INNOVATIVE WAY OF TEACHING COLREGs

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Abstract

"Avoiding Collisions at Sea" (ACTs) was a project funded by the European programme "Leonardo da Vinci" and is managed by Faculty of Maritime Studies, University of Rijeka, Croatia. Other partners who are participating in this project are from United Kingdom, Spain, Slovenia, Bulgaria and Turkey. The goal of this project was to detect gaps in knowledge, understanding and applying of COLREGs (International Regulations for Preventing Collisions at Sea 1972 - Rules) and to develop new way of teaching COLREGs. Research was conducted on more than 1500 seafarers, nautical students and amateur seafarers. On the base of research results, new teaching material was prepared which consists of more than 280 on-line scenarios explaining how to use the Rules in real-life situations. Each scenario consists of description of scenario and explanation which Rule(s) apply and why. Where it is appropriate, scenario is accompanied by video of bird’s-eye view, bridge view, radar screen view and ECDIS view. Developed new innovative way of teaching COLREGs will improve understanding of the Rules.

Keywords:
COLREGs, teaching, scenarios

INTRODUCTION

The Faculty of Maritime Studies in Rijeka is the leader of the European Union project "Avoiding Collisions at Sea" (ACTs). Other partners on the project are maritime training institutions coming from Great Britain1, Spain2, Slovenia3, Bulgaria4 and Turkey5. The project started on November 2013 and ended by December 2015. In order to achieve the project goals, COLREGs questionnaire has been prepared and distributed among nautical students, maritime professionals and non-professionals. Workshops have been organized in all of the partner’s countries in order to validate the results of the questionnaire and the research results obtained have been presented. The results were used to prepare on-line COLREGs course. To prepare scenarios recent COLREGs accidents were analysed and comprehensive database was made. Each scenario in part B of the Rules has prepared simulations for bridge view, bird’s view, radar view and ECDIS view where appropriate. Scenarios in Part C of the Rules have 3D visualisation of the vessels navigational lights and sound of the appropriate sound signals. At the end
more than 283 scenarios were uploaded on line. Course pilot testing was conducted with maritime professionals and students which were browsing the course and pointing out what should be changed in order to improve the scenarios. Participants praised new approach in learning the Rules using scenarios with simulations and 3D visualisation of navigational lights. The course is available in English and in 5 different languages including Croatian, Slovenian, Spanish, Turkish and Bulgarian.

1. TRAINING NEEDS

The Questionnaire has been designed to determine which rules are difficult to understand and which rules are most often broken in practice. Such questions are more difficult than the questions which simply check the knowledge. In a technical sense, the questionnaire has been prepared according to the instructions of the professors from the Faculty of the Humanities and Social Sciences in Rijeka who are dealing with teaching and assessment methods. Preparing questions for testing the Rules understanding has been a very difficult task, only 4 questions from the total of 372 from the MCA COLREGs test have been taken. The questionnaire was distributed from January to the end of March 2014 through Lime survey and in a printed form. The results from the printed form have been inserted in the Lime survey. The questionnaire has been distributed to all maritime schools and colleges, seafarers on board merchant ships, teachers and lecturers at maritime institutions, VTS operators, employees of the port authorities, pilots as well as to masters of fishing boats and yachts. By the end of January 2016, the questionnaire was fulfilled by 1543 participants (professional seafarers, maritime high school and faculty students) and 315 holders of licenses for various types of ships/boats (pleasure craft and small fishing vessels). In order to validate questionnaire results, workshops have been organised. The workshops aimed at presenting the results of the research, at validating the obtained results through discussions, at conducting discussion on the methods of learning the Rules and determining the best way to use the results of the project for long-life learning. In all partners’ countries, workshops have been attended by 102 participants: teachers and professors at maritime colleges and faculties, seafarers, representatives of government authorities and maritime companies, pilots and members of various professional associations related to maritime shipping. It has been concluded, on the workshops, that the results obtained have been in accordance with the workshop participant’s opinions and that there has been a strong need for the implementation of new methods of learning and teaching of COLREGs.

