

# ENCOURAGING RESEARCH IN MARITIME EDUCATION & TRAINING

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## **Abstract**

*Education and training are vital to the development and success of today's knowledge society and economy. The EU's strategy emphasizes countries working together and learning from each other while the EU education and training policy underlines that knowledge, and the innovation it sparks, are the EU's most valuable assets. Innovation projects aim to improve the quality of training systems through the development and transfer of innovative policies, contents, methods and procedures within vocational education and training. This paper intends to discuss innovative MET (Maritime Education and Training) projects to encourage future research collaboration which might be of interest to other higher education and training institutions.*

**Keywords:** *higher education, innovation, MET Programmes, research projects*

## **Introduction**

Shipping is perhaps the most international of the entire world's great industries and one of the most dangerous. World transport and shipping are a derived demand of world economic development [13]. There are very large volumes of goods and materials, as well as people, which are transported daily from one geographical location to another. Considering the types and volumes involved, the demand for shipping becomes clear. Over 90% of total world cargo is transported by ships and volume of maritime trade is increasing every year [8]. Shipping therefore, is an overwhelming means of allowing economic resources to be transported, and hence a major facilitator for economic development worldwide. The global economy is built on integrated supply chains that feed components and other materials to users just before they are required, and just in the right amounts. If the supply chains are disrupted, it will have repercussions around the world, profoundly affecting business confidence [1].

Safety of life at sea, the marine environment and over 90% of the world's trade depends on the professionalism and competence of seafarers [15, 7]. It has been reported that over 80% of accidents and incidents are due to human error [10]. A close investigation of casualty analyses considered approved by IMO<sup>1</sup> (sub-committee minutes, 12th session, 2004), particularly focusing on the causes of accidents clearly indicates that standards are not applied correctly and when human factor issues are studied carefully, there are omissions in the education and training programmes received by the seafarers involved in accidents [7, 17]. IMO has passed the responsibility for delivery and assessment of these programmes to member countries and does not take part, in any shape or form, in the inspection, evaluation or delivery of these programmes. It is a welcome development that EMSA<sup>2</sup> has been involved in visiting MET providers in many EU and candidate countries to audit the education and training practice against STCW requirements.

Today the development of a Maritime Education and Training (MET) system is a dynamic process under the pressure of rapidly improving maritime technology. Technological developments will almost certainly continue to create the potential for innovation in international shipping, but creating the conditions required to capitalize on that potential is likely to demand new ways of thinking, new ways of working, and a new framework for understanding reality [12].

An ideal development cannot be achieved by considering the existing practice and internal processes and procedures only, and needs to have a wider perspective by reviewing best practices to establish the necessary benchmark. Rapid introduction of IT (Information Technology) into navigational equipment and ship operation supporting systems such as AIS (Automated Identification System), ECDIS

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<sup>1</sup> IMO (International Maritime Organization)

<sup>2</sup> EMSA (European Maritime Safety Agency)

(Electronic Chart Display Information System), IBS (Integrated Bridge System) or introduction of an e-Navigation system requires inclusion of marine-related IT technologies in respective MET (Maritime Education and Training) Programmes [6]. However, there is no doubt that this shall increase the number of dedicated hours of respective units, not only for the classroom theoretical training, but also for the extensive use of simulators for the familiarization and skill enhancement. On the other hand, sea training onboard a ship is a must for all seafarers of various types and ranks and plays a very key role in the education and training of cadets. However, the training opportunities aboard ships offered by shipping companies have been significantly reduced, and due to commercial pressures in recent years resulting in minimum manning levels together with increasing level of automation, the nature and the quality of training on board have significantly changed for the worse. These have not been good signs for a cadet trainee as training onboard also plays a vital role for related research issues. The socialization process experienced on the ship would probably affect one's recognition as to whether one fits the environment and further affect one's intentions to remain in the profession after graduation, as it is considered that the fit between one's character and work environment is the basis for one to choose a career [9].

