The Royal Institution of Naval Architects

Education & Professional Development of Engineers in the Maritime Industry

International Conference on Education & Professional Development of Engineers in the Maritime Industry

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and appropriately in reality. Hence, in order to scope all possibilities of risks, university opens It is used to reduce operational risk and prepares operators for most possible and impossible useful developments that may occur in the near to mid-term future.

The rise of 3D CAD has allowed the preparation of design images more quickly, although interpreting a drawings, which can be time consuming to prepare and require skill to interpret. In recent years the students have used the Web application of the Navy ENCOWAR (Maritime Collaborative Website of the Spanish Navy) to send the required maritime security online forms required by the NCGAS (Naval Cooperation and Guidance for Shipping) tool. In turn, for greater interaction, the Spanish Navy designed an online version of the website that would allow the students to simulate the conditions of the corridors. Students have used the Web application of the Navy ENCOWAR. In the website, they also had access to a chat for communication between students, professors and participating naval officers. The Spanish Navy defined the levels of security at each two selected routes, with this; students have learned what corrections should be made in the design or transformation of vessels to avoid terrorists or piracy actions. Once the exercise was finished, we generated a Likert survey that allowed us to measure the acquisition of knowledge and skills gained by Maritime Engineering students.

DEVELOPING NAVAL ENGINEERING WORKFORCE THROUGH UNDERGRADUATE RESEARCH AND EXPERIENTIAL LEARNING Jennifer G. Michaeli, Paul Moses, Orlando Ayala, Gene Hou, and Sebastian Bawab, Naval Engineering and Marine Systems Institute, Old Dominion University, USA. Old Dominion University (ODU) is located in Norfolk, Virginia in the Hampton Roads region that is home to approximately 83,000 active duty Naval personnel. ODU maintains close partnerships with the US Navy, as well as the maritime, shipbuilding and ship repair industries in the Hampton Roads region. In 2014, ODU introduced the Naval Engineering and Marine Systems Institute (NEMSI) within the Batten College of Engineering and Technology in response to the needs of this stakeholder base. NEMSI serves as a focal point for students and faculty in the Navy and NEMSI. NEMSI has been recognized for its faculty excellence in research and teaching. The Institute has been successful in acquisition of research funds and support, including the Navy, the Office of Naval Research, and other foundations. NEMSI has been able to help students learn what corrections should be made in the design or transformation of vessels to avoid terrorists or piracy actions. Once the exercise was finished, we generated a Likert survey that allowed us to measure the acquisition of knowledge and skills gained by Maritime Engineering students.

RAPID PROTOTYPING AND PHYSICAL MODELS IN TEACHING SHIP DESIGN N Bradbeer, R Mead, N Willmore, UCL, UK As part of its MSC courses in naval architecture and marine engineering, UCL delivers a three-month ship design exercise, where groups of 3-4 students develop a ship design from requirement to concept level. A key challenge in this course is communicating geometric information, within the group as well as to external advisors and examiners. This process has traditionally been based on 2D engineering drawings, which can be time consuming to prepare and require skill to interpret. In recent years the rise of 3D CAD has allowed the preparation of design images more quickly, although interpreting a 2D image still requires skill and experience, with room for misunderstanding. One approach which UCL have started to adopt is the use of 3D printing models. These have been produced using a variety of methods, including 3D printers, CNC machines and rapid prototyping equipment. Physical models have the advantage of being very easy to interpret; their chief disadvantages being production time and cost. UCL has experimented with a variety of methods for producing physical models, and students have been required to fabricate models through a range of stages of the ship design exercise, including various forms of 3D printing and fabrication from laser-cut cardboard. This paper presents an overview of the various model production methods that have been tried at UCL, with a summary of their relative advantages and disadvantages, and suggests methods for future courses.

SIMULATION AND VISUALIZATION EDUCATION IN MORE REGION IN ASIA: A CASE STUDY OF INDIA AND THAILAND Fang Han, Faculty of Maritime Technology and Operation, Aalesund University College, Norway Simulator is an integrated engineering tool for the management and training of maritime operators. It is used to reduce operational risk and prepares operators for most possible and impossible scenarios. However, training courses usually cannot guarantee the operators use the product right and appropriately in reality. Hence, in order to scope all possibilities of risks, university opens several simulation and visualization courses to help industries to train the future developers to have a solid understanding of maritime operation and risks. The courses are developed to provide not only fundamental knowledge for students to understand the operators needs regarding to developing high-fidelity solutions for any scenarios, but also can help the maritime industries to reduce the distance between simulation and system in use in reality. The aim is to make the training courses more effectiveness and useful.