![Figure 1: Percentage of correct answers of selected Rules from Part A and B](image-url)
2. COLREGs COURSE DEVELOPMENT AND ASSESSMENT

COLREGs e-learning module course has been developed as an innovative online e-learning and e-assessment platform by adapting the pedagogical framework of proven and appropriate methods and methodologies. In order to develop innovative COLREG course it was necessary to identify, adapt and develop appropriate methods and methodologies for the development of the intended training course strategy, design, content, delivery and assessment. Also, one of the objectives was to identify the interactive pedagogical framework, applying multimedia learning techniques in the development and delivery of training courses. Methods and methodology adopted in the course designs and development are:

1. Scenario design and creation,
2. Delivery practice and modelling,
3. Evaluation and quality assurance,
4. Review and analysis of initial methods and methodology.
Scenario design and creation of course has undertaken a series of activities to improve training provisions for COLREGs. These activities are: analysis of comprehensive needs, study of recent COLREGS accidents, incidents and analysis of survey questionnaires and series of workshops with the support of the maritime community. Course creation consisted of the work in creating a comprehensive database of a number of collision and near miss reports. The selected cases were summarised and transformed into user friendly animated scenarios as a novel means of learning the COLREGs. These summarised reports were converted into animated scenarios by developing a range of real life situations using simulations of a bird’s eye view, bridge view, radar and ECDIS view.

Delivery practice and modelling consisted of qualitative and quantitative methodological and pedagogical frameworks which were developed for the project as a whole. Strengths and limitations of each method were tested by using tools for standardising the education, training and on-line assessment of the COLREGs using an interactive online platform.

Evaluation & Quality Assurance was conducted through internal evaluation by a team of experts. Peer view was conducted to support the external evaluations and piloting plan included a series of trials initially with 3 Target Groups followed up by 5 Target Groups. In total 48 people tested eCOLREGs course in 1\textsuperscript{st} piloting and 107 people tested eCOLREGs course in 2\textsuperscript{nd} piloting. Pilot groups were students, skippers, maritime professionals and instructors/lecturers.

COLREG convention has 38 rules and 4 annexes, divided in 5 parts and 3 sections which resulted with eCOLREGs course. The course has more than 283 scenarios divided by the rules and annexes. The number of the scenarios for the each Rule depends on the number of paragraphs of each Rule and the number of actions to apply the specific Rule. Also, the Rules which were identified as hard to understand with the questionnaire have comments for explanation.

\textbf{Figure 4:} Scenarios available for Rule 13 (Overtaking)
The navigational lights are shown in 3D, so the user can observe them from all directions. That helps the students with the perception of the navigational lights and better understanding the angles of visibility.

**Figure 5:** Example of scenarios with simulations

**Figure 6:** Example of scenarios for navigational lights and sound signals
The course is available at 6 different languages and in the future translation for more languages can be expected.

In 2015 e-COLREGs course has been introduced to students of Faculty of maritime studies Rijeka. This year results of final exam in COLREGs is compared with the former year’s result of final COLREGs exam and shown in Figure 7.

Figure 7: Percentage of students by final score

In this analysed time period 150 students undergo the oral examination of COLREGs. The statistics in Figure 7 show increase of 23% of students with the best final score. Also, the number of students with minimum knowledge is reduced for 25 %. This is evidence that course helps students in learning and understanding COLREGs.

3. CONCLUSION

This course is one of the kind e-learning platforms for COLREGs. The objective of the course is to help the students and seafarers to understand the Rules. For that purpose every situation and action at sea is explained using simulations. That helps students to acquire the perception of situation and purpose of the Rules. Also, some Rules have comments which are further explaining the application of specific Rule. Scenarios can be used by students at home and maritime professional at sea or at the classes by professors. The course was used in COLREGs classes at Faculty of maritime studies Rijeka. The results of final exam showed better knowledge and understanding of the Rules compared with the former years. The course is available via internet at www.ecolregs.com.