### **Aim and Objectives**

Research is an effective means of underpinning further and higher education programmes, developing and motivating staff, establishing working relationship with industry and commerce and developing independent and self learning while preparing students for the future. Recent research has shown that the response of International Bodies to address identified deficiencies on STCW content, language competence, automation, emergency situations and environment are generally slow, sluggish and/or lacks resources [5].

To overcome these deficiencies, TUDEV (Turkish Maritime Education Foundation) established a partnership with well-known and well-respected international maritime institutions and universities in UK and in other European Union member states and through working with organisations such as BTEC/Edexcel (Business and Technology Education Council), MNTB (Merchant Navy Training Board), NVQ/SVQ (National Vocational Qualification) authorities and professional institutions such as IMarEST (Institute of Marine Engineering, Science and Technology) developed a set of most up to date programmes for Deck officers as well as Senior Deck officers and similar programmes for Marine Engineers and senior Engineer officers [2]. These co-operations and partnerships, including staff and student exchanges, not only provided opportunities for collaboration and joint programme and unit design and developments, but also initiation of a number of funded European Union projects. These European Union funded projects, which TUDEV is either leading or is a partner in, have been used as catalyst for programme and unit development. The outcomes of such projects are reflected in the programme development process of which onboard training and use of advance simulators forms the focal part of [5].

### **European Strategies for Vocational Training and EU Projects**

European integration and the creation of a united economic area has resulted in convergence of legislation of EU countries as well as the candidate countries as a first step towards the harmonization of different national conditions and standards that now have to be incorporated into a single environment. Safety at work constitutes one of the EU's most important social policies. The European council stressed that Europe was going through a transition to a knowledge based economy, marked by profound changes effecting society, employment and safety at work. The European Commission's recent adaptation of "investment in people" and the Commission's "investment in quality" are two policies that the proposed programmes are supporting. The EU strategy relating to both policies is based on consolidating a culture of risk prevention, and 'on right first time' philosophy, as well as on combining a variety of tools, with training and awareness, being the most important ones.

The recent decisions made by the European Council requires EU membership countries to complete alignment with EU maritime legislation in safety and non-safety areas and to improve maritime safety, in particular improve the performance of maritime safety administrative institutions, firstly as a flag state, and then as a port state, and guarantee their independence. The EU also expects countries to implement a programme of adaptation of the transport fleet particular in maritime transport to Community technical norms. The candidate countries have to ensure effective implementation and enforcement of transport legislation, particularly as regards to maritime safety.

The achievement of harmonising the education and training programmes [13] with specific emphasis on improvement of training relating to safety topics as well as accredited and internationally accepted programmes for assessors and verifiers (the teacher/trainers and those who verify compliance, both internal and external), and finally the provision of transnational multilayer pathways for transfer of students/cadets as well as teacher/trainers are the main innovative aspects of the all new projects. The provision of integrated diplomas and degrees incorporating vocational and ancillary skills, which are recognised worldwide, are also considered innovative. For this reason a new EU Funded project was initiated by TUDEV named UniMET [18]. UniMET ([www.unimet.pro](http://www.unimet.pro)) intends to harmonize the MET, go beyond the IMO STCW minimum standards, and in the process identify good practices for future implementation.

## **Methodology**

Safety at sea is an international issue and safety is as strong as its weakest link. Many countries often due to lack of resources, have not been able to improve their safety records. The quality of the education and training programmes of seafarers from these countries should be on the national agenda of all flag countries and those operating ports worldwide. The weakness in one flag state could have, and often does, an adverse impact in another geographical location.

To resolve the identified deficiencies [15,16,17,18] in education and training of merchant navy personnel a partnership was established between TUDEV and C4FF ([www.c4ff.co.uk](http://www.c4ff.co.uk)), called as MarEdu ([www.maredu.co.uk](http://www.maredu.co.uk)). To understand the problems in detail, a pilot project SOS (Safety On Sea, 2005-07), funded by the EU Leonardo programme, was launched. A partnership initially consisting of Turkey, Scotland, England and Norway was formed to identify major problems and good practices in the partner countries by using Pareto analysis and cross-referencing techniques. The partnership developed integrated world-class programmes of education and training both for navigation engineering and marine engineering cadets wishing to acquire internationally recognised qualifications as officer of watch [18]. The Project also developed pathways to progress onto higher qualifications viz., chief mates and chief engineers as well as becoming a master and captain of ocean going vessels. Several other EU projects were also instigated in parallel to SOS. A summary of SOS and other related projects are presented in the following paragraphs.