HUMAN RESOURCE DEVELOPMENT IN SHIPBUILDING TECHNOLOGY FOR INDUSTRY AND EDUCATION IN BRAZIL: A CASE STUDY AT FEDERAL UNIVERSITY OF PERNAMBUCO Armando Nelio Shinhara, Ayako Ono, Hisae Fujiiwara, UFPE - Federal University of Pernambuco, Brazil. State strategy to boost training and education initiatives in the shipbuilding sector has led to the implementation of an innovative level human resource development in shipbuilding technology for industry and education in medium and long term, in October of 2010, a human resource formation program financially supported by Brazilian Oil & Gas Company was started selecting more than 100 undergraduate students of naval and mechanical engineering to attend workshops and seminars in this field. Furthermore, due to the lack of experts in this field in Brazil, international agreements were established with top Finish Universities (TUAS, SAMS, LUT). The University of Tokyo, National University of Tokohama of Japan, access to and use of information and resources at a time, place and pace that is suitable to both the organisations. Best examples of classical institute-industry interaction can be traced in the field of Naval Architecture education training, ship and boatbuilding industry and to the state administration have been in this paper by providing traditional university-industry interaction methods and new applications and achievements in industry-Institute Interaction is yet another theme which has been outlined in this paper.

EXPERIENCE-BASED INNOVATIVE PROGRAMME IN Varna, BULGARIA Petar Vankov, Naval Academy Varna, Bulgaria, and University of Varna, Medical University - Varna, ACRO, Bulgaria We live in the “ocean” of cyber-society and this speeds up the growth of all businesses. As a result, the maritime industry is making rapid progress. The sector of higher education has to develop even more. This is to be achieved by providing students with the knowledge and skills necessary for the successful performance of their future jobs. The subject of the contemporary education of naval engineers requires the creation of modern programmes which deliver new competencies and skills. Such strategy is a key to success for a university which aims to educate and train marine professionals ready for real-life challenges. However, academic education does not reflect the dynamics of the rough sea circumstances, for example. It has been proven that basic practical tasks cannot be understood and solved by the traditionally educated students. A sustainable system of e-learning in naval engineering is not possible, it is not “aligned” with real-life cases. A clear example of this is the student’s reluctance to use the computer, and apply while teaching of its subject. The Navy Academy Varna, Bulgaria. The innovative approach respects the fundamental principles of interactive teaching and positive education. Further, the potential of technologies is utilized. The essential acquisition of knowledge and skills is taught while playing computer games. This is possible if the tutor has not only theoretical competencies but also field experiences. The contemporary educator has to be an expert both in theory and practice in order to effectively teach his students how to cross “the bridge” between science and practice “coasts”.

SKILL DEVELOPMENT IN THE MARITIME SECTOR THROUGH E-LEARNING Sohan Ray S K, Ariens International Maritime Research Institute, UAE Availability of well qualified teachers is a serious problem faced by maritime training institutions all over the globe. E-learning, which includes education via the internet or other IT enabled means involving electronic transfer of skills and knowledge through a technology interface can solve this problem to a large extent. Success of E-Learning package depends on the skills of the designer/ developer of package, the needs of the course curriculum and the students who will be involved. Most Experts (SME) play the key role, content development including instructional designers, course developers, graphic designers etc., content review by editorial and SME Reviewers and deployment which involves the packaging and delivery of content to the learners. E-learning offers flexible access and use of information and resources at a time, place and pace that is suitable to both the organisations. Best examples of classical institute-industry interaction can be traced in the field of Naval Architecture education training, ship and boatbuilding industry and to the state administration have been in this paper by providing traditional university-industry interaction methods and new applications and achievements in industry-Institute Interaction is yet another theme which has been outlined in this paper.

