

Maritime training between old and new techniques

Radu Hanzu-Pazara

Lecturer, Constanta Maritime University, hanzu@imc.ro

Paulica Arsenie

Associate Professor, Constanta Maritime University, arseniep@imc.ro

Liviu Constantin Stan

Lecturer, Constanta Maritime University, liviustan14@yahoo.com

Abstract Maritime education is a field that combines theoretical and practical knowledge's in almost 80% of the mandatory learning curricula. In many cases, the practical applications are more advanced than the theoretical support. In order to cover this inconvenience is necessary to keep theoretical knowledge's updated to the level of actual practical techniques used in applications and meet onboard the ships by the students, future officers. The use of computerized applications, use of simulated exercises and on-line learning are some procedures that mark the progress of maritime education and training in this stage. This new approach of teaching includes methods of communication between teacher and students, including specifically oral, electronic and multimedia forms of communication. Some of these procedures are successfully applied in our university. By introducing in the teaching process of different forms of computerized applications, simulators and multi-media courses is targeted the best understanding of different concepts, theoretical or practical, by our students. Last years analyze show an increased interest for electronic forms of training by students, they considering more suitable for their generation to access the information through internet facility and in an interactive form.

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1. Introduction

From the beginning of his history, the humanity has been attracted by the seas. Starting from here, navigation can be considered as an activity with a long history. From the first stages navigation has requested knowledge about how it can be done. In this way, during time, has been developed specialized trainings and techniques adequate for implementation of these trainings. In time have been developed cycles of studies dedicated to maritime training, based on clearly international requirements, with main objective to cover the necessity to have more competent persons on board ships.

Today, many of study disciplines included in maritime training curricula are based on theoretical knowledge and practical applications. The theoretical knowledge's not suffered many and major changes during last years, but, the practical applications have changed accordingly with the technological evolution. So, in this context, the use of computerized programs, multimedia systems and simulators in the training process have become common techniques.

The impact of classically training methods on graduate competency is known, the impact of new methods is under study. We say under study because the use of latest technologies in the maritime training process has a relative short history and due to continue improvements of these technologies, the results have not been completely counted.

An appreciation of the impact produced by the insertion of modern teaching techniques in the training process can be seen through the activity of younger officers onboard ships, where simulated applications are meet in a real form. According with statistics communicated by the shipping companies, the younger officer are more familiarized with the technology presents onboard and have a higher capacity in use of these for a more safer activity.

Even if the modern training techniques have a major role in achievement of future maritime officers competencies and professional skills, never must not be forget the importance and position inside of training of so called classical training methods, like chart working, communication, written transfer of information and teacher implication in the act of training.

Many of the basically knowledge can't be transferred through other methods then classically ones. In this category we include knowledge about principles of navigation, ship handling theory, loading of cargoes principles and engine working principles.

On the other way, is very difficult, almost impossible, to create sophisticated applications using simulators or other computerize programs, without a strong theoretical basement.

Taking in consideration all aspects regarding maritime training, is necessary to know to combine in a harmonious way the theoretical knowledge with practical application and also traditional training methods with the modern ones, in order to achieve the major goals of this training, more competent peoples onboard ships.

2. Role of teaching methods in maritime training

As we stated before, in the present, the maritime training curricula is based on theoretical knowledge and application of these for different situations. Each of them, theory and practice, have an important role in the maritime training process, even there are voices which considers one or other more important. We accept that practical skills are important in a practical activity like maritime navigation or ship engineering, but also we consider, and know, that no one has born with knowledge about navigation and ship engines. So, is important, as maritime teacher or trainer, to know the role of each part, theory and practice, in the entire training process, and most important to choose the right methods for implementation and development of knowledge which wants to transfer to the student.

During times was experienced many methods for knowledge transfer inside of a training process in different fields and from each of them has hold better aspects and through the next method has tried to improve the previous.

The beginning of training methods was based on written and oral techniques for knowledge transfer. Inside of these techniques an important position was occupied by the teacher and his skills in communication.

