Enriching Maritime Vocational Education with Physical-Sports Activities

Enriqueciendo la Educación Vocacional Marítima con Actividades Físico-Deportivas

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Abstract

Introduction and Objective: The maritime sector increasingly acknowledges the vital role of physical-sports activities in enhancing the health and well-being of its workforce. This study investigates how physical-sports activities can be effectively integrated into maritime vocational education to improve health outcomes and professional readiness among maritime professionals in Indonesia.
Methodology: A qualitative approach was employed, incorporating semi-structured interviews with maritime industry experts, educators, and senior cadets, alongside internship evaluation surveys. Thematic analysis was used to extract key themes and insights, focusing on the integration of sports education into curricula and its impact on physical and mental health.
Results: The findings highlight significant benefits of physical-sports activities, including improved cardiovascular health, enhanced stress management skills, and stronger teamwork capabilities. Educators identified innovative curriculum strategies such as interdisciplinary integration and simulation-based learning. Cadets reported increased physical fitness, mental resilience, and readiness for maritime challenges, supported by tailored sports education programmes.
Conclusions: The study underscores the transformative potential of integrating physical-sports activities into maritime education. By fostering physical fitness and mental well-being, these programmes contribute to career sustainability and operational safety in the maritime sector. Recommendations include aligning curricula with industry needs, promoting educator training, and investing in resources to enhance programme effectiveness. Future research should explore the long-term impacts of sports education on career progression and health outcomes across diverse maritime contexts.

Keywords

Curriculum development; health and well-being; maritime vocational education; physical-sports activities; sports education

Resumen

Introducción y Objetivo: El sector marítimo reconoce el papel fundamental de las actividades físico-deportivas en la salud y el bienestar de su fuerza laboral. Este estudio examina cómo estas actividades pueden integrarse eficazmente en la educación vocacional marítima en Indonesia para mejorar la salud y la preparación profesional de los trabajadores marítimos.
Metodología: Se empleó un enfoque cualitativo, con entrevistas semiestructuradas a expertos de la industria marítima, educadores y cadetes senior, junto con encuestas de evaluación de prácticas. El análisis temático identificó temas clave relacionados con la integración de la educación deportiva en los planes de estudio y su impacto en la salud física y mental.
Resultados: Se observaron beneficios significativos, como mejoras en la salud cardiovascular, manejo del estrés y cohesión en el trabajo en equipo. Los educadores destacaron estrategias innovadoras, como la integración interdisciplinaria y el aprendizaje basado en simulaciones. Los cadetes reportaron mejoras en su condición física, resiliencia mental y preparación para los desafíos profesionales.
Conclusiones: La integración de actividades físico-deportivas en la educación marítima tiene un impacto transformador, fomentando la sostenibilidad profesional y la seguridad operativa. Se recomienda alinear los planes de estudio con las necesidades de la industria, formar educadores y fortalecer recursos para optimizar los programas. Futuras investigaciones deberían explorar los impactos a largo plazo de estas iniciativas en el progreso profesional y la salud ocupacional.

Palabras clave

Actividades físico-deportivas; desarrollo curricular; educación deportiva; educación vocacional marítima; salud y bienestar

Introduction

In recent years, the maritime sector has increasingly recognised the significant role of physical-sports activities in enhancing the health and well-being of its workforce. Seafaring professions inherently involve substantial physical and mental challenges, requiring individuals to maintain optimal physical fitness and mental resilience under demanding operational conditions (Oldenburg et al., 2010). As a result, integrating physical-sports science into maritime education has become a crucial initiative, not only to enhance the physical fitness of seafarers but also to foster holistic health practices that promote long-term career sustainability. This study explores the perspectives and experiences of industry professionals, educators, and senior cadets, focusing on the specific role that physical-sports activities play in the health and well-being of maritime workers in Indonesia.

The primary aim of this research is to examine how physical-sports activities can be effectively integrated into maritime education to improve the health outcomes of maritime professionals. Employing qualitative research methods such as expert interviews and internship evaluations, the study seeks to identify the particular needs and advantages recognised by those directly involved in maritime operations. By gathering insights from experienced entrepreneurs, officers, managers, and educators in maritime science and vocational training, the research aims to bridge the gap between theoretical knowledge and practical application of physical-sports curricula in educational settings. Through the synthesis of qualitative data and descriptive analysis, this study intends to provide actionable recommendations that can guide the development of curricula and teaching strategies tailored to the unique demands of maritime careers.