THE TURMOIL IN GEOSPATIAL EDUCATION: IS E-LEARNING AN INDUSTRY-RELEVANT SOLUTION? Jaimie Cross, Brian Gardner, The Marine Learning Alliance Ltd., UK The establishment of distance e-learning as a mechanism to attract students to higher education has been advanced by the proliferation of courses that are available through both existing Universities and commercial enterprises. The general skills shortage in most geopolitical professions has been identified and the skills shortages have been identified in the existing workforce, and attracting new entrants into the profession. Ensuring that students remain fully engaged with online courses has, however, long been recognised as a key link to ensuring the sustainability of the programme and the success of the education to which students remain engaged with courses provided by MLIA, following the unique delivery system and method that practically aids continued engagement and uptake of learning materials. Pragmatic guidance and advice, developed in response to our comprehensive survey, is offered to similarly seek to achieve the same goals through online/remote training programmes.
08.30-09.00 COFFEE & REGISTRATION

09.35-10.10 LESSONS LEARNED IN MARITIME SYSTEM DESIGN EDUCATION
Yushan Pan, Sashidharan Komandur, Maritime Human Factors Laboratory, Norway, Sise Flenko, Department of Informatics, University of Bergen.

Most universities and colleges open human-centred design courses for most design related programmes, majoring in human-computer interaction design (HCI), industrial engineering, ship design, mechanical design, architectural and urban design. However, most design courses teach students how to design systems and components, without teaching how to collaborate, which is essential in modern society. Most students misunderstand human beings are also actors in technology use. An obvious result is that students are not able to apply their knowledge.

In this paper, we present a collaborative approach to teaching and learning that could be applied in design education. We discuss the role of partnerships between industry and academia and the challenges of teaching design to students. We present an overview of the EMSHIP+ (European Master Programme in Ship and Ocean Engineering) and the EMSHIP+ research question.

10.10-10.45 A STUDENT'S TAKE ON EDUCATION IN THE MARITIME INDUSTRY

Having graduated from three major marine engineering courses over the past two years, namely the BEng (Hons) in Yacht and Powercraft Design at Southampton Solent University (RINA and WASET) top score, the Practical Boating building course at the International Boating Building Training College Lowestoft and the BEng with the Nautical Science degree at the University of Auckland (Yacht Engineering Scholarship, two academic awards and teaching assistant position); this paper will offer a new perspective on education and professional development opportunities in the marine engineering field, giving a unique personal perspective on industry links and employment. In total, it benefits from, including online learning resources and latest innovations. Finally, the case study of an eight month full-time distance learning research project realized in collaboration with PTD, a leading international company, shows the advantages of this new learning model. This paper presents the primary stakeholder in the education in the maritime industry: an international student, with the intent to review and share relevant experiences and inherent conclusions to improve the delivery of education and academic collaborations in the future.

10.45-11.15 COFFEE

11.15-11.50 TRAINING CHALLENGES IN AN EXPANDING ENGINEERING CONSULTANCY: GRADUATE TRAINING FOR THE MODERN MARITIME INDUSTRY

London Offshore Consultants are engaged in marine engineering consultancy with a worldwide office and client spread. The technical staff cover the full range of disciplines including naval architects, structural engineers, marine engineers, civil engineers and master mariners. Naval architects are recruited from academia through the company's graduate training scheme which is accredited by RINA. The scheme has been in operation for six years now and the first graduates are working with LOC. The growth of LOC and the increasing intake of other graduate disciplines has led LOC to re-evaluate the training model, and to increase its quality standards. The paper will outline the scheme with contemporaneous accounts of the scheme's implementation, both good and bad experience. Issues involved in the scheme's future development will be discussed.

11.50-12.25 EDUCATION OF MARITIME DOCTORAL STUDENTS AS PART OF INTERNATIONAL UNIVERSITY NETWORK

Aalto University, together with other three universities has received significant funding for an international Research Centre of Excellence for Arctic activities from Lloyd's Register Foundation (LRF), a UK registered charity that invests in science, engineering and technology for public benefit, worldwide. LRF has established a Research Centre of Excellence in Arctic Shipping and Operations. The Centre is headed by the Aalto University (Finland). Also taking part are the Hamburg University of Technology (Germany), the Helsinki University (Finland), the Norwegian University of Science and Technology (Norway) and the Memorial University of Newfoundland (Canada). The Centre will support 10 doctoral dissertations on risk management in Arctic operations over a period of five years. The Centre is the first of its kind in the Nordic Countries and the only centre concentrating on Arctic challenges. The funding provided by LRF is a very significant contribution to the activities of the consortium allowing it to continue to develop global expertise in the challenging operational environment owing to the long distances involved, the great fluctuation in ice conditions, and the unpredictable behaviour of ice. The breakthrough innovations are only possible through the interaction of research and development. The Centre, together with all the other partners involved, is responsible for ensuring the quality and full-scale observations are in balance, which can be achieved most efficiently by international networking. The mobility of the doctoral students has key importance for the success of the project. This paper will describe the basic principle concerning the mobility of the doctoral students and analyze the first experiences gathered from this mobility. The network of the students and their thesis topics will be described together with main links between the studied topics so that the overall challenging targets of the research activities can be achieved.

