



Student-shaped met study programmes

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Considering that the digital revolution introduced computing in the field of maritime science and produced highly sophisticated ships, maritime students are compelled to specialize even before entering the workforce market. Ship operators require cadets with a somewhat clear vision of career path, and, therefore, oblige maritime students to show their interest in specific maritime transportation branch early in their education.

To perceptively select the career path, maritime schools, colleges and academies have a unique responsibility to thoroughly present to maritime students various maritime transportation branches and vessel types operated on markets. One of the examples is Faculty of Maritime Studies in Rijeka, where third-year students were pursuing B.Sc. Degree in Nautical Studies and Maritime Transport Technology are able to choose among four elective courses that explicit characteristics of maritime transportation branches. This approach allows maritime students to gain adequate perspective of various types of ships and facilitates career path decision-making.

The main focus of this paper is to analyze the data collected through interviews and surveys of 107 final-year maritime students to gain the clearer perspective on the importance of qualitative maritime education. Results represent a base for further research in the field of maritime education and training (MET), specifically on identifying and developing appropriate curriculums in maritime education.

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1. Introduction

Maritime transport accounts for more than 90% of worldwide goods exchange in the global market [1]. Modern sea transportation consists of professional and expert operations, which are unified and defined by various international and national regulations and standards. In the past thirty years, the maritime industry has been focused on improving the quality and safety of ship structures and reliability of ship systems in order to reduce the number of accidents and improve the sea transportation standards. This resulted in technologically advanced ships with inbuilt systems capable of operating with a high degree of reliability. However, it is this modern technology of operating highly specialized vessels that require highly specialized maritime profession [2].

There are an increasing number of specialized ships on the maritime shipping that require seafarers with complete understanding of technological advances those ships contain. This is backed up by the specific demands that charterers enforce with ship-owners when developing matrices of experience and competence of seafarers employed. This makes the transition from one vessel type to another highly difficult and challenging. Being successful in safely navigat-

ing a ship is largely dependent upon the skills, knowledge and experience that captains and officers possess [3].

Maritime schools, academies, and universities and MET institution in general have to work on developing curriculums that will allow their students to obtain a broad knowledge of certain ship transportation technologies. A large number of future seafarers that enroll in an apprenticeship on a particular type of a vessel will likely end their respective career on the same type of a vessel. Hence, this paper analyzes the approach of students towards the future choice of the ship technology of their interest in correlation with the study program they are enrolled in.

Maritime studies combine liberal arts and highly professional courses, which makes it largely interdisciplinary form of education. Unlike other university level programs, maritime studies needs to satisfy very specific requirements of international conventions and standards, has a pronounced multidisciplinary nature and bridges very close relationship between academic research and profession itself [4]. Compatibility primarily refers to the conformance with mandatory international standards prescribed by the International Maritime Organization based in London. Nautical Studies program at Rijeka University

has been organized according to the Bologna Declaration [5]. The Nautical Studies course also has to satisfy all criteria prescribed by the STCW (International Convention on Standards of Training Certification and Watchkeeping) convention.

There is insufficient attention paid to ship specific knowledge in maritime education. The concept of various transportation technology learning is not sufficiently recognized as one of the key segment of seafarers' competence and as such there is insufficient curriculum developed for the formal education of seafarers. Therefore, there is need to investigate consistently, diagnose and appropriately resolve issues of ship specific knowledge in today's dynamic and complex shipboard operations.

To investigate underlying determinants of specific transportation technology, theoretical sources and practical application; to determine unavoidable impact of the modern shipping environment, globalization and digital revolution on shipboard management and operations; to determine the importance of understanding specific ship types as key role for the development of maritime student's competence; to propose guidelines for improving maritime education curriculum.

Proceeding from the fundamental determinants of maritime education, in terms of modern shipping environment and complex operations, it is possible to prove by means of scientific methods that proper education of maritime students about various transportation technologies can directly increase readiness, competence and knowledge of future seafarers and actively prepare them for market needed specialization in the maritime sector. Therefore, it is essential to include courses that teach various maritime transportation technologies in the maritime education curriculum.

