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Research Results / Резултати от научни изследвания

SIMULATOR TRAINING – UNIQUE POWERFUL INSTRUMENT FOR EDUCATING, SKILLS CREATING, MITIGATING SKILLS AND RESILIENCE CREATING

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Abstract. Simulator training, a pivotal component of contemporary maritime education, emerges as a potent and distinctive tool for shaping mariners' knowledge, competencies, and fortitude. Through the digital seascape, the simulators serve as the guiding stars of modern maritime education and training. Therefore, this article delves into the profound influence of simulator training in equipping seafarers to tackle an array of multifaceted challenges, including the rapid evolution of technology, intricate international work environments, and the demands of diverse and dynamic climatic conditions. Also, the article sheds light on the critical importance of resilience-building within the maritime industry, emphasizing the need for seafarers to adapt and thrive in dynamic and demanding conditions. It underscores how simulator training acts as a catalyst for the development of precision, adaptability, and the capacity to respond effectively to unforeseen circumstances. This comprehensive approach not only ensures safety for individuals, crew, and cargo but also upholds environmental integrity.

Keywords: simulator training; maritime safety; operational planning

Introduction

In a constantly evolving world, where the oceans persist as both a source of profound fascination and a formidable domain of challenges, the significance of maritime education and training is paramount. This field necessitates an unwavering commitment to precision, the cultivation of essential skills, and, above all, the fortification of resilience in the face of capricious elements. As we navigate an era marked by rapid technological advancements and profound environmental shifts, the maritime industry has diligently turned to innovative methodologies to ensure that seafarers are not merely well-prepared but also adept at responding to the dynamic requirements of the open waters.

However, to deal properly with all challenges such as, but not limited to, quickly growing technology, the organizational task in the multinational and multicultural working environment, exposure to stress, communication interferences, sleep disturbances, noise,

vibration, continuous changes in climatic conditions during a relatively short period, accommodation and social factors, occupational fatigue, a significant change of regulations, the industry requires the human element to be highly qualified and to perform all activities timely in a professional safe way (Fedotova, et al. 2019, Gancheva 2021). Safety for the individuals and crew, environment, and cargo is of utmost importance for reaching the targets. In this context, simulator training emerges as a beacon of transformative education, offering a unique instrument for mariner development.

Therefore, the article delves into the profound impact of simulator training on maritime education, skill acquisition, and the cultivation of resilience in seafarers (Narleva, Gancheva 2023). Through a comprehensive exploration of the multifaceted benefits and applications of simulator-based learning, we unveil the transformative potential that this cutting-edge educational tool holds in preparing mariners to navigate the challenges of today's maritime landscape.

1. Simulator training

Achieving the targets by safety performance is not possible without creating safety awareness and safety culture for the human element.

Creating safety awareness and culture is a long process that combines 3 main factors, namely, education, experience, and skills (Tsonev 2021). In this respect, a very important tool for training during education, and gaining initial experience and skills during the study is a simulator based on real models (Molhova, Biolcheva 2023).

