International Journal of Modern Manufacturing Technologies
ISSN 2067–3604, Vol. V, No. 2 / 2013

ONLINE LEARNING TECHNOLOGY IN THE ACADEMIC EDUCATIONAL PROCESS

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Abstract: The modern society needs citizens more trained and specialized for it evolution and development. These requirements can be covered through a better opening of the scholar system, at all level, to the civil society. Many top universities from Romania validated this trend offering online courses to their students. The paper aims to present the online teaching system that Constanta Maritime University (CMU) introduced, designed to offer easy access to information for teachers and students, but also available for former students, in order to be able to update latest information about technical development in maritime field necessary in their duty activities. The present paper proposes to reveal a piece of the new learning technology, online teaching technology, that combines successfully the new needs of learning and teaching with the computer performance.
The focus of the present case study is on the particularization of an important European project that CMU developed and implemented together with other 4 partners, project with an important online component.
Key words: Online learning, educational technology, continuous learning process, online teaching procedures.

1. INTRODUCTION

The philosophy of education system is now changing globally and rapidly towards a continuous learning process. The modern society needs citizens more trained and specialized for it evolution and development. These requirements can be covered through a better opening of the scholar system, at all level, to the civil society.
It is an important mission of the system, mainly of the academic level training system, to ensure the necessary techniques and information volume for a more educated society, with a higher level of knowledge, in a continuous contact with the latest researches and technical development. The teachers must determine the most appropriate pedagogical approaches for their market of students and the types of courses that they teach.
In the present, inside of the training system are used two concepts of teaching and training, in generally, the traditional concept, based on the paper text and courses audition and the modern concept, using computerized technologies, as simulators, virtual reality and online courses. Both concepts are usefully, because not all types of information's can be communicated using the traditional and the modern one.
There are knowledge, as fundamentals, which are better develop using traditional concept, where the teacher express clearly the terms, definitions, formulas and interact with the students for a higher understanding.
On the other side, courses developed especially for specialization or for upgrading of knowledge, after finishing of the academic training, can be more easily communicated through the modern technology, as online or distant learning. In this case is considered that the receivers of information already have the fundamental knowledge and this new information come to complete it.
In the recent years, many universities offered to their students another educational option next to the traditional one: the online courses. The online learning and online schools revolutionized the education. They appeared as a direct result of the new needs for education of the persons involved in the social and economical life of civil society and do not have enough time to attend to the classes or of the persons that from other vary reasons cannot attend the courses. But this new educational technology could not have been practical without the computerized technologies. In the present days, the computers and computerized programs are part of the life for many people, becoming indispensable for many activity fields. The online teaching technology combines successfully the new needs of learning and teaching with the computer performance. Putting together the social and economical conditions, economical being prior, and the opportunities creates by the online teaching procedures, the development possibilities of this lifelong learning concept increase considerable.

2. THE ONLINE LEARNING BENEFITS

The involvement of the new technologies in the academic educational process has benefits for the students and lecturers, increasing competencies for both and approaching the second by the latest revolutionary educational trends. Significant changes appear to be emerging in higher education and in many components of school education.

The online teaching means to conduct a course partially or entirely through the Internet; thus the Internet is the primary way of communication.

With the Internet, the online courses have become a viable and valuable option for the student who may not be able to enroll full-time in a traditional educational institution. They could be reasons of accessibility, flexibility or quality, all compelling and contributing to the attractiveness of this mode of learning (Boettcher and Conrad, 2010), (Ko and Rossen, 2010). Through the online courses:

