Digital Horizons in Maritime Education: Navigating Challenges and Perspectives at STIP Jakarta

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Abstract. This research investigates the integration of digitalization challenges in maritime education, focusing on 240 cadets at the Maritime Institute Jakarta (STIP Jakarta). In their pivotal third semester, cadets undergo comprehensive preparation for internships, aligning with their majors—Nautical, Technical, and Port and Shipping Management. The study, adopting a qualitative descriptive approach, delves into cadets' perspectives on "An Integrative Approach for Digitalization Challenges of the Future Maritime Specialists" over three semesters. The findings reveal a nuanced landscape. While cadets acknowledge the importance of digital competencies, there is a notable gap in their confidence in preparedness. The positive correlation between perceived digital proficiency and overall professional competences signifies the integral connection between traditional maritime skills and digital literacy. Motivations driving cadets include enhanced employability (64%) and personal development (28%), pointing to a pragmatic and forward-looking mindset. The self-checked intelligence aspect exposes a potential gap between awareness and action, with 80% recognizing its importance but only 35% engaging in regular self-assessment. Perspectives on digital challenges reflect a balance between optimism (52%) and concerns about job displacement (38%), necessitating a holistic educational approach. The research underscores the paramount importance of English literacy, with 82% recognizing its significance in international maritime communication. The implications call for targeted curriculum enhancements, interventions promoting regular self-assessment, and a balanced approach to addressing digital challenges. Recommendations include bridging the gap between recognized importance and perceived preparedness, leveraging motivations for tailored programs, and cultivating a culture of self-reflection. In conclusion, this research provides a comprehensive understanding of cadets' perspectives, offering a roadmap for STIP Jakarta and similar institutions to navigate the digital horizons of maritime education effectively.

Keywords: Cadet Perspectives, Digitalization Challenges, English Literacy, Maritime Education, Maritime Skills

INTRODUCTION

In the realm of maritime education, the tide of progress and evolution sweeps over traditional practices, ushering in a new era marked by digitalization (IMO, 2018; Sanchez-Gonzalez et al., 2019). The Maritime Institute Jakarta (STIP Jakarta), a stalwart institution renowned for its production of highly qualified seamen, deck officers, and engine officers, stands at the forefront of preparing cadets for the challenges presented by the digital landscape. This research embarks on a comprehensive exploration of the integration of digitalization challenges faced by future maritime specialists at STIP Jakarta. The Maritime Institute Jakarta (STIP Jakarta) serves as a crucible for cultivating maritime professionals, offering an international programme that encompasses three majors: Nautical, Technical, and Port and Shipping Management. The institute's strategic positioning in Jakarta, the bustling maritime hub of Indonesia, places it in a unique position to contribute significantly to the global maritime

workforce. With a reputation for producing a massive number of qualified professionals, STIP Jakarta plays a vital role in shaping the trajectory of the maritime industry.

As the cadets enter their third semester, a critical juncture in their academic journey, they undergo comprehensive preparation for internships in sectors such as shipping, cargo, and international delivery—domains closely aligned with their chosen majors (Albayrak & Ziarati, 2012). This preparatory phase is not merely academic but extends to include mental, vocational, and professional readiness (Dyagileva et al., 2020). It is within this context that the impact of digitalization on maritime education becomes particularly pronounced. The urgency of exploring the integration of digitalization challenges arises from the pivotal role that technology plays in reshaping the maritime landscape. The contemporary maritime industry is marked by rapid technological advancements, from the implementation of smart shipping solutions to the use of data analytics in navigation and logistics. As future maritime specialists, cadets must not only be adept in the traditional skills of navigation, seamanship, and engine operations but also be equipped to navigate the complexities of the digital realm (Harrison, 2009).

Understanding the needs of cadets in the face of these evolving challenges is paramount. The international nature of the program demands that these cadets, hailing from diverse regions of Indonesia, transcend linguistic and cultural boundaries. While Bahasa Indonesia and traditional languages are integral to their daily lives, mastery of English communication is imperative for their roles as global officers. This linguistic proficiency is not a mere formality but a necessity dictated by the International Maritime Organization (IMO) and the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) (Christodoulou-Varotsi & Pentsov, 2008; Organization, 2009).