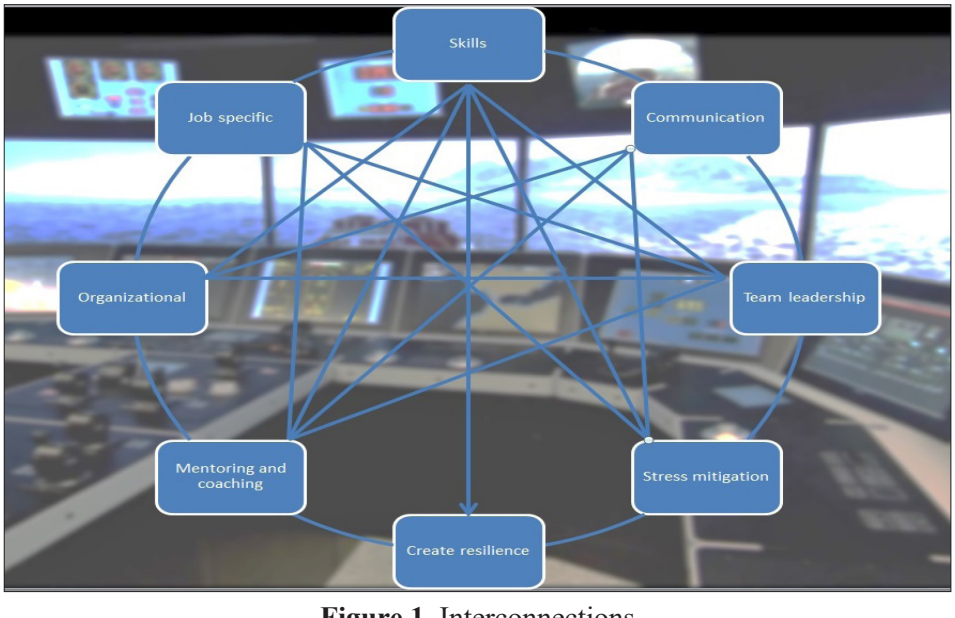

Figure 1. Interconnections

Simulator training plays also a big role in the next stage (after study) during the carrier development of every individual as an important instrument for resilience creation.

The simulator can be effectively used while preparing standard procedures in the stage of assessing the risk and implementing mitigating risk measures (Padesky, Mooney 2012). For example, when a new terminal is built all maneuvering methods for approaching, berthing and un-berthing can be effectively simulated. New ideas or proposals can be tested without commercial impact or loss of money.

Analysis

"Education" and "training" are very often used interchangeably, however, the differences between the two are significant. While education is all about learning the theory, the training is designated to focus on the practical implementation of the knowledge gained during learning with the final target of creating professional skills. And that is where training differs from education, training gives you the skills to do something rather than just know about something. Training is specific to the needs of the shipping industry (Velinov 2013). From one side to the vocation and from another side the skills gap appeared during experiencing the job. It is designated for the individuals who want to implement knowledge already learned, or for the individuals who want to implement a new system, improving a specific task.

That is not to say education has no place – navigators must understand the principles of navigation before they learn to deploy it and an engineer must have a detailed knowledge of mechanics and machinery before they start to operate and maintain the engine (STCW Convention, 2010).

Figure 2. Ship maneuvering module

But what is it we are looking for by implementing simulator-based training? – that foundation through which to build skills based on good knowledge and emphasizing the safe way for performing specific tasks.

To complete tasks successfully, mariners should have a variety of skills. Simply the skills are the ability to complete specific tasks professionally with high-quality results timely and safe (Biolcheva, Valchev 2023). These qualities, known as skills, can be developed through experience.

The modern computerized simulators can reproduce environments very close to the real, hence they provide an in-depth look at skills as they pertain to the workforce (Sterev, 2023). Several skill categories might be created or developed on the simulator. Below are examples of types of skills you could gain by mastering different types of exercises:

– Job skills such as:
  maneuvering in narrow channels,
  maneuvering in shallow waters,
  berthing and un-berthing the ships,
  maneuvering for collision avoidance,
  handling the ship in heavy weather conditions,
  handling the ship in restricted visibility,
  cargo handling,
  planning and monitoring cargo operations,
  planning and execution of search and rescue operations,
  maneuvering with a pilot on board,
  operations with the helicopter (landing and taking off).
– Communication skills such as:
  handling of GMDS communication on board,
  verbal communication,
  nonverbal communication, known as body language,
  reporting and feedback reporting.
– Mentoring and coaching such as:
  ethics,
  patience,
  confidence,
  reliability,
  honesty,
  negotiation,
  developing crew members and assessing the crew members.
– Team leadership skills such as:
  decision-making, delegating responsibilities,
  critical thinking, strategic planning,
  conflict resolution, people management,

solving problems, offering sound advice,
active listening, attention to detail,
rapport building, collaboration,
the team developing, tasks prioritizing,
providing feedback,
of change.

– Organizational skills such as:
bridge team and resource management,
engine team and resource management,
time management,
scheduling,
ability to meet deadlines,
ability to follow directions,
ability to coordinate activities,
setting goals,
information analysis,
reading comprehension,
filing and record-keeping,
data processing,
resource delegation,
event coordination,
multitasking.

In the above-mentioned, we highlighted the advantages of using simulator training during the process of education and skills creation. In the next pages, we will emphasize simulator training as a very important instrument for mitigating stress and creating resilience.

Based on a series of analyses and research International Maritime Community appointed the human element as the main reason for 94% of incidents. One of the main factors affecting human errors is stress.