- The student can attend a course at anytime from anywhere in the world that has internet access, according with his own schedule. This option is value for those persons who have a heavy life program, for who the regular teaching schedule is difficult to be keep. This is one of the possibility offers by the online learning with a great importance in the maritime activity, where the program is made under the local time; ship hours, mostly different by the school local time.
- The course material is accessible 24 hours a day 7 days a week. The students have the ability to read and reread lectures, discussions, explanations and comments. Using the online teaching techniques, the student or trainee have possibility to access more courses on the same time, option to take all the information one time and to cover the curricula in a shorter period than will be done during regular classes.
- In an online environment, attendance to class is only evident if the student actually participates in classroom discussion. This increases student interaction and the diversity of opinion, because everyone gets a say, not just the most talkative.
- Online instructors come with practical knowledge and may be from any location across the globe. This allows students to be exposed to knowledge that can't be learned in books and see how class concepts are applied in real business situations.
- Participating online is much less intimidating than in the classroom. Anonymity provides students a level playing field undisturbed by bias caused by seating arrangement, gender, race and age. The students can also think longer about what they want to say and add their comments when ready. In a traditional class room, the conversation could have gone way past the point where the student wants to comment. In many cases, the interaction between person and computer is more benefic than an interaction person to person related to the process of information and knowledge transfer. The computerized information is taking as impersonal by the receiver and can be interpreted and adapted to the own perception. When the same information is expressed by a person, it could become personalized, the sender putting belong the information, his own remarks or opinions.
- The online environment makes instructors more approachable. Students can talk openly with their teachers through online chats, email and in newsgroup discussions, an open forum for general impressions and opinions, without waiting for office hours that may not be convenient. These communication procedures can help to the improvement of the present data and to generate the development of additional subjects with role of covering of missing date or useful information's for the main course. Also, his option for communication provides enhanced contact between instructors and students.
- Online course development allows for a broad spectrum of content. Students can access the school's library from their PC's for research articles, ebook content and other material without worries that the material is not available.
- Critical to the explosion in the online field is the increasing number of programs and courses now available.

Thus, the major differences between the online and the campus courses can be summarized in five characteristics:

- The faculty role shifts to coaching and mentoring;
- Meetings are asynchronous;
- Learners are more active;
- Learning resources and spaces are more flexible;
- Assessment is continuous.

Today, the computers and computerized programs are part of the life for many people. The present paper, a case study, aims to reveal a piece of the new learning technology, online teaching technology, that combines successfully the new needs of learning and teaching with the computer performance. Putting together the social and economical conditions, economical being prior, and the opportunities creates by the online teaching procedures, the development possibilities of this lifelong learning concept increased considerable (Dumitrache et al., 2010).

3. ONLINE LEARNING PROCESS IN CONSTANTA MARITIME UNIVERSITY

Because there are no geographic barriers to online learning, students can find diversity of course

material that may not be available to them where they live or work. One of the activity field intensive interested in this learning opportunity, the online procedure, is the maritime field. Here, the characteristics of activity cannot allow the direct presence in classes for improving of existing knowledge and skills. In the last decades, the changes, especially technically, has been produced, making necessary a periodically improvement and update. The online teaching techniques represent the better solution for this case, the internet being accessible from the middle of the ocean now.

In this area of activity, Constanta Maritime University developed an important project for distant simulation and tutorial systems on board. The project is under the Leonardo da Vinci program, the cooperation partners being: University of Bremen, Germany as promoter, Kongsberg Maritime, Norway with simulation technology, Elsfleth University of Maritime Studies, Oldenburg, Germany, Constanta Maritime University, Romania, Escola Nautica Infante D. Henrique, Lisbon, Portugal and also seven shipping companies from Romania, Germany and Portugal (Chiotoroiu et al., 2006).

The premise from which the project started was the lack of practical experience of the young officers while the complexity of the work on a ship increased in the last time due to several factors, including here the automation of the ships functions, multinational crew format, and reduction of the crew number. In the recent years a problem in international maritime training became obvious: the lack of experiential learning of entry-level officers or "lost apprenticeship". Like in many other technical work systems, the work processes on board have been an object of extensive automation. Human beings on board modern ships are needed predominantly for planning, control and supervision. However, in critical and unusual situations they have to step in actively. Such situations require flexible problem solving, improvisation and intuition. Furthermore, decreasing number of (experienced) crewmembers on board and the pressure of fast promotion into responsible positions have increased the experiential learning gap of the junior-officers. This problem is most obvious in the tanker shipping, due to the demands on junior officers which are higher in this branch of the maritime industry as compared for example with the field of container shipping.

