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Navigating Challenges: Survival Techniques among Maritime Students

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ABSTRACT

This study examined the learning outcomes of third-year Maritime students from the University of the Visayas in selected survival techniques, using Bloom's Taxonomy as the primary evaluative framework. Through a quantitative-descriptive design, data were gathered from 249 students using a researcher-developed, reliability-tested questionnaire. The findings reveal a consistent pattern across survival tasks: students perform strongly in foundational cognitive levels such as knowledge and comprehension, yet their scores decline in tasks requiring application and evaluation. Practical competencies especially donning life jackets and operating lifeboats emerged as areas of difficulty. Conversely, higher scores were noted in synthesis and evaluation for emergency provisions and water survival, suggesting varying levels of mastery across topics. Overall, the study highlights the need for more practice-oriented and simulation-based training to reinforce higher-order cognitive skills in maritime survival education.

1. Introduction.

Survival skills are a cornerstone of maritime education, forming the essential foundation that future seafarers rely on when navigating emergencies at sea. These competencies ranging from water survival and flotation techniques to lifeboat operations and emergency decision-making are not only mandated by international bodies but are also vital for building confidence and preparedness among trainees. The International Maritime Organization (IMO) and the Standards of Training, Certification and Watchkeeping (STCW) emphasize that seafarers must undergo structured, hands-on survival training to ensure readiness for real-world maritime hazards.

In recent years, researchers have drawn increased attention to the importance of structured water survival training. Repalda (2025) found that swimming competence, flotation device use, and water entry drills significantly improve students' confidence, independence, and emergency preparedness. Supplemental techniques such as ship jumps, clothing-based flotation, and endurance swimming also contribute to stronger hazard responses, as highlighted by Downey (2021). These findings suggest that survival preparedness extends beyond technical skill to include psychological readiness and comfort in dynamic water environments.

Beyond water survival, maritime safety training encompasses first aid, firefighting, abandon-ship leadership, and teamwork under high-stress conditions. Han (2017) reported that hands-on and problem-based training in these areas improves knowledge retention and enhances emergency leadership, particularly when simulations mirror realistic sea conditions. This aligns with the broader shift toward experiential and problem-based learning in maritime education, as Walliser et al. (2016) emphasized that PBL methods cultivate critical thinking, situational judgment, and collaborative problem-solving skills essential during emergencies.

Survival competence also relies heavily on communication, emotional resilience, and the ability to function under pressure. Chiong (2023) noted that maritime training nurtures stress management, decision-making, and personal responsibility, alongside the crucial role of English proficiency in ensuring clear communication during emergencies. This underscores that survival training is both cognitive and behavioral, preparing students to coordinate effectively with diverse crews.

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Educational frameworks such as Bloom's Taxonomy remain highly relevant in evaluating how well students acquire and demonstrate these competencies. By categorizing learning into knowledge, comprehension, application, analysis, synthesis, and evaluation, it becomes possible to identify where students excel and where gaps persist. Prior studies consistently show that while maritime learners often perform well in knowledge-based tasks, they struggle with higher-order skills involving application and evaluation particularly in time-critical survival scenarios.

Given these considerations, the present study assesses the performance of third-year maritime students in various survival techniques through the lens of Bloom's Taxonomy. By examining both foundational knowledge and practical execution, this research aims to provide insights that can strengthen maritime training programs and better align them with international safety standards such as STCW and SOLAS. Understanding these learning patterns is essential for producing seafarers who are not only technically competent but also capable of making sound decisions in life-threatening conditions.

2. Research Objectives.

This study aims to evaluate the learning outcomes of third-year maritime students in selected survival techniques using Bloom's Taxonomy. Specifically, it seeks to:

1. determined the students' cognitive performance (Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation) in each survival technique using frequency and percentage distributions.
2. Recommend instructional and training strategies aligned with STCW standards to strengthen students' mastery of survival competencies.

