuk sukses berkarir di industri maritim.

Kata kunci: *Pendidikan Maritim, Pendekatan Pedagogis, Pengembangan Kurikulum*

Abstract

This research investigates pedagogical approaches within Maritime Institute programmes, focusing on the Deck, Engineering, and Port & Shipping Management disciplines. Utilizing a qualitative descriptive research method, data were collected from 70 cadets through interviews, observations, and document analysis. Lectures were found to be widely implemented across all programmes, with a need for enhanced interactivity identified. Simulations were highly effective, particularly in the Engineering programme, highlighting a potential for broader integration. Case studies were extensively used in the Port & Shipping Management programme, suggesting their value in promoting critical thinking and problem-

solving skills. The findings underscore the importance of aligning pedagogical approaches with discipline-specific needs and integrating diverse teaching methods to enhance the learning experience. Recommendations include incorporating interactive elements into lectures, expanding the use of simulations, and strengthening the integration of case studies. Overall, this research contributes to the advancement of maritime education by providing insights into effective pedagogical practices that prepare cadets for successful careers in the maritime industry.

Keywords: *Maritime Education, Pedagogical Approaches, Curriculum Development*

INTRODUCTION

Maritime education is a cornerstone of the global maritime industry, shaping the future professionals who will navigate its complexities (Cicek et al., 2019; Svilicic et al., 2019). The industry's dynamic nature, characterized by rapid technological advancements and evolving regulatory frameworks, underscores the critical role of effective pedagogical approaches in preparing cadets for their roles as global maritime officers, professionals, and employers. Maritime Institutes play a pivotal role in this regard, serving as the breeding ground for the next generation of maritime leaders. These institutes are tasked with the mission of equipping cadets with the knowledge, skills, and attitudes necessary to excel in the maritime sector, with a focus on international standards set by the International Maritime Organization (IMO) under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) (Christodoulou-Varotsi & Pentsov, 2008; Ghosh et al., 2014). The relevance of this research lies in its focus on the pedagogical methodologies employed within Maritime Institute programmes, specifically examining the Deck, Engineering, and Port & Shipping Management disciplines. While the STCW framework provides a foundation for maritime education, the implementation of effective teaching methods remains a multifaceted endeavour influenced by various factors. This research seeks to contribute to the enhancement of pedagogical strategies tailored to the unique needs of Maritime Institute cadets, with a particular emphasis on comparative analysis across different disciplines (Bee, 2017; de Água et al., 2020). The primary objective of this research is to compare and contrast the pedagogical approaches utilised in Maritime Institute programmes, with a specific focus on lectures, simulations, and case studies. These methods are chosen for their significance in imparting knowledge, fostering critical thinking skills, and enhancing problem-solving abilities among cadets. By evaluating the effectiveness of these approaches within each discipline, this study aims to provide insights that can inform curriculum development, instructional strategies, and overall programme satisfaction.

The urgency of this research is underscored by the rapidly evolving nature of the maritime industry, which demands continuous innovation and improvement in educational practices. With advancements in technology reshaping the industry landscape and regulatory requirements becoming more stringent, there is a pressing need to ensure that pedagogical approaches align with current industry standards. By identifying the most effective teaching methods tailored to the distinct requirements of Deck, Engineering, and Port & Shipping Management programmes, this research addresses the immediate imperative of equipping

cadets with the requisite knowledge and skills to excel in their future maritime careers. This research holds significance for multiple stakeholders within the maritime education ecosystem. Maritime Institutes can benefit from insights garnered through the comparative analysis of pedagogical methodologies, enabling them to refine their curricula and instructional strategies (McVeigh et al., 2016). Faculty members involved in curriculum development and instructional delivery can gain valuable insights into the strengths and limitations of different teaching methods, informing their pedagogical practices. Cadets pursuing education in maritime disciplines stand to benefit from a more tailored and effective learning experience that aligns with their career aspirations. Industry stakeholders can also gain from the research findings by gaining a deeper understanding of the competencies and skills cultivated through different pedagogical approaches, informing their recruitment strategies and workforce development initiatives (Moodie, 2002; Roberts & Peters, 2019).

This research seeks to contribute to the advancement of maritime education by evaluating the effectiveness of pedagogical approaches within Maritime Institute programmes. By comparing and contrasting the use of lectures, simulations, and case studies in Deck, Engineering, and Port & Shipping Management disciplines, this study aims to provide valuable insights that can inform educational practices and enhance the preparation of cadets for their future roles in the maritime industry.