Based on these important and complex premises, the aim of the project is the development of a common strategy to find a solution to cover the lack of experience of the entry level maritime officers, those ones must acquire the necessary abilities, capabilities for the on board work. The attention was focused on the tanker operations where the young officers must handle dangerous cargo. The solution found through the project includes three based components:

- experiential learning (on board of the ships),
- advanced distant learning technology (on board and ashore, online learning with special attention on the simulation technology)
- formal learning in the classroom and simulator (ashore).

The experiential learning of the young cadets could be achieved through an exchange of experience between the junior officers and specialists, experts with good experience and maritime knowhow.

An important part of the project was the implementation of the internet infrastructure for distant learning used for courses release, guidance for the investigative learning. This was done based on the cooperation between educational institutions and shipping companies. Also, Kongsberg Maritime, Norway investigated how maritime simulators could be used and included in the online learning, the focus being on the implementation of the liquid-cargo-handling-simulator into the learning-management system.

Through this project, a virtual e-learning platform was established. Kongsberg Maritime, the simulation software developer, always has a server connected between the four educational institutions through which the students during the cadet's practice can communicate, work and perform exercises, tests, simulations, online exams. Thus, they have the possibility to visualize the simulated application regarding different operation necessary to be known on a tanker ship and to be familiar with the particular installations and operational procedures characteristically to oil, chemical and gas carrier ships. Also, the platform enables communication and knowledge cooperation between educational institutions and shipping companies (Stan et al., 2010).

Moreover, on this server, the junior officers can even log on board merchant vessels and can create scenarios for the vessels developed by Kongberg and develop solutions for them.

The communication between trainers and students can be done through different ways, using the electronic correspondence or an open forum for general impressions and opinions. The internet forum gives flexibility and fluency to the exchange of the communication and short-term problem solutions. These communication procedures help the improvement of the present data and generate the development of additional subjects with role of covering of missing date or useful information's for the main course.

The training developed under such online platform is in line with the STCW convention rules for training

and certification and derives from the IMO model courses.

The following pictures present an example of an exercise developed online through this project. This exercise will demonstrate the normal ballasting procedure based on the product carrier simulator.

The software program allows two modes of operation, the instructor mode, where all the options and settings are available, and the operator mode, or the student's interface, with limited access.

From the instructor mode, different preset conditions, can be loaded, on which the simulation process can start and the own condition can be created and also intervene at any time. Also, it can act as the bridge or as a shore terminal.

In the operator mode the previous mentioned facilities are not present.

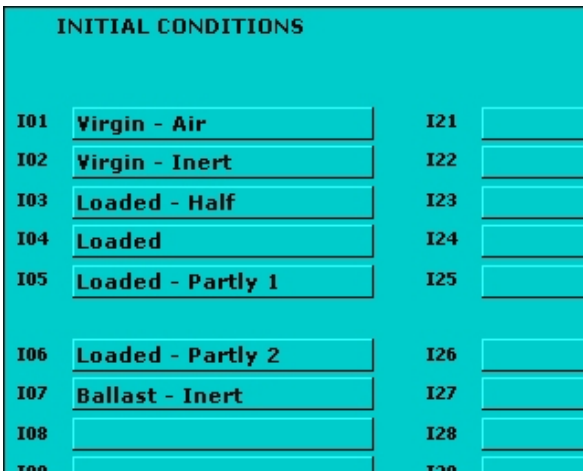


Fig. 1. Initial conditions

When starting the simulator, the Picture Directory screen is displayed.

This interface can be thought as a browser which allows the user to navigate between installations or other indicating screens related to the status of the ongoing operation. (load diagrams, shear forces, bending moment etc.)

The Load Master screen offers stability and force calculation in advanced, to avoid any excessive stress that could damage the ship.