Inside of teaching and training process, the communication is a vital part of it. In an informative environment, as academic, the freedom of information must be certified. For this reason is necessary to develop systems to facilitate information transfer. Lecturers and students, as main elements of this system, must to be able to assure a correct information transmission and receive.

Long period have considered that only teachers are responsible for information issues. Now, students have their contributively part at this process. Taking account the present stage of research activities and the fast moving of information in all media systems, students can have their own opinion about it, opinion which can contribute positively to the development of the studied subject.

So, the communication today must be considered a two-way process. This mean that information sent must to have a reply, as a feedback. Based on the received feedback, sender can have an image of his own capacity in generation of information.

A positive feedback is an encouragement for future new ideas and information, for a higher development of the present stage. On the other way, a negative feedback can produce two effects: first to lead to conclusion of a necessary improvement of the present stage, second, to cut any interest in the subject and leave it.

From these considerations we can deduce the role of verbal and written communication as part of maritime training. Communication have an important role also when is use an advanced training technology. Here communication is the first stage of an application when is transfer all the details and requirements of the future activities. If communication is realized in a wrong manner or information transmitted is not correctly understood, the scope of application can be completely compromise.

Transfer of knowledge through written form is use especially for courses and laboratory application content development and can be seen as easier training method.

Both of these training techniques are consider the classically ones and here the teacher has a very important role in selection of information and right method of transmission.

If these are considered as traditional methods, today become more important the new ways, like computerized and virtual environment communication tools.

Computer based training is not a new tool for training and connection between lecturers and students. These computerized programs for training are used today in many teaching domains, being designed to help students to acquire knowledge and to do this without a lecturer near by. In the maritime academics this training tools have an important role due to necessity of mixing theory and practice. During practice, especially on sea, students can be connected with the theoretical aspects of their duties and with a dedicated lecturer through these programs.

Beside of the advantages presented by these programs, there are some disadvantages, especially regarding the production costs of these materials and the time spent for concept and creation.

In many situations, the computer based training have replaced by the e-learning or by the on-line training. These new methods of communication and training permits real time transfer of information and a direct connection between students and lecturer.

Many universities have developed system for communication between lecturers and students, especially on-line systems which offer possibility to test courses content and teaching materials, to find students opinion about these and to help lecturers to make changes and necessary improvements to their own course materials. Many of these communication systems are created inside of the institution web portal or like an independent teaching platform.

3. The connection between the use of new training techniques and improvement of the training process

In the present days, the computers and computerized programs are part of the life of many people. The computerized technologies are becoming indispensable for many activity fields, computers being part of the educational processes, or even the essence of these.

Various technologies as simulators, computerized programs and many types of virtual learning as web platforms and virtual campuses are used today for training purpose in the maritime academic field.

All these have their own history and evolution, some faster, others in time, but all, as single or combined, help to reach the final goal, better trained seafarers for more and secure oceans.

From all these training procedures, the first were the specialized training programs, based on computerized technology and used mostly for designing and studying of different processes. Being the pioneers, these programs did not have a very expressive way of revealing the results and in fact, the procedures for obtaining these results were difficult. Having a poor data base, it was necessary for applications to know the entrance data and all usable variables as user. During time, these programs have been improved and in short time they became indispensable for training courses regarding ship design, engine design and engine internal processes, and liquid cargo transfer or in situations that request a deep study of thermal and tensional processes inside of different parts of ships body.

The next step in the technological development of the training process has been marked by the advanced computerized programs, more complex, with a more realistic presentation of processes and operations - the simulators. Basically, the simulators consist of computerized programs, but the graphical expression is more evaluate, the images offered are closer to reality and in this way, they allow to the user to interpret easier the information.

The use of simulation in providing solutions to the problems of risk and crisis management and the optimal use of crew resources has a long established pedigree in maritime training [1].

Simulator-based training courses were introduced primarily to train the skills of passage planning and the importance of the Master/Pilot relationship [2].