Reducing the human element error to a minimum is necessary to mitigate the stress, as it is always a negative factor (Grech, Horberry, Koester 2020).

Stress means that a mariner may perceive tasks, internal demands, and surrounding media, as nearing the limit or over his ability to manage the specific task or dynamically developed situation (Peev, Rogashka 2012; Dimitrakieva et al. 2023).

More particularly stress will be an issue for junior officers who meet the many complicated equipments and operate it for the first time. As a result of stress, the junior officer can stick his mind and make a serious human error.

In this respect, simulator training is a significant instrument for reducing stress even eliminating it.

The computerized simulator based on real equipment allows the students, or the experienced officer already to familiarise and exercise with the new equipment before boarding the ship and operating such equipment in the reality.

The officers well familiar in advance with the operation of the specific equipment and well knowing its limitations, specifics, and advantages will be much more confident when starting to operate the equipment for the first time on board (Guidelines 2019). As a result of the advanced simulator training, they will not be stressed and will perform the tasks as a routine.

The same applies to the experienced officers who operated already similar equipment, as each new piece of equipment differs from the previous.

Another big advantage of simulator training is the opportunity for the trainee to exercise the tasks which can't be tested in a real situation on board due to possible negative results (Bui et al. 2008).

In conclusion, we can say that simulator training is an important and unique tool and method for reducing stress by creating adequate knowledge and skills for the trainees and making them confident while using the specific equipment in the reality. It plays a big role in the acceptability of many of the new technologies on board ships.

If crew abilities to operate the new system are not well exercised before new ship systems are introduced, the systems may be unacceptable when deployed, as the technologies that are not accepted by the operator are less likely to be used properly and are more likely to be sabotaged or misused, thus any inherent potential for increasing safety or efficiency may not be realized.

Other reading of the International Maritime Community analysis and research related to the reason for incidents shows that the incidents not leading straight to human error opens windows for discussion whether they could be prevented by timely and proper human action or not.

Here we will focus on resilience creation as an important factor in ensuring that crew members will act properly and adequately in critical situations and crises.

Resilience in ship operations we can define as the ability to remain functional in quickly and unexpectedly developing critical situations. To remains functional by taking proper decisions and executing adequate actions while dealing with crises.

Building resilience is a matter of mindfully changing basic behaviors and thought patterns. The first step is to change the nature of self-talk. Self-talk is the internal monologue people have that reinforces beliefs about the person's self-efficacy and self-value. To build resilience, the person needs to eliminate negative self-talk, such as "I can't do this" and "I can't handle this", and replace it with positive self-talk, such as "I can do this" and "I can handle this". This small change in thought patterns helps to reduce psychological stress when a person is faced with a difficult challenge (Bergman 2019). The second step a person can take to build resilience is to be prepared for challenges, crises, and emergencies.

In ship handling, preparedness is created by creating emergency response plans and contingency plans. For personal preparedness, the individual can create resilience by exercising emergency scenarios based on real happened cases in the industry and possible emergency scenarios imaginary created for training purposes.

Both aforementioned exercises can be done on computerized simulators only.

In addition to the aforementioned, the simulator can be created and simulated post-happened incidents to analyze the root cost and appoint the preventive measures, such as training required for preventing reoccurrence.

Conclusions

The article illuminates the paramount role of simulator-based education in preparing seafarers for the multifaceted challenges of the modern maritime industry. It has underscored the dynamic and evolving nature of the field, where adaptability, precision, and resilience are prerequisites for success.

Simulator training stands as a transformative educational tool, equipping maritime professionals to navigate a diverse array of challenges, from rapid technological advancements to navigating within multinational and multicultural work environments. The emphasis on resilience-building has been a central theme, highlighting the importance of mariners' ability to thrive in the face of adversity and unexpected circumstances.

The industry's relentless commitment to safety, both for individuals and the environment, is exemplified through simulator training, which has emerged as the guiding star of maritime education and training. The innovative methodologies presented in this article herald a new era of maritime education, ensuring that the workforce is highly qualified, adaptable, and capable of meeting the industry's evolving demands.

As we move forward, the maritime industry will rely increasingly on simulator training to cultivate mariners who are not only well-prepared but also resilient in the face of the unpredictable. The journey through this article has unveiled the transformative potential of simulator training, fortifying the capabilities of seafarers and elevating maritime education to unparalleled levels of excellence.

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