The stresses vary with the cargo distribution throughout the length of the ship. Incorrect loading can damage the ship and so, the cargo/ballast must be placed according to a carefully calculated plan.

The cargo barograph will give the operator a total view of the cargo and ballast tanks with information about tank level, flow rate, cargo density and quantity in each tank.

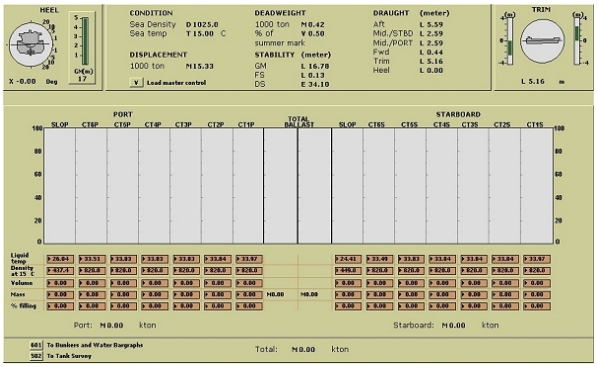


Fig. 3. Cargo barograph

Also it displays information about heel angle, metacentric height and trim.

Tank survey screen displays the cargo, ballast and slop tank configuration along the ship, giving information about tank level and ullage. Also ship conditions will be dynamically updated based on tank ullage.

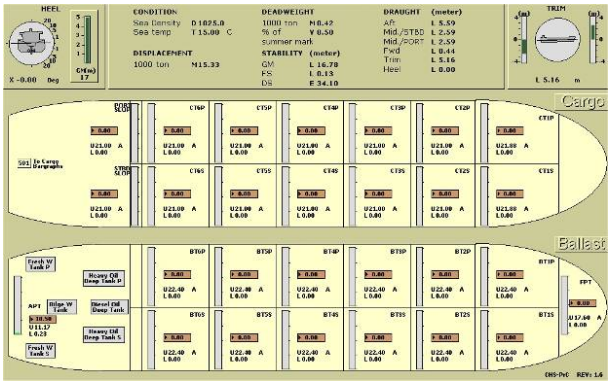


Fig. 4. Tank survey screen displays

The shear forces diagram calculates its values from the load distribution of the ship including the steel weights of the different hull sections and the corresponding buoyancy forms.

The bending moments are calculated from the shear forces. The actual bending moment is drawn in blue, the red and the yellow curves gives maximum limits for respectively harbor and seagoing condition.

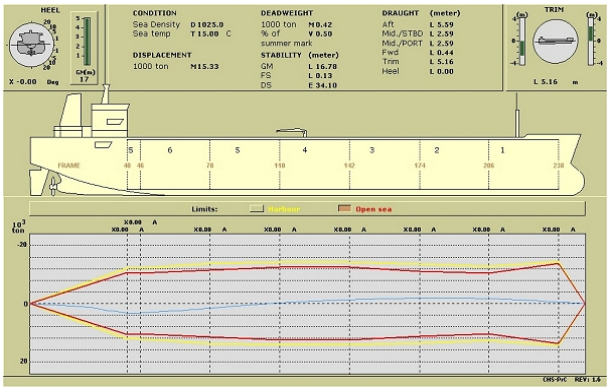


Fig. 5. Picture of bending moments and forces (a)

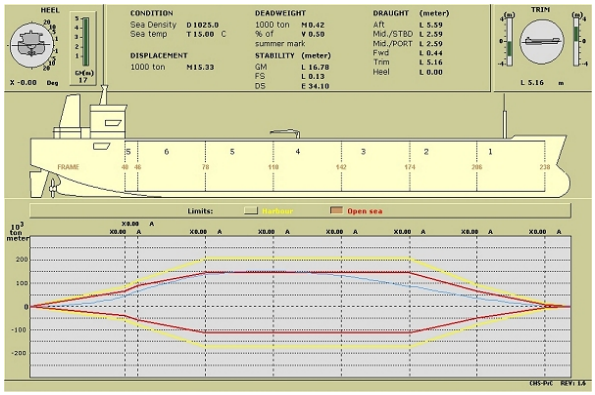


Fig. 6. Picture of bending moments and forces (b)

The stability curve in the form of righting arm values is calculated for heel angles ranging from 0 to 60 degrees.