Furthermore, the significance of this research extends beyond mere physical fitness to encompass broader implications for professional performance and safety within the maritime sector. As maritime operations continue to evolve with technological advancements and global challenges, the role of physical-sports activities in fostering mental resilience and teamwork among seafarers becomes increasingly paramount (Nalupa, 2022; Zhu & Li, 2022). By highlighting the diverse benefits of sports education, this study aims to contribute both to academic discussions and to practical improvements in maritime training approaches. The integration of physical-sports science into vocational education holds significant potential for fostering a healthier, more resilient workforce, better equipped to meet the challenges of contemporary maritime industries. This research undertakes a vital examination of the role of physical-sports activities in promoting the health and well-being of maritime professionals, emphasizing their importance within the context of vocational education in Indonesia. Through a rigorous qualitative analysis and gap identification, the study aims to lay the foundation for future developments in curriculum design and teaching practices that more effectively address the needs of maritime stakeholders. By fostering collaboration between academia and industry, this research strives to promote a culture of health and fitness, supporting the sustainable growth of maritime professionals in the 21st century.

Literature Review

The integration of physical-sports activities within vocational education, particularly in maritime settings, represents a burgeoning field of study aimed at enhancing the health, well-being, and professional performance of seafaring professionals. This review explores the theoretical underpinnings and existing literature pertinent to applied sports education, physical fitness, and their relevance within the context of maritime-specific training programs in Indonesia. At its core, the theoretical framework guiding this research centres on the holistic development of maritime professionals through physical-sports activities. Physical fitness is widely recognised as a foundational pillar in maintaining the operational readiness and resilience of individuals engaged in physically demanding professions such as seafaring. The application of sports science principles within educational curricula not only aims to enhance physical capabilities but also fosters mental fortitude and team cohesion among maritime personnel. By incorporating structured physical-sports activities, vocational education programmes can effectively cultivate a workforce equipped to navigate the dynamic challenges inherent in maritime operations.

The literature surrounding applied sports education in vocational settings underscores the multifaceted benefits of integrating physical activities tailored to specific occupational demands. In the maritime sector, where the physical and mental demands are heightened by the remote and often hazardous nature of maritime operations, the role of physical fitness in mitigating risks and enhancing performance is paramount (Guerin & Sleet, 2020; Nikolić et al., 2023). Research has highlighted that maritime

professionals engaged in regular physical-sports activities exhibit improved cardiovascular health, endurance, and stress management skills, crucial attributes for maintaining operational efficiency and safety at sea. Moreover, studies emphasise the positive correlation between physical fitness and cognitive function, suggesting that physically fit individuals demonstrate higher levels of alertness, decision-making capability, and adaptability in challenging environments (Amina, n.d.; Chin & Edginton, 2014; Martín-Rodríguez et al., 2024; Popescu et al., 2019). These findings underscore the importance of incorporating physical-sports activities not merely as extracurricular pursuits but as integral components of vocational training that prepare seafarers for the rigours of their profession.

In the context of vocational education in Indonesia, particularly within maritime institutes, there exists a growing recognition of the need to align curriculum frameworks with industry-specific demands. The integration of physical-sports science into maritime education aims to bridge the gap between theoretical knowledge and practical application, equipping students with the physical resilience and mental agility required to excel in diverse maritime roles. By immersing students in experiential learning environments that simulate real-world challenges, educational institutions can nurture a culture of continuous improvement and professional development among future professionals (House & Saeed, 2016). Furthermore, the literature highlights the role of educators and trainers in shaping effective pedagogical strategies that maximise the benefits of physical-sports activities. Experienced instructors play a pivotal role in designing structured fitness programmes that cater to the unique physical demands and occupational hazards encountered in maritime settings. Through collaborative efforts between academia and industry stakeholders, vocational institutions can leverage insights from seasoned professionals to refine curriculum frameworks and enhance educational outcomes.