2. The role of met institutions in developing maritime competences

Higher degrees of sophistication within computerized vessels, as well as charterer's selection matrices, require MET institution to offer maritime students different and multidisciplinary education.

While maritime universities and academies educate students to take up management ranks both onboard and ashore, maritime high schools educate seafarers for deck and engineering operational ranks [6]. Because some of the students will not continue their education through university studies, but will rather join the workforce straight after graduating from high school, there is a need of curriculum adjustment to allow students to gain perspective on various ship types and gain broad view of advantages and challenges of each maritime transportation branch.

At the Faculty of Maritime Studies in Rijeka, third year Nautical Studies and Maritime Transport Technology students can choose between four elective courses related to the maritime transport technology, namely "Liquefied Cargoes Transport Technology", "Containers and RO-RO Transport Technology", "Dry Bulk and Special Cargoes

Transport Technology", "Passenger Transport Technology". Through these and other courses, students can get acquainted with the advantages and challenges of specific ship types, which makes it easier to choose a specialization.

In order to determine the interest in specific ship technologies, a survey has been undertaken with final-year students of Nautical Studies and Maritime Transport Technology. Smaller and randomly chosen student sample was interviewed in order to obtain more detailed data. The survey was anonymous and was conducted among the entire student population of last year nautical students. After analyzing student groups via the ISVU system (Information System of Higher Education), evidence was found that not all of the students chose all of the previously stated courses. This fact has led to further research in order to define the relationship between the students' preference for sailing on a specific type of ships and the study program, together with the option of choosing elective courses and option of choosing the title of the BSc essay.