The 1980s saw the introduction of Engine Room simulators and towards the end of that decade, cargo operations simulators also became available. These types of simulator have primarily been used to train officers in the handling of operations, including fault finding and problem diagnosis, and increasingly to train teams in the skills of systems, resource and risk management.

Many types of simulator: bridge, engine and cargo control room, have tended to emphasize a physically realistic environment in which these exercises occur, although of the PC-based simulators for training some tasks is increasingly widespread [5].

The only mandatory requirements in the maritime domain for the development of the non-technical skills of crisis management are those of the International Maritime Organization's (IMO) Seafarer's Training, Certification and Watchkeeping Code. Table A-V/2 of this code specifies the minimum standard of competence in crisis management and human behavior skills for those senior officers who have responsibility in emergency situations.

The simulators used in the maritime officers training are a compulsory request of the STCW Convention and Code in order to assure an increased safety of maritime activities.

The competence assessment criteria detailed within the Code are not based on specific overt behaviors, but rather on generalized statements of performance outputs, and as such are highly subjective and open to interpretation.

At the end, but not the last, the technology used in the present training process uses the virtual techniques through its components as on-line teaching and web based applications.

The incorporation of the elements of information and communication has been highly accepted and renowned as valuable aspects in the formation process of engineers and technologists.

The advent of on-line technologies coupled with an emerging recognition of the importance of effective teaching are acting together as catalysts to change the face and nature of teaching and learning across all sectors of education. Significant changes appear to be emerging in higher education and in many components of school education. Through on-line technologies, we finally appear to have the means to create the forms learning environments that we know work best. The classroom of tomorrow is starting to emerge and it is quite different to the classroom to which many are accustomed. Perhaps the most noticeable difference is in the roles of the participants. Everyone seems to have to do things a bit differently [4].

On-line learning can be an active and engaging experience. There's not much room for spectating in a well-designed on-line learning environment. Students are encouraged to collaborate and work together. The environment is usually one of a shared learning space with learners attentive and receptive to others in the class.

Move to on-line is coinciding with moves to more authentic learning settings. The on-line technologies encourage and support such strategies as problem-based learning, case-based learning and even work-place learning. The concept of a classroom as a place of learning is expanded as the classroom loses its boundaries [4].

Learning on-line encourages and supports the development of a range of students' key and generic skills. There are many useful skills that can be developed through networked learning including information literacy, task management and working with others. Learners become self-sufficient and cognizant of their own role in influencing what is learned. It's all about whom takes responsibility for what is learned.

Learners often need to be encouraged and induced into the changed roles and need to be consulted and negotiated with to gain their cooperation and consent [3].

4. The impact of new training techniques on student's competencies and skills

The use of the latest technology during the training process in maritime field has a good impact on increasing safety and security over seas. This impact, as results of training, is seen in time and evaluated from feed backs received from companies where graduates work after finishing studies. Other modality to evaluate the impact, as general evaluation, is represented by the reports of international organizations regarding safety on sea and from them to extract the percentage represented by our graduates.

These evaluations are used for maritime transport sector, where graduates work as ship officers, for rest of graduates who work in connective activity domains, as port operation, ship operations and others, and the evaluation feed back is provided mainly by the companies.

Beside of these evaluations provided by the independents and also beneficiaries of the training results, our university, as maritime trainer provider, have designed its own evaluations, made during studying years and after graduation.

The maritime statistics show a large number of ship accidents as capsizing or sinking caused by the deficient loading of ships, completely ignoring tensions in the hull or not enough studying them according with the sea state during voyage. More tragically is that these types of accidents have human casualties and for protecting human life on sea in these situations, one must know what can happen in case of over solicitation of ship structure.

In the same direction, now are used loading simulators, especially for specialized ships, as oil and chemical tankers and gas carrier ships. Based on information about ship structure behaviour for different loading conditions and using simulators after, can be completed the training related to ships operation.

During simulated exercises students have the possibility to operate different types of cargo, with different characteristics and, most important, different grades of risk. This training offers possibility to become familiar with the future real operations onboard of these ships.