This research recognizes the pressing need to comprehend the perspectives of cadets in their transformative journey towards becoming maritime professionals. Beyond academic considerations, the study extends its purview to include a nuanced understanding of self-checked intelligence, professional competences, motivations, and other influencing factors (Breines & Chen, 2012; Manuel, 2017). The 240 cadets selected for this research represent a diverse cohort whose experiences will provide valuable insights into the intricacies of preparing for a career in the maritime industry amidst the challenges of digitalization (Sanchez-Gonzalez et al., 2019). A brief exploration of the existing literature reveals a growing discourse on the impact of digitalization in the maritime sector. The maritime industry, once characterized by traditional practices deeply rooted in manual navigation and communication, is undergoing a paradigm shift. Digital technologies such as the Internet of Things (IoT),

artificial intelligence, and automation are redefining the operational landscape of ships and port management (Plaza-Hernández et al., 2021).

In the maritime education domain, there is a discernible trend towards integrating digital competencies into the curriculum. The rationale behind this shift is grounded in the acknowledgment that future maritime professionals must be technologically adept to navigate the demands of a modern maritime environment (Neilson & Rossiter, 2013; Rochwulaningsih et al., 2019). The literature underscores the necessity for a holistic approach that combines traditional maritime skills with digital literacy. Moreover, the linguistic dimension emerges as a crucial factor in the literature. English proficiency is identified as a cornerstone for effective communication in the international maritime context. The language of instruction, documentation, and communication in the maritime industry is predominantly English, reflecting the global nature of maritime operations. As such, the literature emphasizes the importance of linguistic competence, aligning with the standards set by IMO and STCW (Organization, 2009; Trenkner, 2009).

The existing literature underscores the dynamic nature of the maritime industry, necessitating a re-evaluation of educational approaches. This research aims to contribute to this discourse by offering a nuanced understanding of how cadets at STIP Jakarta perceive and navigate the digitalization challenges in their maritime education, with a specific focus on the role of English literacy.

RESEARCH METHOD

This research adopts a qualitative descriptive approach to comprehensively explore the perspectives of 240 cadets at the Maritime Institute Jakarta (STIP Jakarta) regarding the integration of digitalization challenges in their maritime education. Given the nature of the study, the researcher adopts a hands-on approach, immersing themselves in academic papers, relevant literature, and observable phenomena within the educational setting (Darlington & Scott, 2020). Unlike traditional interview-based methodologies, this research leverages cadet self-reflection through carefully designed survey instruments (Christodoulou-Varotsi & Pentsov, 2008). The qualitative descriptive design is chosen to capture the richness and depth of the cadets' experiences without imposing preconceived categories or theoretical frameworks. This approach allows for an in-depth exploration of the integration of digitalization challenges by providing a holistic view of the cadets' perspectives, motivations, and self-checked intelligence. It aligns seamlessly with the exploratory nature of the research, offering flexibility to adapt to the evolving dynamics of the maritime education landscape (Christodoulou-Varotsi

& Pentsov, 2008; Dyagileva et al., 2020). The primary data collection method involves the distribution of structured surveys to the 240 cadets randomly selected for the study. The survey instruments are meticulously crafted to encompass various dimensions, including academic preparedness, mental readiness, vocational and professional competences, motivations, and perspectives on the challenges posed by digitalization. Cadets are encouraged to provide detailed responses, offering insights into their subjective experiences. While the study refrains from conducting traditional interviews, it strategically incorporates open-ended questions within the survey (Hamza et al., 2016). These questions are designed to elicit nuanced responses, allowing cadets to articulate their thoughts, reflections, and personal experiences related to the integration of digitalization challenges. The absence of direct interviews minimizes potential biases and ensures that the cadets' perspectives are captured authentically.

The collected data undergoes a rigorous qualitative analysis employing thematic coding. Themes are derived from recurring patterns, insights, and perspectives emerging from the cadets' responses. The researcher systematically organizes the data into meaningful categories, enabling the identification of overarching trends and nuanced variations in the perspectives of the cadets. To enhance the credibility and validity of the findings, triangulation is employed by cross-referencing survey responses with existing literature and observable phenomena within the maritime education context. This iterative process ensures a comprehensive and nuanced understanding of the cadets' experiences, allowing for a robust exploration of the research objectives (Manuel, 2017).

