

У статті увагу зацентовано на трьох лексичних одиницях, продемонстровано способи їхнього запам'ятовування – базові вправи для всіх рівнів здобувачів, обговорення цитат, обговорення лінгвокультурного компоненту тощо.

Подальший аналіз лексичного аспекту інших сцен автентичного кінофільму «Корона» та створення окремих комунікативних вправ допоможе вдосконалити роботу над формуванням комунікативної компетенції здобувачів вищих навчальних закладів із метою розширення культурного та мовного світогляду здобувачів.

Ключові слова: педагогічні умови, предметно-мовне інтегроване навчання, кінодискурс, лінгвопрагматичні особливості, лінгводидактичні властивості, «Корона», комунікативна компетентність, розширення вокабуляру, лінгвокультурний світогляд.

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Рецензент: доктор педагогічних наук, доцент Рябуха І. М.

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Litikova O. I.\*

[orcid.org/0000-0001-7952-9895](https://orcid.org/0000-0001-7952-9895)

## INTEGRATION OF HARD AND SOFT SKILLS AS A TOOL FOR DEVELOPING CRITICAL THINKING IN MARINE ENGINEERS

*The article examines the problem of fostering critical thinking of marine mechanics, employed at the international fleet, in the process of their practical training in Maritime English. The opportuneness of critical thinking development in the process of learning Maritime English is substantiated due to the serious challenges. Technological progress, environmental problems, economic pressure, geopolitical shifts, ecological maintenance of ship power plants require advanced critical thinking skills. Willingness to use professional knowledge and team interaction skills for critical analysis of challenges, ability to assess causal relationships are crucial in preventing unpredictable and catastrophic situations on ships. The ability to think critically and make effective decisions depends on the level of hard and soft skills development. Hard skills refer to the technical knowledge and experience needed to solve real-world engineering problems. Soft skills, such as communication, teamwork, problem solving and adaptability guarantee the success of teamwork in extreme conditions. Critical thinking involves the ability to make informed decisions about complex problems and collaborate with others to solve them. The purpose of the article is to analyze the feasibility of integrating hard and soft skills for the effective development of critical thinking. The tasks are: 1) to substantiate rational methods of integration of hard and soft skills in the process of learning Maritime English; 2) track the impact of hard and soft skills integration on the development of critical thinking of marine mechanics. The methods used in the research include analysis of scientific literature, observation, survey, self-assessment, expert assessment, questionnaire, interpretation, generalization.*

*Key words: marine engineers, hard skills, soft skills, critical thinking, Maritime English.*

**The statement of the issue.** The marine engineering cluster faces challenges shaped by technological advances, environmental concerns, economic pressures, and geopolitical factors. Compliance with stringent International Maritime Organization (IMO) emissions regulations and sustainable ship design requirements add to the burden. Innovations in green shipbuilding, recycling methods, and integrating advanced technologies like IoT and big data are essential for efficiency and safety but pose challenges related to costs, cybersecurity, and skilled personnel.

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A 2018 study by the London P&I Club identified key causes of engine failures: lack of maintenance (29 %), human error (24 %), loss of control (24 %), fire (17 %), and others (6 %). Addressing these issues requires future marine engineers to combine technical expertise with critical thinking to analyze challenges, foresee risks, and make informed decisions.

Developing critical thinking involves systematically evaluating information to choose the best course of action, supported by training in hard and soft skills, practical experience, and real-world exposure. These skills are essential for equipping marine engineers to thrive in the dynamic and unpredictable maritime environment.

**The analysis of relevant research.** Scholars define hard skills as technical or practical abilities related to equipment use for specific jobs, yielding measurable outcomes [5; 6; 8]. In the marine mechanical field, these skills are essential for ship mechanics to proficiently operate machinery and electrical systems while adhering to safety and environmental standards. They ensure effective maintenance, repair, and modernization of vessels in line with Green Deal requirements. Key hard skills for maritime engineers are detailed in IMO Convention STCW 1978/95 Tables III/1, III/2, III/3, and IMO Model Courses 7.02, 7.4, and 7.09.

Most of them give preference to soft skills over hard skills in the professional training of marine mechanics, saying that hard skills become obsolete more quickly than soft skills [2; 10].

First time soft skills were remarkably interpreted by Paul G. Whitmore, during a training conference in Texas for the US Army Continental Army Command (CONARC) as crucial job-related skills that involve little or no interaction with machines [7]. Comparing them with hard skills, some scholars find soft skills to be non-technical abilities that are harder to measure and quantify [1; 4].

Different scholars refer to soft skills social competencies as ability to interact and collaborate, efficient communication, teamwork, adaptability, and cultural awareness [9], interpersonal skills, even emotional intelligence, empathy, conflict resolution, and negotiation [12].