For officers who intend to work on board all types of tanker ships is compulsory to provide special training.

Making an analyse of the results after training with and without technology in line of ship operation, mainly loading operations, we observe an increasing level of knowledge and skills at students that complete this training using simulators and computerized programs. Also, their professional evolution onboard ships can evolve successfully, considering them able to get a more rapid accommodation to ship equipments designated for cargo operation.

In the navigation field, the main technology used for training is represented by the ship handling simulator and crisis management simulator. Both of them have important roles in the safety area, basically helping the trainee to realize a safety ship navigation, second to protect the environment in case of maritime disasters, as ship collisions followed by the oil pollution.

The classical training for avoiding collision supposed the use of plotting paper for calculation of optimum avoidance manoeuvring. Today, the simulation techniques allow not only to calculate and deduct the right avoidance manoeuvring, but also to live this manoeuvring. This possibility offers a way to understand exactly what presumes such a manoeuvre and to correlate the avoidance information with the ship handling procedures.

The practical results of this innovative method are represented by the decreasing of collisions in simulated environment with over 60 percents compared with the classical procedure.

In the real environment the results are almost comparable with the simulated ones, statistics being obtained from shipping companies that take our students as cadets or officers and also from our students from their own experience as cadets. Over 80 percents of returned students from their cadet practice revealed that the hours spent in ship handling simulators were very usefully onboard and allowed them to be familiarized with ships bridge equipments, to react faster in different closer situations and to prove to their trainer officers their own level of competency.

Training on ship handling simulators gave better results for graduates, which after a number of years spent on sea, decided to work in the harbour pilot activities. For these, it is imperatively important to know how to handle a ship in small spaces as harbour basins and how to use correctly ships handling capacities.

Also, this training is requested in order to raise graduate's interest to work in the vessel traffic control services, where is necessary for ship handling characteristics and capacities and to anticipate the dangerous manoeuvres.

Crisis management simulator has proved its utility through the reduction of cases of large oil quantity pollution or limitation of such pollutions. From their recruitment in the training process until today, the number of wrong actions in case of accidents with oil pollution has decreased with 40 percents due to a better knowledge of the indicated procedures and protocols applied in these situations.

Besides the training of future or actual maritime deck and engine officers, these simulators are usefully for training of personnel engaged in solving dangerous situations, as emergency situation inspectorate personnel, which has possibility to perform different emergency situations involving commercial ships or other type of boats, for lives saving operations and help of a boat in distress.

In connection with online training, our university developed in time its own web based training system, where our students and former students can find necessary information's as courses and applications.

This facility is very usefully in the distant learning concept, and taking into account the maritime work environment, this concept is very agreed by the present seamen who want to improve their skills and competencies in order to accede to a superior rank, to pass to ship officer position.

Almost 80 percents of the students included in the part time study cycle are accessing this form of courses provider, doing this activity during their onboard stages, in order to be ready for exam at returning home.

The communication between trainers and trainees can be done through different ways, using the electronic correspondence or an open forum for general impressions and opinions. These communicative procedures can help the improvement of the present data and to generate the development of additional subjects with role of covering of missing data or usefully information's for the principal courses.

5. Conclusions

We are living in a time of changes. Many of well known activities are change today or just transform. This process doesn't avoid the training field, either the maritime training system. But, the present change doesn't means to give up completely to the previous training methods and techniques.

In the actual context is important to realize a good harmonization between older and new techniques, to combine in a right way theoretical knowledge with practical skills, to put together traditional teaching methods with latest technologies use for training, in order to achieve the main goal of any maritime training, better trained personnel onboard ships.

In the present paper we tried to present different types of training technology, some classically, other of the last moment, and to show the advantages of each of them and how can contribute, through a correct usage, to increasing of maritime training level and graduate's competencies.

As a conclusion of ours analyze, we consider than new techniques have a clearly way for development and part of them, like virtual learning, will become in the future the most common way of training, maybe, with some reserves in the maritime field, due to specificity of training and necessity of a lot of practical applications, difficult to be realized completely in a virtual environment.

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