Ethical considerations play a paramount role in this research. The cadets' voluntary participation is ensured through informed consent, emphasizing the voluntary nature of their involvement. Confidentiality is maintained to safeguard the identity of the participants, and the collected data is handled with the utmost sensitivity and privacy. In summary, this research method embraces a qualitative descriptive approach, leveraging survey instruments to navigate the perspectives of cadets at STIP Jakarta regarding the integration of digitalization challenges in their maritime education. The methodological design ensures a robust and ethical exploration of the cadets' experiences while contributing valuable insights to the discourse on maritime education in the digital era.

RESULTS AND DISCUSSIONS

Results

The exploration into the integration of digitalization challenges in the maritime education of 240 cadets at the Maritime Institute Jakarta (STIP Jakarta) has yielded multifaceted insights. The survey instruments, strategically designed to encompass various dimensions, provided a comprehensive view of the cadets' perspectives, motivations, and self-assessed competences in the face of digital challenges. The results, presented below, are organized thematically for clarity and coherence. The academic dimension reveals a notable awareness among cadets regarding the significance of digital competencies in their maritime education. When asked about their preparedness for digital challenges, 78% of the respondents acknowledged the importance of integrating digital skills into their coursework. However, only 45% expressed confidence in their current level of preparedness. This dissonance suggests a recognition of the importance of digital skills but a perceived gap in their acquisition.

Table 1: Cadets' Perception of Academic Preparedness

Categories	Percentage
Importance of Digital Skills	78%
Confidence in Current Preparedness	45%

Professional Competences:

In the realm of professional competences, the findings indicate a positive correlation between perceived digital proficiency and overall professional preparedness. Cadets who reported a high level of confidence in their digital skills also exhibited greater confidence in their readiness for professional challenges in the maritime sector. This alignment suggests that cadets recognize the intrinsic link between digital literacy and their future roles as maritime specialists.

Table 2: Correlation between Digital Proficiency and Professional Competences

Digital Proficiency Level	High Confidence in Professional Competences (%)	Moderate Confidence in Professional Competences (%)	Low Confidence in Professional Competences (%)
High	72%	20%	8%
Moderate	42%	48%	10%
Low	15%	35%	50%

Motivations and Self-checked Intelligence:

Exploring the motivations behind cadets' pursuit of digital competencies unveils a diverse range of driving factors. The majority (64%) expressed a motivation rooted in the anticipation of enhanced employability, citing the industry's increasing reliance on digital technologies.

Another noteworthy motivation, articulated by 28% of the respondents, is the desire for personal development and adaptability in the evolving maritime landscape.

However, the self-checked intelligence aspect reveals a noteworthy discrepancy. While 80% of cadets believe in the importance of assessing their own intelligence and competences, only 35% engage in regular self-checks. This indicates a potential gap between awareness and action in terms of self-assessment, pointing towards an area that could be targeted for intervention and support.

Table 3: Motivations and Self-checked Intelligence

Motivations	Percentage
Employability and Industry Demand	64%
Personal Development and Adaptability	28%
Engagement in Regular Self-checked Intelligence	**Percentage**
Yes	35%
No	65%

Perspectives on Digital Challenges:

When asked about their perspectives on the challenges posed by digitalization, a nuanced spectrum of responses emerged. While 52% acknowledged the transformative potential of digital technologies in enhancing efficiency and safety in maritime operations, 38% expressed concerns about potential job displacement due to automation.

Table 4: Cadets' Perspectives on Digital Challenges

Positive Perspectives on Digitalization (%)	Concerns about Job Displacement due to Automation (%)
52%	38%

Integration of English Literacy:

Given the international nature of maritime operations, the integration of English literacy emerges as a crucial aspect of the research. The findings reveal a notable alignment between cadets' perceived importance of English proficiency and their recognition of its centrality in international maritime communication. A significant 82% of cadets emphasized the importance of mastering English communication in their future roles.

Table 5: Importance of English Literacy in Maritime Education

Importance of English Literacy (%)
82%

Overall Reflections:

In synthesizing the findings, it becomes evident that while cadets recognise the pivotal role of digital competencies in the maritime sector, there exists a nuanced interplay of confidence, motivations, and perspectives. The positive correlation between perceived digital proficiency and professional competences signifies a growing cognizance of the integral connection between traditional maritime skills and digital literacy. However, the research also unveils areas of concern, such as the perceived gap in academic preparedness and the potential disparity between the importance attached to self-checked intelligence and its actual practice.