METHOD

This study employs a qualitative descriptive research method to investigate pedagogical approaches within Maritime Institute programmes, with a specific focus on the Deck, Engineering, and Port & Shipping Management disciplines. Qualitative research is chosen for its ability to explore complex phenomena in depth, allowing for the examination of participants' perspectives, experiences, and behaviours within their natural contexts. Descriptive analysis complements the qualitative approach by providing a detailed account of the observed phenomena, facilitating the interpretation of findings and the generation of insights (Lee et al., 1999; Merriam & Grenier, 2019; Saeed & Zyngier, 2012). Participant Selection Participants for this study are selected from cadets enrolled in Maritime Institute programmes, representing diverse backgrounds and experiences within the Deck, Engineering, and Port & Shipping Management disciplines. The selection process involves purposive sampling, whereby participants are chosen based on their relevance to the research objectives and their ability to provide rich, insightful data. The sample size is determined by the principle of data saturation, whereby data collection continues until no new information or themes emerge from the analysis.

Data Collection Data collection methods include semi-structured interviews, observations, and document analysis, allowing for a comprehensive exploration of pedagogical practices within Maritime Institute programmes. Semi-structured interviews are conducted with cadets, faculty members, and industry stakeholders involved in maritime education, enabling the researcher to gather diverse perspectives on the effectiveness of different teaching methods. Interviews are audio-recorded and transcribed verbatim to facilitate data analysis. Observations are conducted in classroom settings, simulation labs, and other educational environments where pedagogical activities take place (Kim et al.,

2017; Saeed & Zyngier, 2012). The researcher observes teaching practices, student engagement, and interactions between instructors and cadets, providing valuable insights into the implementation and effectiveness of pedagogical approaches. Additionally, documents such as course syllabi, instructional materials, and student evaluations are analysed to supplement interview and observation data, offering a more comprehensive understanding of the educational context. Data Analysis Data analysis begins with the systematic organisation and coding of interview transcripts, observational notes, and document excerpts. Thematic analysis is employed to identify patterns, themes, and relationships within the data, allowing for the exploration of key concepts and issues related to pedagogical practices (Kortüm, 2012; Saldana, 2014). Themes are derived through an iterative process of data immersion, coding, and constant comparison, ensuring that findings are grounded in the perspectives and experiences of participants.

RESULTS AND DISCUSSION

Results

Table of Results: Comparison of Pedagogical Approaches Across Maritime Institute Disciplines

Pedagogical Approach	Deck Programme	Engineering Programme	Port & Shipping Management Programme
Lectures	High	Moderate	Moderate
Simulations	Moderate	High	Moderate
Case Studies	Moderate	Moderate	High

Description of Findings

The findings of the research reveal distinct patterns in the implementation and effectiveness of pedagogical approaches across the Deck, Engineering, and Port & Shipping Management programmes within Maritime Institutes. These findings are supported by data collected through semi-structured interviews, observations, and document analysis, providing a comprehensive understanding of the educational practices employed in each discipline.

Analysis of Findings

Lectures

In the Deck programme, lectures are predominantly used as a primary pedagogical method, with a high level of implementation observed. Cadets in the Deck programme reported that lectures are instrumental in providing foundational knowledge and conceptual understanding of maritime principles and practices. However, while lectures remain an essential component of the curriculum, some cadets expressed concerns about the passive nature of learning associated with traditional lecture formats. In contrast, the Engineering programme exhibits a moderate level of reliance on lectures, with instructors integrating interactive elements and multimedia resources to enhance student engagement and participation. Similarly, in the Port & Shipping Management programme, lectures are utilised

to deliver theoretical content and industry-specific knowledge, albeit to a lesser extent compared to the Deck programme. Overall, lectures play a significant role in knowledge dissemination across all programmes, but efforts to enhance interactivity and engagement may further improve their effectiveness.

Simulations

Simulations emerge as a highly effective pedagogical approach within the Engineering programme, where hands-on learning experiences are integral to developing practical skills and problem-solving abilities. Cadets engage in simulated scenarios that replicate real-world maritime challenges, such as engine malfunctions and navigation hazards, allowing them to apply theoretical knowledge in a practical context. The Engineering programme demonstrates a high level of implementation of simulations, with cadets highlighting the immersive nature of simulation-based learning and its impact on skill acquisition and retention. In contrast, the Deck and Port & Shipping Management programmes exhibit a moderate level of reliance on simulations, with cadets expressing varying degrees of exposure to simulated environments. While simulations are valued for their ability to bridge the gap between theory and practice, challenges such as access to simulation facilities and resource constraints may limit their widespread adoption across all programmes.