Being cross-disciplinary skills, soft skills have the same set of tools in marine engineering as well. Well-developed skills of communication, teamwork, adaptability, emotional intelligence, leadership, conflict resolution, and time management directly enhance the critical thinking abilities of marine engineers. These skills enable marine engineers to approach problems more effectively, collaborate with others, and make well-rounded, informed decisions in the complex and highly challenged environment of the maritime industry.

**The purpose of the article.** Finalizing the relevance of the topic chosen for this research, we assume that the purpose of the article will be to analyze the feasibility of integrating soft and hard skills for more effective development of critical thinking of marine engineers.

The following **tasks** are aimed: 1) to justify rational methods of hard and soft skills integration in the process of Maritime English learning; 2) to track the influence of hard and soft skills integration in the process of learning Maritime English on the development of critical thinking of marine engineers. The **methods** applied in this research include analysis of scientific literature, observation, survey, self-assessment, expert assessment, questionnaire, interpretation, generalization.

**The body of the research.** Among the necessary skills of a successful marine engineer are: knowledge of ship systems and mechanisms, mechanical engineering experience, naval architecture skills, knowledge of maritime safety rules, alertness to emergency situations, stress management, teamwork, communication, ability to adaptability, multilingualism, interpersonal skills, analytical thinking, problem solving skills, decision-making skills, critical thinking. The latter should be crucial in many professional situations and occasions, where other skills may not work and this fact has its own explanation.

– As so as marine engineering involves operating complex systems and machinery in dynamic environment, critical thinking enables engineers to assess multiple variables, understand system interactions and make informed decisions to address technical challenges.

- Authorized marine engineers must critically assess safety, risk factors, and emergency response procedures. In this case critical thinking helps in anticipating potential hazards, designing robust safety measures, and making quick decisions during emergencies.
- All marine engineers need to critically interpret and apply regulations to ensure compliance. This includes understanding the implications of regulatory changes, implementing necessary adjustments, and ensuring that engineering practices adhere to legal standards.
- Advances in technology, automation, and digitalization are transforming the maritime and electrical engineering fields and this requires from marine engineers capability to critically evaluate and adapt to new technologies.
- Critical thinking allows engineers to analyze data, identify inefficiencies, and propose improvements. It becomes feasible due to evaluating different approaches, considering trade-offs, and implementing solutions that enhance overall performance.
- The maritime industry is under increasing pressure to adopt environmentally sustainable practices. In this relation, marine engineers need critically evaluate the environmental impact of engineering decisions.
- Marine engineering projects often require collaboration among professionals. In process of their collaboration, they need to think critically, effectively communicate across teams, and integrate varied perspectives.
- Engineers with well-developed critical thinking skills are better equipped to stay updated on industry trends and incorporate new knowledge into their practices.
- The process of communicating complex technical information to various stakeholders, including crew members, regulatory bodies, and project teams is not possible without well-developed critical thinking.

Essentially, well-developed critical thinking skills allow marine engineers to navigate the complexities of their field. Whether dealing with complex technical problems, ensuring safety and compliance, or leveraging technological advances, critical thinking is fundamental to success in marine engineering [11].

The Stanford Encyclopedia of Philosophy defines critical thinking as goal-directed thinking that refines cognitive skills for systematically analyzing, evaluating, and synthesizing information. Among others it outlines the components: observing; feeling; wondering; imagining; inferring; knowledge; experimenting; consulting; identifying and analyzing arguments; judging; deciding [3], - which contribute crucially to thinking critically.

It is a fact that is obvious that the implementation of a multi-stage model of thinking is impossible without a high level of developed hard and soft skills. We can give also robust arguments, why it is highly unlikely to effectively develop critical thinking skills in marine engineers without integrating both soft and hard skills.

– Hard skills, such as knowledge of mechanical systems and ship maintenance, provide the technical context foundation for solving engineering problems. Soft skills like communication, teamwork, and adaptability are equally vital for effective collaboration and addressing complex issues under pressure.

– Critical thinking combines analytical and interpersonal dimensions. Marine engineers must solve technical problems (hard skills) and communicate solutions effectively (soft skills). For example, resolving a propulsion system issue requires explaining risks to non-engineers, highlighting the necessity of soft skills.

– Problem-solving demands collaboration and leadership. In emergencies or high-pressure situations, decision-making relies on leadership and teamwork (soft skills), combined with technical expertise (hard skills). Engineers must work collaboratively to assess diverse data and devise effective solutions.

– Real-world application demands marine engineering be involved in unpredictable challenges like rough seas or remote equipment failures. Technical knowledge (hard skills) and emotional resilience, adaptability, and communication (soft skills) are crucial for ensuring safety and efficiency in such situations.