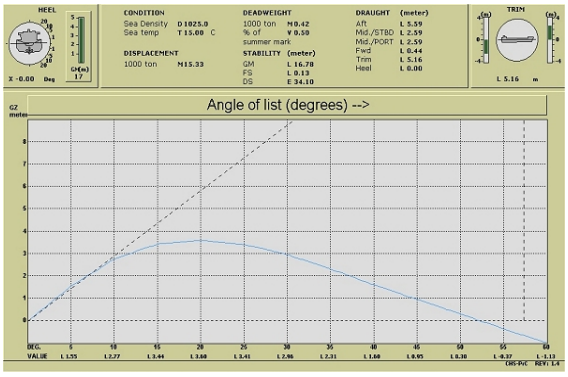


Fig. 7. The stability curve

All righting arm values are corrected (reduced) for possible "free surface" effects. The reduction in metacentric height is specifically given. The area under the stability curve represents the heel resistance or dynamic stability. The following pictures were designed as an introduction to the simulator, and starts by presenting the initial condition used and the keys used for operation.

The initial condition used in this exercise is “Virgin – Air” which means the ship is empty, with no cargo, ballast or supplies onboard. After selecting the work condition, the instructor must engage the simulation, switching the simulator from FREEZE mode to RUNNING mode, by pressing the F1 key on the keyboard. In the operator mode, giving the specific exercise, the student must check the load and stability conditions prior to any ballasting planning. A special consideration must be given to the actual bending moment. The diagram shows that in this case it’s best to fill tanks no. 3 port and starboard, otherwise the existing bending moment could exceed the permitted value and the ship could suffer serious damage.

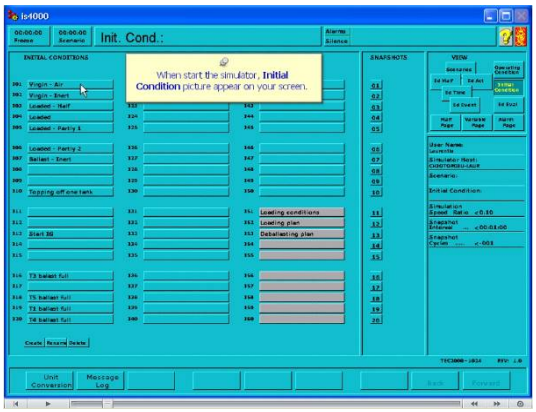
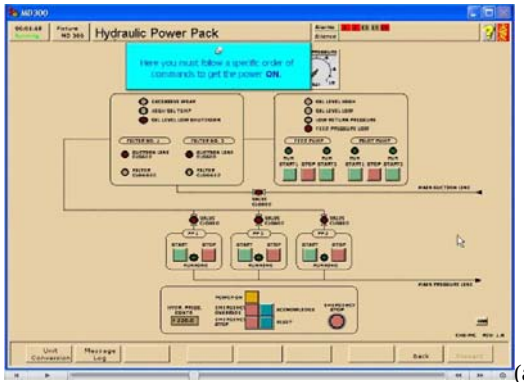
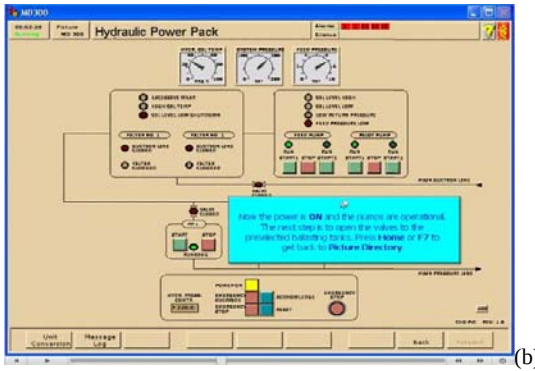


Fig. 8. Initial conditions – empty ship

After planning the ballasting chart, the student must start the operational procedure for filling tanks 3 S/P. First he must start the power generators for the electrical driven pumps. This is done in the “Hydraulic Power Pack” screen, where he must follow a specific algorithm to get the power ON. This is explained in the demonstration.