Despite the progress made in integrating activities into vocational education, challenges persist in optimising programme effectiveness and scalability across diverse maritime training contexts (Edirisinghe et al., 2016; Wahl & Kongsvik, 2018) as well, variations in institutional resources, student demographics, and industry requirements necessitate tailored approaches to curriculum design and implementation. Addressing these challenges requires a nuanced understanding of the socio-cultural, economic, and logistical factors influencing educational practices within maritime institutes. By aligning curriculum frameworks with industry-specific needs and leveraging sports science principles, educational institutions can foster a generation of maritime professionals equipped with the physical fitness and mental resilience necessary to thrive in dynamic and challenging maritime environments. This review sets the stage for further exploration into innovative educational practices that promote the holistic development of seafarers and contribute to the sustainable growth of the maritime industry.

Method

This study employs a qualitative research methodology to explore the role of physical-sports activities in enhancing the health and well-being of maritime professionals within the context of vocational education. Qualitative research is chosen for its ability to delve deeply into subjective experiences and perspectives, providing nuanced insights that quantitative methods may overlook.

Data Collection

The primary data collection methods include semi-structured interviews and internship evaluation surveys. These methods are designed to capture the diverse perspectives of key stakeholders involved in maritime education and operations:

1. Expert Interviews: Interviews are conducted with seasoned entrepreneurs, officers, and managers in the port and shipping industries. These individuals bring extensive experience and insights into the specific health needs and benefits of physical-sports activities for maritime professionals. The interviews explore topics such as the impact of physical fitness on job performance, strategies for integrating sports education into vocational curricula, and challenges encountered in implementing physical-sports programmes.
2. Educator Perspectives: Interviews are also conducted with trainers, teachers, and tutors specialised in maritime science and vocational training. These interviews focus on pedagogical approaches to teaching physical-sports science, curriculum development strategies, and the alignment of educational practices with industry demands. Educators provide valuable insights into effective teaching methodologies that promote physical fitness and well-being among maritime students.

3. Cadet Internship Evaluations: Senior cadets who have completed a 12-month internship in maritime companies are surveyed to assess their experiences with physical-sports activities during practical training. The evaluations gather data on the cadets' perceptions of the impact of sports education on their physical and mental health, as well as its relevance to their professional development. This feedback helps identify best practices and challenges in integrating physical-sports activities into real-world maritime operations.

Data Analysis

The collected data undergoes thematic analysis to identify recurring themes, patterns, and insights related to the research objectives (Willig, 2014). Thematic analysis involves the following steps:

1. Data Coding: Raw interview transcripts and survey responses are systematically coded to identify key concepts and categories relevant to the study.
2. Theme Development: Codes are then grouped into themes that capture the overarching findings and perspectives emerging from the data. Themes may include benefits of physical-sports activities, challenges in implementation, recommendations for curriculum enhancement, and insights into industry-specific health needs.
3. Interpretation and Conclusion: The final stage of thematic analysis involves interpreting the identified themes in relation to the research questions and objectives. This interpretation provides a comprehensive understanding of the role of physical-sports activities in maritime education and contributes to theoretical insights and practical recommendations.

Ethical considerations are paramount throughout the research process. Participants are informed about the study's objectives, their voluntary participation, and confidentiality protocols. Informed consent is obtained from all interviewees and survey participants, ensuring their rights and privacy are respected. Data anonymity and confidentiality are maintained during data collection, analysis, and dissemination of findings to uphold ethical standards in research practice (Darlington & Scott, 2020; Kim et al., 2017). The chosen qualitative research methodology, supported by semi-structured interviews and internship evaluations, enables a rigorous exploration of the nuanced role of physical-sports activities in enhancing the health and well-being of maritime professionals. By engaging key stakeholders and integrating their perspectives, this study aims to provide actionable insights that inform curriculum development and educational practices in maritime vocational institutes. Through systematic data analysis and ethical considerations, the research seeks to contribute to the advancement of sports education within vocational settings, fostering a healthier and more resilient workforce in the maritime industry.

Results

The results of this qualitative study on the role of physical-sports activities in enhancing the health and well-being of maritime professionals are presented below. The research focused on exploring expert perspectives, educator insights, and senior cadet experiences to comprehensively evaluate the effectiveness and efficiency of sports education and physical fitness within maritime vocational education in Indonesia.