3. Literature Review.

3.1. Importance of Survival Techniques in Maritime Education.

Survival techniques are fundamental to maritime education, ensuring that seafarers are prepared to respond effectively to emergencies at sea. According to the International Maritime Organization (IMO, 2023), survival training including life jacket donning, lifeboat operations, abandon-ship procedures, and emergency provisions is essential for both personal safety and crew coordination. Structured programs ensure that maritime graduates possess the practical skills, confidence, and decision - making abilities necessary for handling real-life emergencies.

3.2. Cognitive Skills and Bloom's Taxonomy.

Bloom's Taxonomy provides a structured framework to assess learning outcomes across six cognitive domains: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (Swart & Danete, 2019). In maritime education, this framework helps instructors evaluate not only theoretical understanding but also practical competence. Kim et al. (2021) emphasize the need to cultivate higher-order cognitive skills, ensuring that students can apply procedures, analyze situations, and make critical decisions in emergency scenarios.

3.3. Bridging Theory and Practice.

Despite extensive theoretical training, students often struggle to translate knowledge into effective practice. Slocum and Bohrer (2021) found that while students could explain emergency procedures, their execution under simulated stress was often suboptimal. Similarly, Baldauf et al. (2016) observed that students could describe protocols accurately but faced difficulties performing tasks in high-pressure conditions. Skurka et al. (2018) also highlighted a disparity between confidence in procedural knowledge and the ability to evaluate or perform tasks in emergencies. These findings suggest the need for instructional strategies that combine theory with experiential learning.

3.4. Experiential and Simulation-Based Learning.

Experiential learning has been shown to bridge the gap between theory and practice. Nurmatova and Altun (2023) argue that hands-on exercises and reflective practice are critical for developing practical skills. Zenios (2020) emphasizes applying knowledge in realistic, controlled environments to foster critical thinking and decision-making. Simulation-based training, including virtual reality and lifeboat simulations, allows students to experience emergencies safely, developing higher-order cognitive skills such as analysis, synthesis, and evaluation (Hwang et al., 2022; Voloshynov et al., 2022; Türkistanlı, 2023).

3.5. Water Survival and Specialized Skills Development.

Structured water survival training comprising swimming, flotation device use, and rescue drills enhances students' confidence, independence, and preparedness (Repalda, 2025). Supplemental exercises such as ship jumps and clothing-based flotation techniques further improve readiness (Downey, 2021). Survival training also includes first aid, firefighting, abandon-ship procedures, and leadership development, with hands - on and problem - based learning methods improving both knowledge retention and leadership competencies (Han, 2017; Walliser et al., 2016).

Moreover, programs target stress management, decision - making, and teamwork under pressure, while emphasizing English proficiency to ensure effective emergency communication (Chiong, 2023). Self-defense training is increasingly incorporated to address modern threats like piracy and illegal acts (Godlevsky & Saratovskiy, 2021). Interactive, application - focused instruction aligned with STCW and SOLAS standards builds self-efficacy and hazard response capabilities, preparing graduates to respond effectively to onboard hazards (Wu et al., 2014; Grancharova & Lutzkanova, 2023; S., Widada et al., 2025).

3.6. Trends in Maritime Education.

Recent trends highlight the use of digital technologies, including virtual reality (VR), simulation-based exercises, and blended learning, to enhance skill acquisition and confidence prior to real-life application (Voloshynov et al., 2022; Türkistanlı, 2023). These innovations support the development of practical competencies, critical thinking, problem-solving, and overall preparedness, making graduates more industry-ready (Chiong, 2023).

4. Research Method.

This study employed a quantitative descriptive research design to evaluate the performance of third-year Marine Engineering students in survival techniques. The research was conducted at the University of the Visayas Main Campus, located on Colon Street, Cebu City. A total of 249 third-year Marine Engineering students participated as respondents, selected through convenience sampling due to their accessibility and availability during the study period.

Data were collected using a researcher-developed questionnaire comprising 36 items that addressed various survival techniques relevant to maritime education. The instrument was specifically designed to assess student performance across the six cognitive domains of Bloom's Taxonomy: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.