(a)



(b)

Fig. 9. Hydraulic Power Pack

The next step consists of opening all the valves towards the designated tanks, and starting the ballast pumps.

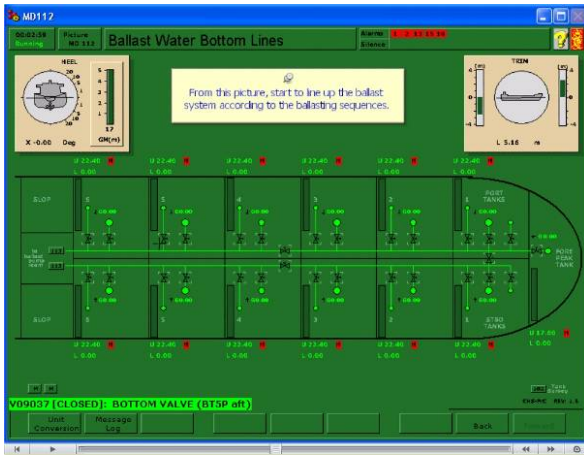


Fig. 10. Ballast Water Bottom Lines screen

This is done from the "Ballast Water Bottom Lines" screen and "Ballast Pump Room" screen.

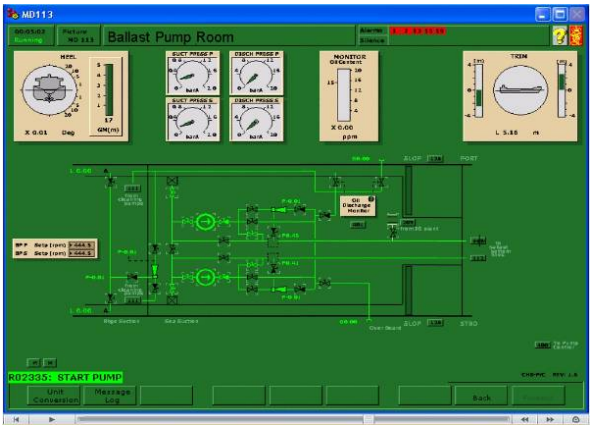


Fig. 11. Ballast Pump Room screen

While the process is underway, there are flow, pressure and temperature indicators that give precise information feedback, helping the student for a better control. Finalizing the ballasting procedure, the student must find that the bending moment was reduced and of course, as a consequence of weight loading, the metacentric height was reduced.

4. CONCLUSIONS

The paper reveals through a rigorous presentation the new teaching method that a majority of educational institutions has implemented in the educational system, with good results for the students' instruction and not only for them. Also, it presents as example an exercise developed online through the project presented in the paper. In nowadays, it is compulsory for the educational institutions to develop systems able to provide adequate training and to offer possibilities to acquire new competencies and knowledge during life. The usage of the newest teaching techniques as online and distant learning, combined with the traditional forms of training seems to represent the optimum solution for a better and high quality learning system. The paper certifies the applicability of this new learning method in our university with good results. The "experiential learning gap" of the junior-officers, the main objective of the project, was covered in a successfully way. Thus, it was noticed a considerable improvement of the practical skills level of the junior officers on board of the ships. Also, the constant cooperation and communication give to the cadets the confidence in their professional capabilities and abilities. The method makes learning and training more effective and attractive for students, it is a valuable step in the student training. The paper comes to develop the picture of this new learning method, with good replications in the educational system. The contribution of the paper refers to a higher understanding of the role of the new training method through a particular case presentation.

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Received: May 07, 2013 / Accepted: December 5, 2013 / Paper available online: December 10, 2013 © International Journal of Modern Manufacturing Technologies.