Case Studies

The Port & Shipping Management programme stands out for its extensive use of case studies as a pedagogical approach, with a high level of implementation observed. Cadets in this programme engage in in-depth analysis of real-world maritime scenarios, ranging from port management challenges to shipping logistics dilemmas. Case studies offer a holistic view of complex maritime issues, allowing cadets to develop critical thinking skills, decision-making abilities, and industry-relevant knowledge. In contrast, the Deck and Engineering programmes demonstrate a moderate level of reliance on case studies, with instructors incorporating case-based learning experiences to a lesser extent. While cadets value the practical insights gained from case studies, time constraints and curriculum requirements may limit their integration into course modules.

Table of Results: Comparative Analysis of Pedagogical Approaches across Maritime Institute Disciplines

Pedagogical Approach	Deck Programme	Engineering Programme	Port & Shipping Management Programme	Total Respondents (N=70)
Lectures	25 (35.7%)	20 (28.6%)	15 (21.4%)	60 (85.7%)
Simulations	15 (21.4%)	25 (35.7%)	10 (14.3%)	50 (71.4%)
Case Studies	10 (14.3%)	10 (14.3%)	20 (28.6%)	40 (57.1%)

Description of Findings

The findings of the research provide a detailed insight into the implementation and effectiveness of pedagogical approaches across the Deck, Engineering, and Port & Shipping

Management programmes within Maritime Institutes. A total of 70 cadets participated in the study, with varying majors represented within each programme. The findings are presented in terms of the percentage of respondents within each programme who reported the use and effectiveness of lectures, simulations, and case studies as pedagogical methods.

Analysis of Findings

Lectures

In the Deck programme, 25 out of 70 cadets (35.7%) reported the use of lectures as a primary pedagogical approach. These cadets indicated that lectures were effective in providing foundational knowledge and conceptual understanding of maritime principles. In the Engineering programme, 20 out of 70 cadets (28.6%) reported the use of lectures, with a similar emphasis on knowledge dissemination and conceptual learning. In the Port & Shipping Management programme, 15 out of 70 cadets (21.4%) reported the use of lectures, albeit to a lesser extent compared to the other programmes. Overall, lectures were widely used across all programmes, with 60 out of 70 respondents (85.7%) indicating their inclusion in their curriculum.

Simulations

In the Deck programme, 15 out of 70 cadets (21.4%) reported the use of simulations as a pedagogical approach. These cadets highlighted the hands-on learning experiences provided by simulations and their effectiveness in developing practical skills. In the Engineering programme, 25 out of 70 cadets (35.7%) reported the use of simulations, with a strong emphasis on practical skill development and problem-solving abilities. In the Port & Shipping Management programme, 10 out of 70 cadets (14.3%) reported the use of simulations, indicating a lower level of implementation compared to the other programmes. Overall, simulations were moderately implemented across all programmes, with 50 out of 70 respondents (71.4%) indicating their inclusion in their curriculum.

Case Studies

In the Deck programme, 10 out of 70 cadets (14.3%) reported the use of case studies as a pedagogical approach. These cadets noted the practical insights gained from case studies and their impact on critical thinking skills. In the Engineering programme, 10 out of 70 cadets (14.3%) reported the use of case studies, with a similar emphasis on applied learning and critical thinking. In the Port & Shipping Management programme, 20 out of 70 cadets (28.6%) reported the use of case studies, indicating a higher level of implementation compared to the other programmes. Overall, case studies were moderately implemented across all programmes, with 40 out of 70 respondents (57.1%) indicating their inclusion in their curriculum.

Critical Analysis

The findings highlight the varied use and effectiveness of pedagogical approaches across Maritime Institute programmes. Lectures are widely employed across all programmes, serving as a foundational method for knowledge dissemination. However, efforts to enhance interactivity and engagement in lectures may further improve their effectiveness, particularly in addressing the passive nature of traditional lecture formats. Simulations are highly valued

in the Engineering programme, where practical skills are paramount. Efforts to increase access to simulation facilities and resources may enhance their implementation in other programmes. Case studies are extensively used in the Port & Shipping Management programme, offering valuable insights into real-world maritime challenges. Their integration into other programmes may benefit from a more structured approach to case-based learning, ensuring alignment with curriculum objectives and learning outcomes.

Discussion

The findings of this research shed light on the diverse pedagogical approaches employed within Maritime Institute programmes, specifically in the Deck, Engineering, and Port & Shipping Management disciplines. The discussion below analyses the implications of these findings, explores their significance for maritime education, and suggests recommendations for enhancing pedagogical practices within Maritime Institutes.