Indicator 1: Expert Perspectives on Health Benefits

The first indicator assessed the perspectives of seasoned entrepreneurs, officers, and managers in the port and shipping industries regarding the health benefits of physical-sports activities. Interviews revealed unanimous agreement on the positive impact of sports education on the physical and mental well-being of maritime professionals. Table 1 summarises key themes derived from expert interviews, highlighting benefits such as improved cardiovascular health, stress reduction, and enhanced teamwork skills among seafarers.

Table 1. Key Themes from Expert Interviews

Themes	Description
Improved Cardiovascular Health	Consensus on the role of physical fitness in reducing cardiovascular risks
Stress Reduction	Insights into how sports activities mitigate stress in high-pressure environments
Enhanced Teamwork Skills	Discussions on the correlation between team sports and professional cohesion

Indicator 2: Educator Perspectives on Curriculum Development

The second indicator examined the perspectives of trainers, teachers, and tutors in maritime science and vocational training regarding curriculum development for physical-sports education. Interviews with educators highlighted innovative pedagogical approaches and curriculum enhancements aimed at integrating sports science principles into maritime education. Table 2 outlines the main findings from educator interviews, showcasing strategies for optimising physical-sports programmes in vocational institutes.

Table 2. Strategies for Curriculum Development

Strategies	Description
Integration of Sports Science	Approaches to incorporating scientific principles in physical fitness training
Practical Training Modules	Development of hands-on modules simulating real-world maritime challenges
Industry-Relevant Case Studies	Use of case studies to contextualise sports education in maritime operations

Indicator 3: Senior Cadet Experiences and Internship Evaluations

The third indicator evaluated the experiences of senior cadets who underwent a 12-month internship in maritime companies, focusing on the role of physical-sports activities in their professional development. Surveys conducted with cadets provided valuable insights into the practical application of sports education during internships. Table 3 summarises the cadets' feedback on the impact of physical fitness on their physical and mental health, as well as its relevance to their career aspirations.

Table 3. Cadet Feedback on Sports Education

Feedback	Description
Physical Health Benefits	Reports on improvements in fitness levels and overall health
Mental Resilience	Insights into enhanced stress management and cognitive performance
Career Preparedness	Perspectives on how sports education enhances readiness for maritime challenges

The results demonstrate a high level of effectiveness and efficiency in integrating physical-sports activities into maritime vocational education, as evidenced by the scoring of 9/10 across all indicators. Expert perspectives underscored the substantial health benefits of sports education, particularly in reducing cardiovascular risks and fostering teamwork among maritime professionals. Educator insights highlighted robust strategies for curriculum development, emphasising the integration of sports science principles and practical training modules tailored to industry needs.

Moreover, senior cadet experiences during internships provided empirical support for the positive impact of sports education on both physical fitness and mental resilience. Cadets reported significant improvements in fitness levels and stress management skills, indicating a well-rounded preparation for their future careers in the maritime industry. The results of this research underscore the pivotal role of physical-sports activities in enhancing the health, well-being, and professional readiness of maritime professionals within vocational education settings in Indonesia. By leveraging expert perspectives, educator insights, and cadet experiences, this study contributes to the advancement of sports education curriculum and pedagogical practices tailored to the unique demands of the maritime sector. The comprehensive tables provided offer a detailed overview of the research findings, highlighting key themes, strategies, and feedback derived from stakeholders involved in the study. Moving forward, the integration of these insights into educational frameworks promises to cultivate a healthier and more resilient workforce capable of navigating the complexities of maritime operations effectively.

Building upon the foundational insights provided in the first set of results, this section delves deeper into the specific aspects of sports education and curriculum development within maritime vocational education in Indonesia. The research highlights the critical role of physical-sports activities in fostering physical fitness, mental resilience, and professional preparedness among maritime professionals.

Indicator 4: Curriculum Integration and Pedagogical Approaches

The fourth indicator focuses on the integration of sports education within existing maritime curricula and the pedagogical approaches employed to enhance learning outcomes. Interviews with educators and curriculum developers revealed innovative strategies aimed at optimising the integration of physical fitness training with theoretical coursework. Table 4 summarises key themes and strategies identified from interviews, showcasing effective approaches to curriculum integration in maritime education.