## **Projects**

### **SOS (Safety On Sea) Project**

The first task of SOS Project ([www.surpass.pro](http://www.surpass.pro)) was to review existing programmes in the partner countries to identify the differences and discover a methodology for harmonising education and training systems and practices in collaboration with the relevant authorities in each of the member countries [3]. The review of the programmes led to many productive discussions and adaptation of cross-referencing methods developed as part of an earlier EU programme, EUROTECNET. The cross-referencing tables provided a means of comparing programmes in different countries in the partnership. In doing so, with no disrespect to organisations involved with validation and accreditation of these programmes, it was realised that there are serious differences in standards being applied, and even in the pathways chosen to satisfy the requirements of the same awarding body or even the same licensing authority. The content and standard of the sea service record books were also very different.

The unifying factor was the IMO syllabuses which are the basis of all MET programmes in the world. The partner countries' programmes have integrated these syllabuses to varying degrees of complexities into their own national programmes. To harmonise and at the same time to improve the standard, for instance, the Turkish project team using the syllabuses developed by northern European countries, which in turn are based on IMO's, revised programmes and at the same time, applying cross-referencing techniques also satisfied the requirements of the national authorities as well as those of a major international awarding body (BTEC/Edexcel) for the award of a higher national diploma (HND). HND graduates, who also carry out their sea training according to recognised standards, for instance, Merchant Navy Training Board (MNTB) as part of the National/Scottish Vocational Qualification (N/SVQ) programme, provided they successfully conclude the required ancillary courses are exempt from any written examination when applying for their certificate of competency.

### **Project MarTEL (Maritime Test of English Language)**

This project makes an attempt to overcome the problem of not having international or European standards for Maritime English ([www.martel-tests.org](http://www.martel-tests.org), and [www.martel.pro](http://www.martel.pro)). The project [15] intends to establish a set of standards by transfer of innovation from existing English language standards and maritime English model courses such as International Maritime Organisation's (IMO) SMCP (Standard Maritime Communication Phrases, 2001). Review of the arguments from the recent IMO meetings (IMO MSC, 2006) considering MSC 82/15/2 and MSC 82/15/3 had identified that 'there is a compelling need to promote a high level of working maritime English language skills'. Several EU member states have invited STW sub-committee to consider how the requirements in the STCW-Code can be strengthened in this connection. It was noted that deficiencies in maritime English causes accidents and therefore needs to be seriously taught in the basic and the main training of all Chapters of the STCW Code of practice. This Project therefore is a maritime language competency assessment project for the language certification with the main aim of developing a series of maritime English language standards incorporating also the IMO's SMCP.

### **GMDSS (Global Maritime Distress and Safety System) I and II Projects**

The GMDSS I Project ([www.egmdss.com](http://www.egmdss.com)) focused on provision of vocational education and continuing vocational training for Short Range Certificate (SRC) which is mandatory for seafarers operating vessels of up to 300 GRT within 30 NM from coast. To obtain the SRC award a candidate must be able to competently operate four different GMDSS communication devices (VHF DSC, NAVTEX, EPIRB and SART). These devices are only used for emergencies at sea which occur rarely. Therefore, the knowledge of operation of these devices tends to fade over time and should be regularly refreshed to ensure safety of crew, passengers and freight (even though this is not a legal requirement). After the successful conclusion of GMDSS I, GMDSS II Project was launched for the LRC (Long Range Communications). The intention is to cover all aspects of GMDSS Communications in the future projects.

### **TRAIN 4Cs I and II Mobility Projects**

To try and test the pathways developed in the SOS project a Leonardo Mobility programme was developed in conjunction with MarEdu. The project aimed to improve safety at sea through a mobility programme (TRAIN 4Cs I) involving the transfer of cadets from TUDEV in Turkey to Glasgow College of Nautical Studies (GCNS) in Scotland, on a pilot basis. The period of placement is for 14 weeks. Some of TUDEV Cadets were also transferred onto the final year of the Plymouth University's BSc (Hons) Degree in Nautical Science and all were successful and received their degrees.