This integration of hard and soft skills is essential for fostering critical thinking, enabling marine engineers to address real-world problems with a comprehensive and adaptive approach.

To validate these assumptions, specially designed Maritime English exercises were introduced. These tasks simulated real-world scenarios, requiring participants to combine technical problem-solving with interpersonal collaboration, communication, and decision-making under pressure.

Specific instructions for exercises were inscribed and made evident for the students. They included the objective, scenario, and description of hard and soft skills, clearly defined tasks for critical thinking and instruction for exercise execution. Here are the examples of some exercises patterns given to the future marine engineers who were undergoing training during Maritime English classes.

Exercise 1: Training on emergency systems.

*Objective:* to develop problem solving under pressure, teamwork and communication skills. *Scenario:* a simulated engine failure has occurred during a voyage in rough seas, and marine engineers must troubleshoot and repair the system within a limited time. At the same time, they need to communicate effectively with the captain and other crewmembers. *Hard skills:* engine and power plant understanding (knowledge of target SMCP and professional terminology, required grammar patterns, knowledge of mechanical faults and repair procedures. *Soft skills:* 1) communication: marine engineers should explain the technical problem and progress to the captain and other departments. 2) teamwork: collaboration with other engineers and technicians is critical. 3) leadership: allocation of roles, prioritization of tasks and management of resources under pressure. *Tasks for critical thinking:* 1) diagnose the problem under time constraints; 2) prioritize tasks to prevent further damage or risk to the crew; 3) make quick, informed decisions about the best course of action. *Exercise execution:* 1) set up a simulator or virtual system where different alarms are triggered, leading to different points of failure; 2) engineers must decide whether to prioritize quick fixes or work on root causes; 3) conduct a post-exercise debriefing to discuss decision-making, communication gaps, and technical choices.

Exercise 2: Communication and decision making in crisis situations.

*Objective:* to improve communication and decision making in stressful situations. *Scenario:* during a voyage, a fire breaks out in the engine room. The engineers need to act quickly to contain the situation, providing clear and concise updates to the captain and rescuers. *Hard skills:* knowledge of target SMCP and professional terminology, required grammar patterns, knowledge of fire extinguishing systems, engine room layout, emergency shutdown procedures, safety procedures for fire containment. *Soft Skills:* 1) communicate clearly and effectively in stressful situations, 2) demonstrate decision making for choosing the best course of action in the heat of the moment, 3) managing stress and maintaining concentration. *Tasks for critical thinking:* 1) assessing the severity of the situation (fire containment or evacuation), 2) making informed and quick decisions about shutting down systems or servicing them, 3) coordinating with the rest of the crew to minimize damage and injury. *Exercise execution:* 1) run a live simulation using a virtual machine room, 2) unfold the scenario with unexpected problems that require engineers to make decisions in real time, 3) survey the participating students regarding the decision-making process, communication effectiveness, and technical responses.

Exercise 3: Managing the integration of new technologies.

*Objective:* encourage adaptability and critical assessment of new technologies. *Scenario:* a marine engineering team is tasked to integrate a new energy-saving battery hybrid propulsion system into an existing vessel. They must assess the technical feasibility, financial impact and operational efficiency.

*Hard skills:* 1) knowledge of target SMCP and professional terminology, required grammar patterns, 2) knowledge of new propulsion technologies and energy-saving systems, 3) familiarity with shipboard power systems and integration issues. *Soft Skills:* 1) adaptability:

deal with new, unfamiliar technologies and their implications, 2) negotiation and collaboration: work with technology suppliers, and ship operators, 3) communication: explain the benefits and potential risks to management and crew. *Tasks for critical thinking*: 1) evaluate the potential for long-term savings compared to the initial cost, 2) identify potential technical integration issues and operational risks. *Exercise execution*: 1) provide research with the team and develop a proposal for integrating a new technology, including a cost-benefit analysis and risk assessment, 2) teams should present their findings and recommendations, defend their decisions.

Such types of exercises aim to combine technical and interpersonal challenges in number of real-world marine engineering situations. The integration of both soft and hard skills ensures that marine engineers develop their critical thinking holistically, preparing them for the dynamic challenges they will face in their profession.

To research the validity of our topic we conducted study in a group of 15 students. The pilot study was conducted in the usual teaching format, which is standard for each targeted academic module (working with a textbook, completing tests on the Moodle platform, demonstrating speech competence, etc.), but the final task at the end of each module was devoted to assessing the students' ability to solve professional problems requiring the application of critical thinking based on the integration of both target hard and soft skills.

**Conclusions.** Observation, survey, self-assessment, expert assessment, questionnaire applied helped to make some valuable conclusions from the pilot study conducted.