Implications and Recommendations

The results offer valuable implications for the Maritime Institute Jakarta (STIP Jakarta) and similar institutions seeking to enhance their curriculum in response to digitalization challenges. Firstly, there is a need for a targeted approach to bridge the gap between the recognized importance of digital skills and cadets' perceived preparedness. This could involve the integration of practical modules and simulation exercises focused on digital applications in maritime operations. Secondly, the findings highlight the significance of English literacy in maritime education. Institutions may consider incorporating language proficiency programs tailored to the specific needs of maritime professionals, ensuring that cadets are not only proficient in their technical skills but also adept in international communication. Lastly, interventions promoting regular self-checked intelligence assessments could enhance cadets' self-awareness and facilitate a more proactive approach to personal and professional development.

This research offers a panoramic view of cadets' perspectives on the integration of digitalization challenges in maritime education. The nuanced findings provide a foundation for informed decision-making, curriculum enhancement, and interventions that align with the evolving demands of the maritime industry in the digital era.

Discussions

Integration of Digital Competencies

The research findings illuminate the evolving landscape of maritime education, where the integration of digital competencies is both acknowledged and perceived as a pivotal aspect of cadets' preparedness for future professional roles. The dissonance between the perceived importance of digital skills (78%) and the confidence in their current preparedness (45%) underscores the need for a targeted approach in curriculum design. Implications of this misalignment suggest potential gaps in the delivery of digital education or a need for more practical, hands-on experiences in navigating digital tools and technologies. Maritime

institutions, including the Maritime Institute Jakarta (STIP Jakarta), could benefit from re-evaluating and enhancing their curriculum to ensure cadets receive comprehensive exposure to digital competencies relevant to their future roles.

Correlation between Digital Proficiency and Professional Competences

The positive correlation between cadets' perceived digital proficiency and their confidence in professional competences reveals an essential insight. Cadets who feel more confident in their digital skills also express greater assurance in their readiness for professional challenges in the maritime sector. This correlation substantiates the growing recognition within the industry that digital literacy is not an isolated skill but an integral component of overall professional competence. The Maritime Institute Jakarta and similar institutions should leverage this correlation to design integrated educational modules that weave digital literacy seamlessly into the fabric of traditional maritime education. This holistic approach aligns with the demands of the contemporary maritime industry, where professionals are expected to seamlessly navigate both physical and digital aspects of their roles.

Motivations and Self-checked Intelligence

The motivations driving cadets to pursue digital competencies showcase a blend of pragmatic considerations and personal aspirations. The predominant motivation, rooted in the anticipation of enhanced employability (64%), aligns with the industry's increasing reliance on digital technologies. This underscores cadets' awareness of the evolving nature of their future workplace and the need to stay competitive.

However, the self-checked intelligence aspect reveals an intriguing gap between awareness and action. While 80% acknowledge the importance of regularly assessing their own intelligence and competences, only 35% engage in this practice. This gap indicates a potential area for intervention, such as incorporating structured self-assessment mechanisms into the educational process. Maritime institutions should encourage and facilitate regular self-reflection to foster a proactive approach to personal and professional development among cadets.

Perspectives on Digital Challenges

The nuanced perspectives on digital challenges among cadets reflect the dynamic nature of the maritime industry's evolution. While a majority (52%) acknowledges the transformative potential of digital technologies in enhancing efficiency and safety, a substantial portion (38%) expresses concerns about potential job displacement due to automation. This duality in perspectives highlights the need for a balanced approach in preparing cadets for the digital future.

Maritime institutions must address these concerns through comprehensive education that not only imparts digital skills but also contextualizes the role of technology in enhancing rather than replacing human capabilities. This can be achieved through fostering a culture of continuous learning, emphasizing adaptability, and instilling confidence in cadets to navigate the evolving landscape of maritime operations.

Integration of English Literacy

The research underscores the paramount importance of English literacy in the context of international maritime communication. An overwhelming majority of cadets (82%) recognize the significance of mastering English communication in their future roles. This aligns with the standards set by the International Maritime Organization (IMO) and the Standards of Training, Certification and Watchkeeping for Seafarers (STCW), emphasizing English as the primary language of maritime communication.

Maritime institutions, including STIP Jakarta, should consider this finding as a call to further enhance English literacy programs. Tailored language proficiency courses can be integrated into the curriculum to ensure that cadets not only excel in their technical skills but are also adept in effective communication on an international stage.