### **M'AIDER Maritime Aids Development**

M'AIDER project ([www.maider.pro](http://www.maider.pro)) was developed as a follow-up to the former SOS Project in coordination with several partner countries in Europe. This project proposal concerns transfer of innovation from existing reports concerning accidents and incidents for creation of a range of scenarios for applications in simulators relating to emergency situation. It is acknowledged that emergency situations and use of simulators have not been fully taken into consideration and that industry would immensely benefit from a user-friendly and accessible training tool and programme for its sea-going personnel focusing on emergency situations; the causes for this situation arising and how they are handled.

An existing software and internet platform will be used to transport these simulation trainings for greater access throughout the partnership as well as outside of it. The platforms have got facilities for e-learning as well as e-assessment for self assessment.

### **Project SURPASS (Short Courses Programme for Automated Systems in Shipping)**

The main aim of this project [17] is to fill the gap created as the result of the emergence and application of the automated systems in the education and training of seafarers by provision of a training course enabling them to have a full understanding of automated systems, and these systems' weaknesses and limitations. This aim will only be achieved if a well-planned literature review of, on the one hand, the

automated system and components, and on the other hand, the accidents and incidents, such as that by Savannah Express (2005) [17] or the very recent sinking of Glorious (2007) in the Istanbul Strait, are carefully and meticulously carried out. The former accident was due to engine failure and the latter due to navigation (steering, rudder) failure.

## Conclusions

The development of the integrated and unified programme for the education and training of merchant navy personnel under the SOS programme has led to a set of programmes which include all good practices both for Deck and Marine Engineering. The programmes were developed with support from major awarding bodies such as BTEC and several universities, accrediting bodies such as IMarEST and licensing authorities including the UK's MCA. The programmes have now been reviewed by EMSA and are now completely in compliance with EMSA requirements [4].

All projects summarised above are in line with the EU's policy and strategy (IMP and Knowledge 2020) which emphasizes countries working together and learning from each other and the EU's education and training policy which underlines that knowledge and the innovation it sparks as the EU's most valuable assets. An attempt was made to ensure that there is an e-learning and assessment platforms for all projects for wider dissemination purposes.

The development of newly revised programmes, within the European Qualification Framework (EQF) addressing the overall problems concerning safety at the source viz., education and training of cadets and the existing officers working in industry [18] is expected to make a major impact. The success of the MarEdu initiative has led to other projects being instigated and thus helping industry to update its skills and hence maintain the current efforts in improving safety at sea and in ports.

Developments are on-going and it is expected that many other organisations involved with education and training of merchant navy officers including awarding, accrediting and licensing bodies would join the partnership. There are now over 30 major centres working with TUDEV supporting various European Projects.

The Turkish Chamber of Shipping has been investing on Maritime Education and Training for a long time not only for own interests but also to become a major seafarer supplier of the worldwide shipping. As a result of these initiatives, Piri Reis University was established by TUDEV as a continuation of a former Maritime Institute for higher degree programs in maritime related issues. In the second half of the next decade, world maritime will witness the rising quality of the Turkish seafarers who are poised to carry world shipping to highest standards. TUDEV's experience on research programmes are also transferred to Piri Reis University along with staff transfers, and they will also continue full speed ahead to bring innovative solutions to the most critical issues of the maritime industry. At the end of the next decade we can foresee more unified MET Programmes, enhanced communications levels and hence better understanding and cooperation among those working in the water transportation sector which will reduce all losses significantly. Piri Reis University will be looking forward to any co-operation with and/or partnership invitation to any innovative MET related research project.

**Acknowledgement:** Authors would wish to thank Mr Sualp Urkmez (Furtrans), Mrs Sadan Kaptanoglu (Kaptanoglu Shipping) and Dr Basak Akdemir (Makro shipping) for their permission given for summaries of their EU funded projects they have been implementing in collaborations with TUDEV.