To ensure the reliability of the instrument, a Cronbach's alpha test was conducted. The resulting coefficient demonstrated that the questionnaire was highly reliable for data collection. Following this, the questionnaire was administered to the participants under supervised conditions.

Collected data were analyzed using descriptive statistical techniques, including frequency and percentage distributions, to provide a comprehensive overview of students' performance across the different cognitive domains. This approach allowed for a clear assessment of both strengths and areas for improvement in students' mastery of survival techniques.

5. Results and Discussion.

RO1. Determined the students' cognitive performance (Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation) in each survival technique using frequency and percentage distributions.

Table 1: Frequency and percentage of respondents' learning based on Bloom's Taxonomy.

BLOOM'S TAXONOMY LEARNING DOMAIN												
SURVIVAL TECHNIQUES	Knowledge		Comprehension		Application		Analysis		Synthesis		Evaluation	
Frequency and Percentage	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Donning of the Lifejacket	227	91.16	139	55.82	55	22.09	129	51.80	62	24.90	200	80.32
Lifeboat Operations	90	36.14	141	56.63	83	33.33	166	66.67	119	47.80	117	46.99
Abandon ship Procedures	145	58.23	91	36.55	79	31.73	120	48.19	96	38.55	66	26.51
Emergency Provisions	60	24.10	127	51	84	33.73	127	51	154	61.85	106	42.57
What to do on Water	138	55.42	172	69.08	152	61.04	118	47.39	112	44.98	68	27.31
How to Avoid Hypothermia	99	39.76	124	49.80	124	49.80	142	57.03	112	44.98	157	63.05

Source: Authors.

The results of the study reveal distinct patterns in students' mastery of survival techniques across the cognitive domains of Bloom's Taxonomy, and these patterns align closely with existing maritime safety literature. Students exhibited very high knowledge in basic tasks such as donning a lifejacket (91.16%), demonstrating familiarity with essential procedures; however, their performance dropped considerably when required to execute these steps, with application reaching only 22.09%. This gap between knowing and performing reflects Repalda's (2025) findings that structured water survival training significantly enhances both confidence and practical execution implying that while students grasp theoretical procedures, they need more experiential and repetitive training to translate knowledge into confident action. Similarly, lifeboat operations reflected low knowledge (36.14%) and application (33.33%) despite students performing relatively well in analysis (66.67%), suggesting that they can interpret scenarios but lack hands-on readiness. This is consistent with Downey (2021), who emphasized that STCW-aligned training demands not just theoretical understanding but active skill practice through ship jumps, flotation drills, and basic swimming evaluation to ensure genuine preparedness.

In abandon - ship procedures, the moderate (58.23%) knowledge but low comprehension and application suggest limited internalization of emergency responses, which resonates with Han's (2017) argument that hands-on, scenario-based instruction significantly improves emergency response leadership and retention of life-saving procedures. The unexpectedly strong performance in higher-order domains for emergency provisions particularly synthesis (61.85%) indicates that once guided, students can connect and apply concepts effectively. This outcome echoes Walliser et al. (2016), who highlight the power of problem-based learning in strengthening maritime students' ability to integrate safety knowledge and make reasoned decisions during complex situations.

Students also performed relatively well in foundational water survival tasks, with high comprehension (69.08%) and application (61.04%), yet evaluation remained low (27.31%), revealing difficulty making real-time judgments under pressure. This aligns with Chiong's (2023) findings that maritime training develops critical thinking, stress management, and teamwork only when trainees engage in realistic, high-pressure simulations that mirror authentic emergency environments. Hypothermia prevention emerged as the most balanced area, with moderate to high cognitive performance across all domains. This suggests that students are capable of making informed decisions about cold-water survival, which reflects STCW and SOLAS training standards emphasizing the integration of hazard awareness, leadership, and decision-making in survival education (Wu et al., 2014; Widada et al., 2025).