Implications and Recommendations

The research findings have profound implications for maritime institutions, educators, and policymakers involved in shaping the future of maritime education. Firstly, there is a clear imperative to bridge the gap between the recognized importance of digital skills and the perceived preparedness of cadets. Institutions should consider revisiting and restructuring their curriculum to incorporate practical, hands-on experiences that align with the digital demands of the maritime industry. Secondly, the positive correlation between digital proficiency and overall professional competences should guide the development of integrated educational modules. These modules should seamlessly incorporate digital literacy into the broader framework of maritime education, emphasizing the interconnectedness of traditional and digital skill sets.

Thirdly, the motivations driving cadets to pursue digital competencies highlight the pragmatic nature of their aspirations. Institutions should leverage these motivations by offering targeted programs, workshops, or certifications that enhance employability and align with industry trends. Fourthly, the gap between the acknowledgment of the importance of self-checked intelligence and its actual practice calls for interventions promoting regular self-assessment. Institutions can integrate structured self-assessment mechanisms into their educational processes, fostering a culture of continuous improvement and self-awareness.

Fifthly, the nuanced perspectives on digital challenges underline the importance of a balanced approach in educational programs. Institutions should address concerns about job displacement through education that not only imparts technical skills but also instils confidence, adaptability, and a proactive mindset among cadets. Lastly, the recognition of English literacy as a critical component of maritime education necessitates the enhancement of language proficiency programs. Maritime institutions should invest in tailored courses that ensure cadets are not only technically proficient but also effective communicators on the global stage.

The implications and recommendations drawn from this research provide a roadmap for maritime institutions to navigate the crossroads of maritime education and digitalization. By addressing the identified gaps and leveraging the positive correlations, institutions can empower cadets to meet the challenges of the digital era with confidence, competence, and adaptability.

CONCLUSION

In the culmination of this research journey into the integration of digitalization challenges in maritime education, a nuanced portrait has emerged, illuminating the intricate dynamics shaping the future maritime specialists at the Maritime Institute Jakarta (STIP Jakarta). The convergence of perspectives, motivations, and self-checked intelligence among the 240 cadets offers profound insights into the transformative journey these individuals undertake as they navigate the ever-evolving landscape of the maritime industry. The dissonance observed between the recognized importance of digital competencies and the cadets' confidence in their preparedness underscores the imperative for strategic interventions in curriculum design. Maritime institutions, including STIP Jakarta, are poised at a critical juncture, tasked with recalibrating their educational frameworks to seamlessly integrate traditional maritime skills with the imperative digital literacy demanded by the contemporary industry.

The positive correlation between digital proficiency and overall professional competences stands as a beacon guiding the way forward. This correlation unveils a symbiotic relationship between the mastery of digital tools and the holistic readiness of cadets for their forthcoming roles. The integration of digital literacy into the broader fabric of maritime education is not merely a technological upgrade; it is an indispensable facet that shapes competent, confident, and adaptive maritime professionals. Motivations driving cadets towards digital competencies paint a pragmatic and forward-looking narrative. The anticipation of enhanced employability and personal development underscores a keen awareness of the

dynamic nature of the maritime workplace. Institutions can leverage these motivations to tailor programs that resonate with the aspirations of cadets, fostering a sense of purpose and relevance in their educational journey.

However, the research also spotlights a potential gap in the practical application of self-checked intelligence. While cadets overwhelmingly acknowledge its importance, the actual engagement in regular self-assessment practices remains limited. This observation presents an opportunity for institutions to cultivate a culture of introspection and continuous improvement, encouraging cadets to proactively assess and enhance their competencies. The nuanced perspectives on digital challenges, encompassing both optimism and concerns, highlight the need for a balanced educational approach. Institutions must not only equip cadets with technical skills but also instil the resilience and adaptability needed to thrive in an industry undergoing profound technological transformations.

Finally, the resounding importance of English literacy as a cornerstone for effective communication in the international maritime context underscores the global nature of the profession. Maritime institutions are urged to further elevate language proficiency programs, ensuring that cadets are not only proficient in the technical language of their discipline but are also eloquent communicators on the international stage. In conclusion, this research not only unveils the intricate tapestry of perspectives within the maritime education domain but also serves as a compass directing institutions towards a future where maritime professionals seamlessly navigate the challenges of the digital era. As STIP Jakarta and similar institutions chart their course, they are entrusted with the responsibility to harness these insights, shaping a generation of maritime specialists ready to not only sail the seas but also navigate the digital horizons that lie ahead.

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