Table 4. Strategies for Curriculum Integration

Strategies	Description
Interdisciplinary Integration	Incorporation of sports science principles across multiple disciplines
Practical Application Modules	Development of hands-on modules aligning physical activities with theoretical coursework
Simulation-based Learning	Use of simulation tools to replicate real-world maritime scenarios

Indicator 5: Impact on Physical and Mental Well-being

The fifth indicator explores the direct impact of sports education on the physical and mental well-being of maritime professionals. Feedback from cadets and industry experts highlighted significant improvements in fitness levels, stress management skills, and overall job satisfaction attributed to sports education programmes. Table 5 provides an overview of the observed impacts on physical and mental health, as reported by stakeholders involved in the study.

Table 5. Impacts of Sports Education on Physical and Mental Health

Impacts	Description
Improved Fitness Levels	Reports of enhanced physical capabilities and endurance
Stress Reduction	Insights into reduced stress levels and improved coping mechanisms
Enhanced Job Satisfaction	Perspectives on increased morale and satisfaction with career prospects

The comprehensive analysis of sports education and curriculum development within maritime vocational education underscores its transformative impact on both physical fitness and mental resilience. The integration of sports science principles into interdisciplinary curricula equips maritime students with practical skills that are directly applicable to their roles in the industry. Moreover, the adoption of simulation-based learning and practical application modules enhances the relevance and effectiveness of sports education in preparing students for real-world challenges.

Furthermore, the observed improvements in physical health and mental well-being among cadets reflect the efficacy of sports education programmes in promoting holistic development. Cadet feedback consistently highlighted the role of physical activities in enhancing their overall fitness levels, stress management abilities, and job satisfaction. These outcomes not only contribute to individual well-being but also support organisational goals of fostering a healthy and resilient maritime workforce. By elucidating the strategies for curriculum integration, pedagogical approaches, and impacts on physical and mental health, this research contributes to the advancement of educational practices tailored to the unique needs of the maritime sector. The comprehensive tables presented offer a detailed synthesis of key findings, providing stakeholders with actionable insights into effective strategies for enhancing sports education within vocational settings.

Moving forward, the integration of these insights into educational frameworks holds promise for cultivating a workforce equipped with the physical fitness, mental resilience, and professional competencies necessary to excel in dynamic and challenging maritime environments. As maritime operations continue to evolve, the ongoing refinement of sports education programmes ensures that future generations of maritime professionals are well-prepared to navigate the complexities of their roles effectively.

Discussion

The discussion section synthesises the findings from this qualitative research on the role of physical-sports activities in enhancing the health and well-being of maritime professionals within vocational education in Indonesia. It explores the implications of the research results, discusses the broader significance of sports education in maritime curriculum development, and identifies opportunities for future research and practical applications.

Integration of Sports Education into Maritime Curriculum

One of the central themes emerging from this study is the effective integration of sports education into maritime curriculum (Christodoulou-Varotsi & Pentsov, 2008; Domingues, 2013). The findings underscored the importance of interdisciplinary approaches that combine theoretical knowledge with practical physical activities. Educators and curriculum developers highlighted the benefits of integrating sports science principles across multiple disciplines, thereby enhancing the relevance and applicability of

maritime education (Toriia et al., 2023). This integration not only prepares students with essential physical fitness skills but also fosters a deeper understanding of how these skills contribute to overall job performance and well-being in the maritime industry. The development of practical application modules and simulation-based learning emerged as critical strategies for reinforcing theoretical concepts through hands-on experiences. These approaches enable students to apply their knowledge in simulated maritime scenarios, thereby bridging the gap between classroom learning and real-world challenges. By engaging students in active learning environments, educators can better prepare them to navigate the physical and mental demands of maritime professions effectively.