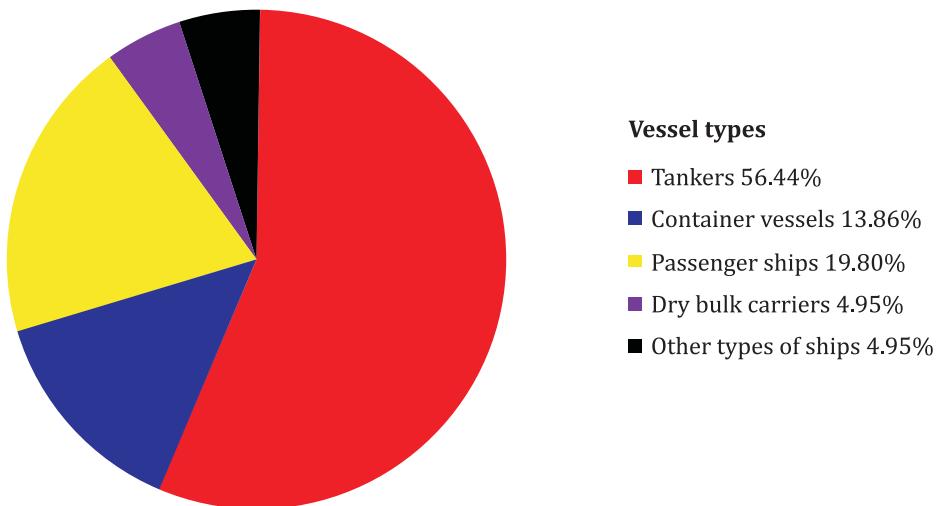
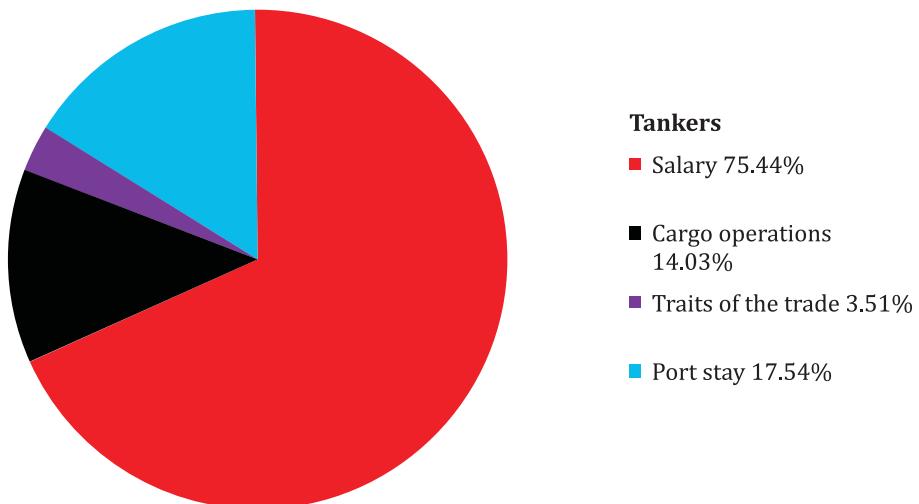
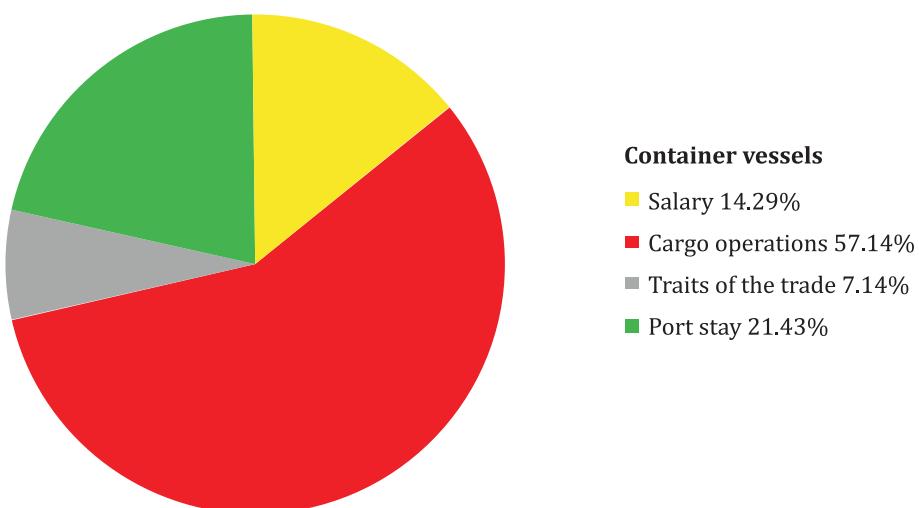
The results of the survey where Nautical Studies students were asked on which type of a ship they would like to sail on are shown below.

The results indicate a distinctively subjective approach when defining reasoning for an individual choice. After analyzing interviews results, it was determined that the factor that largely influenced the answers was information and knowledge about specific transport technology obtained through education at high MET institution. Other influencing factors are knowledge obtained at maritime high schools, personal experience of working seafarers (word of mouth), media reports, professional presentations and similar.

Interviews also revealed reasoning behind particular choices, which is shown by following figures.

Comparing the above analyzed data with the title of the BSc essays defended by the students at Faculty of Maritime Studies in Rijeka in the period from 2009 until today, it can be notice strong correlation between students vessel type preference and BSc essay topics. It is therefore concluded that the majority of students choose their BSc essay supervisor based on their future career preferences. It should emphasize that students are free to suggest BSc essay topics. Writing a essay enables students to learn more about the ship type they are interested in by producing a detailed literature review and working with a supervisor. This consequently enables students to prepare better for and understand all of the relevant ship characteristics and transport technology traits. After analyzing the title of the BSc essays it was found that the topics related to certain vessel technologies are chosen from different courses which allows for a varied approach and the possibility of treating the problems surrounding the specific ship types.