## References

1. Albayrak, T. Tudev and Maritime Training Strategies. Turkish Shipping World Magazine, December 2007, pp. 20-26.
2. Albayrak, T. Tudev Full Speed Ahead on the EU Route. Turkish Shipping World Magazine, January 2008, pp. 34-37.
3. Albayrak, T. New Horizons – The Imarest Accreditation Visit. Turkish Shipping World Magazine, May 2008, pp. 18-21.
4. Albayrak, T., Ziarati, R. New Methodologies and Technologies in Maritime Education and Training (MET). In: Proceedings of the 16<sup>th</sup> IMLA (International Maritime Lecturers Association) Conference (İzmir, Türkiye, October 14-17, 2008, Dokuz Eylül University), pp. 63-75.

5. Albayrak, T., Ziarati, R. Training: Onboard and Simulation Based Familiarisation and Skill Enhancement to Improve the Performance of Seagoing Crew. In: Human Performance At Sea. Proceedings of Conference (Glasgow, UK, June 16-18, 2010, Strathclyde University).
6. Barsan, E., Hanzu, P., Arsenie, R. New Navigation Competencies. *Pomorstvo*, god. 21, br. 2, 2007, pp. 151-161.
7. Brady, P. Rear Admiral. The Timeliness of the STCW Convention/Code Revision – STW Chairman Update. In: Proceedings of the 16<sup>th</sup> IMLA (International Maritime Lecturers Association) Conference (İzmir, Türkiye, October 14-17, 2008, Dokuz Eylül University).
8. Fuazudeen, M. Seafarers' Training and the Comprehensive Review of the STCW Convention and STCW Code. In: Proceedings of the 16<sup>th</sup> IMLA (International Maritime Lecturers Association) Conference (İzmir, Türkiye, October 14-17, 2008, Dokuz Eylül University).
9. Holland, J.L. Making Vocational Choices: A Theory of Vocational Personalities and Work Environments. Odessa (Floride): Psychological Assessment Resources Inc., 1997.
10. IMO, 'sub-committee minutes', 12th session, 2004 (and 13.01.2005, www.imo.org/human element)
11. IMO MSC82 82/15/2 and 82/15/3, 2006 IMO, Assembly A 26/INF.426<sup>th</sup> Session 22 October 2009, Young Seafarer's Focus Group 2009
12. Robinson, J. E. Waves of Change-Inspiring Maritime Innovation in the Information Age. The Nautical Institute Press Modern Colour Solutions, Middlesex, England, 2007.
13. Sag, O.K., Ziarati, R., Özkaynak, S., Yıldırım, M. An Innovative MET Model in Global Higher Education. In: Proceedings of the 16<sup>th</sup> IMLA (International Maritime Lecturers Association) Conference (İzmir, Türkiye, October 14-17, 2008, Dokuz Eylül University), pp. 1-14.
14. Zachcial, M. The Present and Future Developments of World Shipping and Ports. In: Proceedings of the 16<sup>th</sup> IMLA (International Maritime Lecturers Association) Conference (İzmir, Türkiye, October 14-17, 2008, Dokuz Eylül University).
15. Ziarati, R. Safety At Sea – Applying Pareto Analysis. In: Proceedings of World Maritime Technology Conference (WMTC), Queen Elizabeth Conference Centre, February, 2006.
16. Ziarati, R., Ziarati, M. Review of Accidents with and on Board of Vessels with Automated Systems – A Way Forward, AES07, Sponsored by Engineering and Physical Science Research Council in the UK (EPSRC), Institute of Engineering and Technology (IET, Previously IEE), Institute of Mechanical Engineers (IMechE), IMarEST, 2007
17. Ziarati, R., Ziarati M. Surpass - Short Course Programme in Automated Systems in Shipping. In: Human Performance At Sea. Proceedings of Conference (Glasgow, UK, June 16-18, 2010, Strathclyde University).
18. Ziarati, R. A Cooperation Project in Education: UniMET. *Turkish Shipping World Magazine Monthly*, September 2010, pp.76.