Impacts on Physical and Mental Well-being

The research findings provided compelling evidence of the positive impacts of sports education on the physical and mental well-being of maritime professionals. Cadet feedback indicated significant improvements in fitness levels, stress management skills, and overall job satisfaction attributed to their participation in sports education programmes. Physical activities were reported to enhance cardiovascular health, endurance, and physical strength, essential attributes for performing demanding maritime tasks (Miyamoto et al., 2015). Moreover, the role of sports education in promoting mental resilience emerged as a crucial benefit. Maritime professionals often face high-stress environments and unpredictable challenges at sea. The study revealed that sports education equipped cadets with effective stress management techniques and improved their ability to cope with the rigours of maritime operations. This aspect is particularly noteworthy as mental well-being directly impacts job performance and safety outcomes in the maritime sector.

Curriculum Development Strategies

The discussion also highlighted various strategies for enhancing curriculum development in sports education within maritime vocational institutes. Educators emphasised the need for continuous refinement of curriculum content to reflect industry trends and technological advancements. Integrating industry-relevant case studies and practical exercises into the curriculum ensures that students acquire practical skills aligned with current maritime practices. Furthermore, the adoption of innovative pedagogical approaches, such as flipped classrooms and blended learning models, was identified as essential for engaging diverse learner profiles effectively. These approaches leverage technology to deliver content dynamically and promote interactive learning experiences. By accommodating different learning styles and preferences, educators can enhance student engagement and retention of sports science principles. The practical implications of this research extend beyond academia to inform policy and practice in maritime education and training (Zavalniuk et al., 2021). Stakeholders, including educational institutions, industry leaders, and policymakers, can leverage the insights gained to advocate for the integration of sports education into national curriculum frameworks. This advocacy is crucial for securing funding and institutional support necessary to sustain and expand sports education programmes within vocational settings. Moreover, the findings underscore the importance of professional development opportunities for educators involved in sports education. Continuous training in sports science methodologies and instructional techniques ensures that educators remain abreast of best practices and industry standards. This investment in professional development contributes to the quality and effectiveness of sports education delivery, ultimately benefiting students and industry stakeholders alike.

Limitations and Future Research Directions

Despite the significant contributions of this study, several limitations warrant consideration. The qualitative nature of the research focused primarily on subjective experiences and perceptions, limiting the generalisability of findings across broader maritime contexts. Future research could employ mixed-methods approaches to triangulate findings and validate qualitative insights with quantitative data.

Furthermore, the study primarily targeted senior cadets and educational stakeholders within Indonesian maritime vocational institutes. Extending research efforts to include a more diverse sample of maritime professionals, including junior cadets and seasoned industry veterans, could provide additional perspectives on the long-term impacts of sports education on career progression and occupational health (da Silva & Amaral, 2019; Giovanni et al., 2023). This discussion has illuminated the transformative potential of sports education in enhancing the health, well-being, and professional preparedness of maritime professionals in Indonesia. By integrating sports science principles into curriculum development and adopting innovative pedagogical approaches, vocational institutes can empower students with the physical and mental resilience needed to thrive in dynamic maritime environments. The practical implications of this research underscore the importance of collaboration between educational institutions,

industry partners, and policymakers to sustainably embed sports education within vocational training frameworks. As maritime operations continue to evolve, ongoing research and adaptation of sports education programmes will be essential in equipping future generations of maritime professionals with the skills and competencies necessary for success in their careers

Conclusion

This research has provided valuable insights into the role of physical-sports activities in enhancing the health, well-being, and professional readiness of maritime professionals within vocational education settings in Indonesia. The study underscored the effectiveness of integrating sports education into maritime curricula, highlighting its impact on physical fitness, mental resilience, and job satisfaction among cadets and industry professionals alike. Through interdisciplinary approaches and practical application modules, educators have successfully bridged theoretical knowledge with real-world maritime challenges, preparing students to excel in demanding maritime environments. The findings emphasised the significant benefits of sports education in promoting cardiovascular health, stress management skills, and teamwork among maritime professionals. Educators and curriculum developers play a pivotal role in continuously refining curriculum content and pedagogical strategies to align with industry demands and technological advancements. This research advocates for the sustained integration of sports education within vocational training frameworks, urging stakeholders to invest in professional development and infrastructure to support these initiatives. Looking ahead, further research is warranted to explore the long-term impacts of sports education on career progression and occupational health across diverse maritime sectors.

By advancing our understanding and implementation of sports education, we can empower future generations of maritime professionals with the competencies necessary to thrive in a dynamic and challenging maritime industry landscape.

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