Data analysis shown in the following graph was produced on the basis of a title of the BSc essay choice and its relation to a specific vessel type, regardless of the course it was chosen from. Title of the BSc essay chosen by the last year students of Nautical Studies reveal that maritime students are increasingly aware about the importance of spe-

**Figure 1** Vessel types students are interested in**Figure 2** Tankers selection reasoning**Figure 3** Container vessels selection reasoning

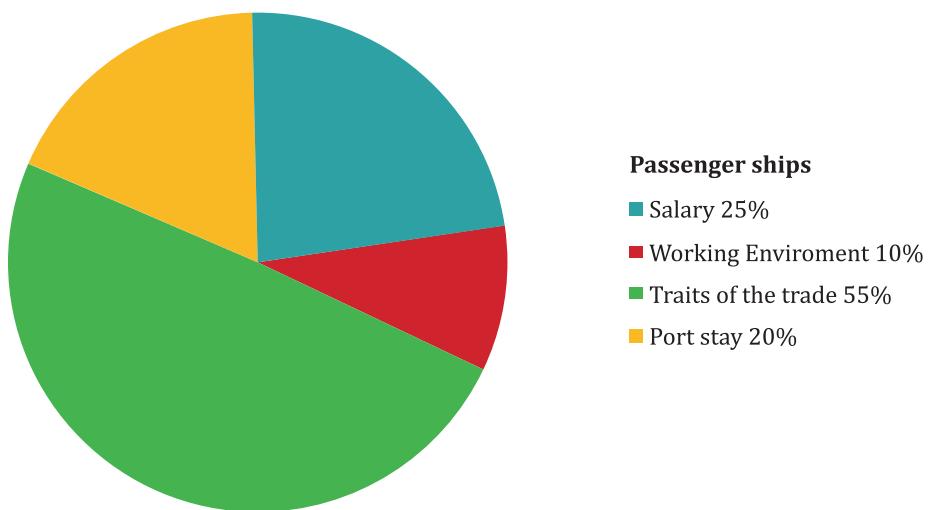


Figure 4 Passenger ships selection reasoning

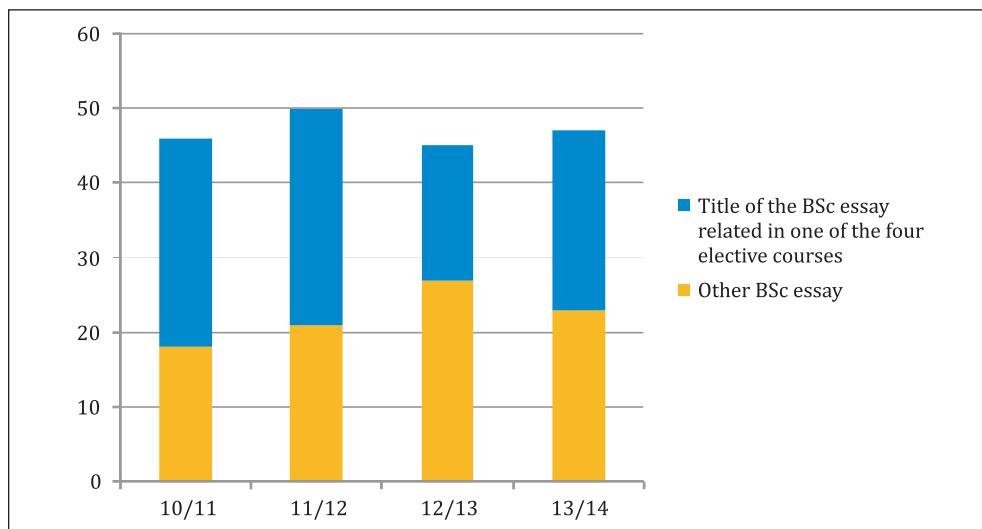


Figure 5 Total student number with regards to the number of students who did their BSc essay in one of the four elective courses