Furthermore, while students possess adequate theoretical knowledge, they need more practice-based, simulation-heavy and application-focused instruction to strengthen higher-order survival skills. This implication aligns with recent advancements in maritime education where VR simulations, blended learning and realistic drills significantly enhance lifeboat launching, emergency evacuation and life-saving appliance operation (Voloshynov et al., 2022; Türkistanlı, 2023). evidence shows that practical skill acquisition directly correlates with self - reported preparedness and confidence in emergency situations- (Chiong, 2023). Findings of this study reinforce the global call for more immersive, STCW-aligned maritime survival training that moves beyond memorization toward authentic performance, decision-making and hazard response capabilities.

RO2. Recommend instructional and training strategies aligned with STCW standards to strengthen students' mastery of survival competencies.

To strengthen students' mastery of survival competencies, maritime training institutions should adopt instructional strategies that are explicitly grounded in the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) while embracing modern, learner - centered approaches. Evidence shows that students develop stronger water survival and emergency - response competence when exposed to structured, skills-based training such as swimming drills, flotation device handling, ship-jump simulations, and clothing-based buoyancy exercises, all of which build confidence and practical readiness (Repalda, 2025; Downey, 2021). Incorporating hands-on, problem - based learning in first aid, firefighting, abandon-ship procedures, and emergency leadership fosters deeper understanding, faster recall, and more adaptive thinking during crises, aligning closely with STCW's emphasis on practical proficiency and hazard response (Han, 2017; Walliser et al., 2016). Additionally, integrating simulation-based and VR-enhanced training enables students to practice lifeboat launching, life raft operation, evacuation sequences, and emergency decision-making in realistic yet controlled environments, reducing risk while maximizing exposure to authentic scenarios (Voloshynov et al., 2022; Türkistanlı, 2023). Training programs should also reinforce critical soft skills such as communication, teamwork, and stress management since STCW competencies depend not only on technical mastery but also on the ability to remain composed and collaborative under pressure (Chiong, 2023). Furthermore, embedding safety cultures through repeated drills, reflective debriefings, and language proficiency development, particularly in English, enhances students' capacity to interpret instructions accurately and perform effectively during emergencies.

Conclusions.

The findings of this study indicate that third-year maritime students at the University of the Visayas exhibit strong performance in the Knowledge domain of Bloom's Taxonomy but show uneven achievement across higher-order cognitive skills, including Application, Analysis, Synthesis, and Evaluation. In particular, students demonstrated proficiency in recalling survival procedures such as donning life jackets and understanding emergency provisions; however, they encountered challenges when applying these procedures in practical or simulated contexts, such as lifeboat operations and abandon-ship drills. This gap underscores the difficulty of translating theoretical knowledge into effective real-world performance, echoing prior research that emphasizes the disparity between cognitive understanding and practical competence in maritime education (Slocum & Bohrer, 2021; Baldauf et al., 2016; Skurka et al., 2018).

These results highlight the critical need for experiential and simulation-based learning strategies that bridge theory and practice. Structured water survival training including swimming, flotation device use, and rescue drills has been shown to enhance confidence, independence, and emergency preparedness among maritime students (Repalda, 2025; Downey, 2021). Similarly, problem-based and hands-on exercises, such as shipboard fire-fighting and abandon-ship procedures, foster knowledge retention, leadership, and decision-making skills (Han, 2017; Walliser et al., 2016). Incorporating these approaches, alongside modern innovations such as virtual reality simulations (Voloshynov et al., 2022; Türkistanlı, 2023), can provide students with risk-free environments to practice emergency responses, develop critical thinking, and strengthen higher-order cognitive skills.

Faculty development also plays a pivotal role in enhancing student outcomes. Training instructors in active learning methodologies, formative assessment, and application-focused pedagogy can facilitate the cultivation of practical competencies, critical thinking, and problem-solving skills (Chiong, 2023; Zenios, 2020). Moreover, fostering effective communication, stress management, and teamwork under pressure prepares students to respond competently in high-stakes maritime scenarios, aligning with STCW and SOLAS standards (Wu et al., 2014; Grancharova & Lutzkanova, 2023; S., Widada et al., 2025).

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