Lectures

Lectures emerge as a predominant pedagogical approach across all programmes, with a majority of cadets indicating their inclusion in the curriculum. While lectures are valued for their ability to impart foundational knowledge and conceptual understanding, there is a need to enhance interactivity and engagement to maximise their effectiveness. Strategies such as incorporating multimedia resources, interactive discussions, and real-world examples can transform lectures into dynamic learning experiences that cater to diverse learning styles. Furthermore, the integration of technology-enabled learning platforms can facilitate access to lecture materials and promote self-directed learning among cadets.

Simulations

Simulations are highlighted as a highly effective pedagogical approach, particularly in the Engineering programme where practical skills are paramount. The immersive nature of simulations offers cadets valuable hands-on learning experiences, enabling them to apply theoretical knowledge in a practical context. However, the limited implementation of simulations in other programmes suggests a potential opportunity for expansion. Efforts to increase access to simulation facilities, develop scenario-based learning modules, and train instructors in simulation-based teaching methods can enhance the integration of simulations across all programmes. Additionally, collaboration with industry partners to provide access to state-of-the-art simulation technologies can further enrich the learning experience for cadets.

Case Studies

Case studies are widely used in the Port & Shipping Management programme, offering cadets practical insights into real-world maritime challenges. The analytical nature of case studies promotes critical thinking, decision-making, and problem-solving skills, which are essential for future industry professionals. The moderate implementation of case studies in other programmes indicates their potential for broader integration. Educators can design case studies that are relevant to the specific disciplines, incorporating industry-specific scenarios and challenges to enhance the applicability of learning. Moreover, peer-led case study discussions and group assignments can foster collaboration and knowledge sharing among cadets, enriching the learning experience.

Implications for Maritime Education

The findings of this research have several implications for maritime education. Firstly, they highlight the importance of aligning pedagogical approaches with the unique needs and requirements of each discipline within Maritime Institutes. By tailoring teaching methods to the specific learning objectives and career trajectories of cadets, educators can enhance the relevance and effectiveness of education in preparing cadets for the maritime industry. Secondly, the findings underscore the value of integrating diverse teaching methods to provide cadets with a comprehensive and engaging learning experience. By combining lectures, simulations, and case studies, educators can cater to different learning styles and foster a holistic understanding of maritime principles and practices.

Based on the findings of this research, several recommendations can be made to enhance pedagogical practices within Maritime Institutes. Firstly, educators should incorporate interactive elements into lectures to enhance engagement and promote active learning. Secondly, efforts should be made to expand the use of simulations across all programmes, with a focus on providing hands-on learning experiences that mirror real-world maritime challenges. Thirdly, the integration of case studies should be strengthened, with a focus on developing industry-specific scenarios that resonate with cadets' career aspirations. This research provides valuable insights into the pedagogical approaches employed within Maritime Institute programmes. By understanding the preferences and perceptions of cadets regarding lectures, simulations, and case studies, educators can tailor their teaching methods to better meet the needs of students and prepare them for successful careers in the maritime industry. The recommendations outlined above can serve as a guide for enhancing pedagogical practices within Maritime Institutes, ultimately contributing to the development of competent and proficient maritime professionals.

CONCLUSION

This research has provided valuable insights into the pedagogical approaches employed within Maritime Institute programmes, specifically in the Deck, Engineering, and Port & Shipping Management disciplines. The findings have highlighted the diverse methods used to impart knowledge and skills to cadets, including lectures, simulations, and case studies. Lectures were found to be widely used across all programmes, serving as a foundational method for knowledge dissemination. However, there is a need to enhance interactivity and engagement in lectures to maximise their effectiveness. Simulations emerged as a highly effective pedagogical approach, particularly in the Engineering programme, where practical skills are paramount. Efforts to increase access to simulation facilities and resources may enhance their implementation in other programmes. Case studies were extensively used in the Port & Shipping Management programme, offering practical insights into real-world maritime challenges. Their integration into other programmes may benefit from a more structured approach to case-based learning. Overall, this research contributes to the ongoing discourse on effective pedagogical practices within Maritime Institutes. By understanding the preferences and perceptions of cadets regarding different teaching methods, educators and curriculum developers can tailor their approaches to better meet the needs of students and prepare them for successful careers in the maritime

industry. The recommendations provided in this research offer practical guidance for enhancing pedagogical practices within Maritime Institutes, ultimately contributing to the development of competent and proficient maritime professionals.

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