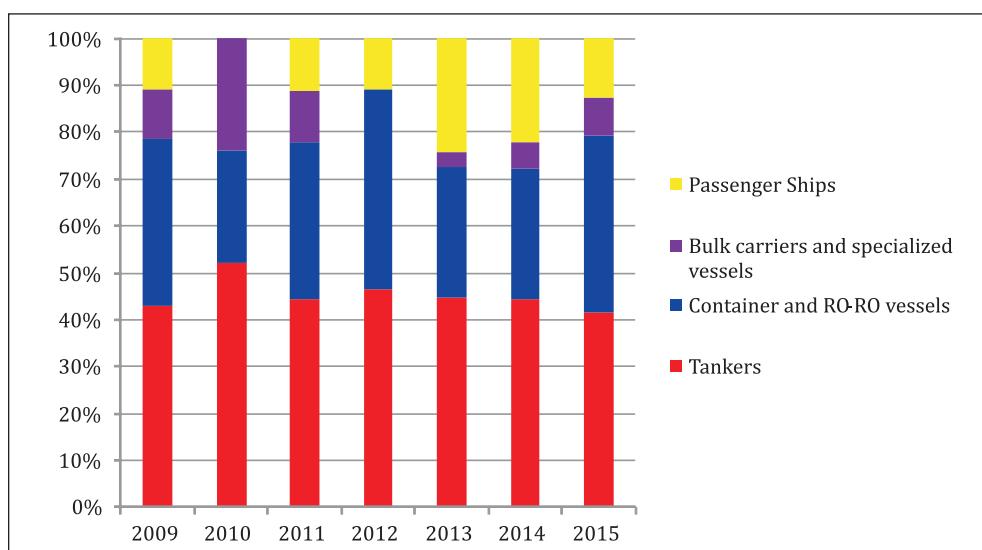


Figure 6 Topics of BSc essay in relation to the specific vessel types

cialization and ship specific knowledge. This is depicted in the following graph.

3. The role of the teaching staff at the faculty

Even though maritime students see benefits from the entire curriculum of the maritime studies, importance is weighted towards the four elective courses presented at the last year of studies mainly due to tangible knowledge gained by participating in those courses. It is important to state that these courses offer practical approach to learning through appointing guest lecturers that are active seafarers, through visiting vessels, shipyards and repair yards, visiting terminals and witnessing cargo operations, participating in various workshops, case studies and simulator trainings. It is evident from the interviews that maritime students also believe that the role of the faculty is of special importance as well. Students expect from lecturers to demonstrate practicality of the course syllabus and help students gain basic level of competence.

Interviewed students state that the greatest knowledge is gained by learning from various guest lecturers and maritime professionals. This allows first-hand experience sharing and promotes interaction between the industry and undergraduate studies. Through such means, it is possible to understand more deeply various challenges of specific maritime transport technology and to find out specific traits of working on various vessel types, including the lifestyle and wages.

When circumstances allow, the faculty should use all resources possible to organize classes in more practical environment including ship visits where maritime students could experience practical interactions with vessel crew and the vessel itself.

4. Conclusion

From the survey and interviews analysis, it is evident that tangible knowledge gained by learning about various transportation technologies is largely beneficial for maritime students. This will allow future seafarers to specialize early and prepare for multiple challenges that specific ship type contains within its navigating, cargo or machinery operations. Adequate preparation will yield best results from apprenticeship and will lay the best foundation for accelerated rank advancement.

Lectures should be accompanied with the appropriate level of practical work in order to enhance learning and better prepare seafarers for «real world» challenges they will encounter upon graduation and once entering the workforce.

The most significant role of the maritime education institutions, except providing the theoretical knowledge, is to allow students using sophisticated simulators such as the navigation simulators, cargo simulators, ballast management simulators and engine room simulators is of invaluable importance to educate competent seafarers that will be ready for immediate immerse in the workforce. Furthermore, each maritime educational institution, with the help from the state, should provide practical training to the students that would be carried out on school ships for a period of several weeks, where students could apply the theoretical knowledge they already possess and develop practical competence.

Open source content is evidently available to everyone, therefore educational institutions will have to focus on delivering learning beyond the academic and STCW oriented curriculum. It is the soft skills/intangibles that will shape the competence of maritime students and deliver fully ready workers on the maritime market of tomorrow.

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