12.25-13.30 LUNCH

13.30-14.05 EMSHIP+: AN UNIQUE EUROPEAN MASTER PROGRAMME IN SHIP & OFFSHORE STRUCTURES
Rigo Philippe, University of Liege, Belgium.

The EMSHIP+ programme is unique because it brings together the experiences of educators, trainers, industrial partners and students in the rapidly developing areas of marine and offshore engineering. Our paper related to the EMSHIP experiences as a relevant case study:

• of academic collaborations, partnerships, and alliances,
• of partnerships between industry and academia,
• of academic collaborations, partnerships, and alliances,
• of knowledge and design practice through the PD insight, shape them as maritime system designers.

We discussed the effort that can help to increase students’ capability of understanding design, technology in use and in terms of perceptions of how well the design course can be structured students for the work practice.

Ellena Sra-Moredo Mic, Professional Training Manager, Netherlands Maritime Technology Peter de Vos Mic, Assistant Professor, Delft University of Technology, The Netherlands

This represents a preliminary programme and may be subject to change.

In order to meet the changing needs of the (international) industry the course has been reviewed such that it meets the requirements of the post academic maritime continuing education (PAMAS) demanded at the region, partnerships were created between the shipyards and academy. In order to fulfill the need of the Dutch industry for an acknowledged qualitative continuing education programme. In the near future the course may also join other international maritime accreditation, we aim to extend the course even more. The course itself (the structure of the course, materials used, etc.) will be the topic of this paper, as well as the recent view process that has been performed in order to fulfill all accreditation criteria. The fact that the course has such a high potential and strength is still record and is still able to improve, it is an accomplishment worth presenting.

14.45-15.40 COFFEE

15.10-15.45 ACADEMIC AND TECHNOLOGICAL PARTNERSHIPS BETWEEN A NEWLY CREATED UNDERGRADUATE COURSE IN NAVAL ENGINEERING AND ITS INDUSTRY LINKS
Silvio Eduardo Gomes de Melo, Paula Soemy Arruda Michima, Marco Antonio Ladasilat Petkovic, Federal University of Pernambuco, Brazil.

Brazil has established in the last few years new naval polies. Those poles, capable of building ships not present until now in Brazil, were planned in the 1990's to address the lack of technological and branch organization of the Dutch Shipbuilding industry on a course on Marine Propulsion Systems. This course has been running successfully for over a decade now, which has cumulated into more than 200 maritime professionals having benefited from the course. This paper is aimed to discuss some of the topics related to the design of Marine Propulsion systems such as the different types of propulsion systems, characteristics of marine propulsors, drive systems (components) and matching of propulsion systems. Traditionally, the course is divided over 5 modules which can be taken separately. This course has attracted many maritime professionals from various countries over the last decade.

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15.45-16.20 ITALIAN MARITIME CLUSTER AND GENOA UNIVERSITY: A COLLABORATIVE PARTNERSHIP FOR THE EDUCATION
Gianfranco DAMILANO, ATENA - Massimo FIGARI, University of Genoa - Alessio GNECCO, AIPAM - Roberto ORVETO, Board of Engineers - Carlo PEDDENZA BONHIO, University of Genoa, Italy.

The growth of LOC and the increasing intake of other graduate disciplines has led LOC to re-examine the scheme with a view to broadening its remit. The paper will outline the scheme with support 10 doctoral dissertations on risk management in Arctic operations over a period of five years. The Centre is the first of its kind in the Nordic Countries and the only centre concentrating on Arctic operations. The Centre will support 10 doctoral dissertations on risk management in Arctic operations over a period of five years. The Centre is the first of its kind in the Nordic Countries and the only centre concentrating on Arctic operations.

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