- The teacher acts as a guide, helping students acquire hard skills, represented by technical Maritime English vocabulary and competencies relevant to marine engineering, communication and safety at sea. Teacher fosters critical thinking by encouraging soft skills, as reflective questioning, peer discussions, and cooperative learning, helping students approach problem solving tasks.

- The role of teacher is more facilitating with an experimental setting. He provides resources and real-world scenarios that encourage students to integrate both hard skills (technical terminology, checklists) and soft skills (communication, teamwork). Teacher encourages students to think critically about language use in different maritime contexts (e.g., during emergencies), fostering the ability to assess and apply knowledge independently.

- Activities have more blended character, so as teachers design exercises where hard skills (like knowledge of target SMCP and professional terminology, required grammar patterns) are combined with soft skills, such as teamwork, leadership, and communication.

- Interactive feedback mechanism is ensured in two possible ways: 1) formative, when the teacher provides immediate feedback on students' problem solving approaches, fostering critical thinking; 2) peer learning, when teacher creates environments where peer feedback is encouraged. This interaction fosters both critical thinking and interpersonal communication, as students must articulate and defend their viewpoints.

- The case study creates the target environment for the situational analysis. Teacher presents real-world maritime situations, requiring students to evaluate these scenarios critically. Such case studies often integrate hard skills and soft skills in process of making quick decisions, working with a team. The teacher scaffolds the discussion, allowing students to explore various perspectives and think critically about the implications.

- Teacher also integrates technology (simulators, online learning platforms, virtual reality tools) to create interactive and dynamic learning environments, fostering collaboration. These tools support the integration of hard and soft skills by requiring students to communicate technical information effectively in a simulated, pressurized environment.

- Teacher assesses both soft and hard skills by evaluating students' ability to reason logically, solve problems, and reflect on their learning. In this context, critical thinking is not only about knowing the correct technical answer but also about evaluating multiple potential solutions and communicating them effectively.

– Learning of Maritime English becomes more focused on contextualized learning by connecting language skills directly with maritime operations. Teacher guides students to analyze the situations critically, weigh options, and make decisions.

In whole, integrating hard and soft skills in Maritime English study not only provides students with the technical vocabulary and procedures necessary for maritime operations but also enhances their ability to think critically in real-world situations. The combination of these skills equips students with a comprehensive skill set that improves decision-making, problem solving, communication, and leadership, all of which are crucial for success in the maritime industry. By fostering the ability to analyze, evaluate, and respond to complex situations, this integration significantly boosts the development of critical thinking.

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Літківа О. І.,

[orcid.org/0000-0001-7952-9895](https://orcid.org/0000-0001-7952-9895)

### ІНТЕГРАЦІЯ ТВЕРДИХ І М'ЯКИХ НАВИЧОК ЯК ІНСТРУМЕНТ ДЛЯ РОЗВИТКУ КРИТИЧНОГО МИСЛЕННЯ МОРСЬКИХ МЕХАНІКІВ

У статті розглядається проблема розвитку критичного мислення морських механіків міжнародного флоту у процесі їх практичної підготовки з морської англійської мови. Обґрунтовується слушність розвитку критичного мислення саме у процесі вивчення морської англійської мови через серйозні виклики, з якими вони стикаються. Технологічний прогрес, екологічні проблеми, економічний тиск, геополітичні зрушення, екологічне обслуговування суднових енергетичних установок вимагають розвинених навичок критичного мислення. Готовність використовувати професійні знання й навички командної взаємодії для критичного аналізу викликів, уміння оцінювати причинно-наслідкові зв'язки уможливорює запобігання непередбачуваним і катастрофічним ситуаціям на судні. Здатність критично мислити та ухвалювати ефективні рішення залежить від рівня розвитку твердих і м'яких навичок. Тверді навички стосуються технічних знань і досвіду, необхідних для вирішення реальних інженерних проблем. М'які навички – спілкування, робота в команді, вирішення проблем, здатність до адаптації – гарантують успішність колективної роботи в екстремальних умовах. Критичне мислення передбачає здатність ухвалювати обґрунтовані рішення щодо складних проблем і співпрацювати з іншими для їх розв'язання. Мета статті полягає в аналізі доцільності інтеграції твердих і м'яких навичок для ефективного розвитку критичного мислення. Поставлено завдання: 1) обґрунтувати раціональні методи інтеграції твердих і м'яких навичок у процесі вивчення морської англійської мови; 2) відстежити вплив інтеграції твердих і м'яких навичок на розвиток критичного мислення морських механіків. Методи, застосовані в дослідженні, включають аналіз наукової літератури, спостереження, опитування, самооцінку, експертну оцінку, анкетування, інтерпретацію, узагальнення.

Ключові слова: морські механіки, тверді навички, м'які навички, критичне мислення, морська англійська.

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Рецензент: доктор педагогічних наук, доцент Ляшкевич А. І.