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The Paradigm of Sustainable Development in Maritime Education and Training[1]

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The comprehension of the sustainable development paradigm in the maritime industry and particularly in maritime education and training (MET) appears to be disintegrated. While announcing the 2013 World Maritime Day theme "Sustainable development: IMO's contribution beyond RIO+20", MET was mentioned among eight pillars of sustainable maritime development. However, the vision of sustainable MET was limited to "continuous supply of quality seafarers and maritime experts required for all aspects of the maritime industries"[3], which disregards the complexity of engaging into sustainable development. Consequently, the comprehensive model of sustainable MET remains unclear: is there a need to review MET systems and curriculums? Which subjects are affected by the sustainable maritime development and in what way? Are there any specific teaching/learning and assessment tools to be applied or skills to be demonstrated? Despite the absence of answers to these concerns, there seems to be little discussion among MET professionals yet. The 2015 World Maritime Day theme "Maritime education and training" is an invitation to analyse the issue of sustainable MET once more.

The paper is aimed at analysing the interrelationship between sustainable development and MET, extrapolating the pedagogical concept of education for sustainable development (ESD). It will take the reader from the definition of sustainable development to its application in the maritime industry and MET. Related challenges in shipping will be investigated along with speculations about the future demands for maritime professionals. Most importantly, the paper will explore the possibility to apply the achievements of the ESD concept in MET. Recommendations will be elaborated concerning incorporating sustainable development principles into MET with references to various aspects of MET institution management.

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[3] IMO. (2013). *Renewing IMO's commitment to sustainable maritime development*. Retrieved February 13, 2013, from http://www.imo.org/About/Events/Rio2012 /Documents/Sustainable%20Maritime%20Development%20leaflet.pdf.

This paper concludes that predominant narrow understanding of MET, as a demand derived from the maritime industry, resulted in a simplified insight into implications of sustainable development for this sector. Considering MET in a broader perspective, as an instrument to achieve sustainable maritime development, reveals a range of additional measures to be introduced into MET systems and processes.

I. Sustainable development and its application in the maritime industry

Throughout the ages humankind has relied on natural resources. However, recent technological advancement that allowed unlimited utilization of these resources, together with a constant desire for economic growth has altered human interaction with nature into exploitation. Practised in the long-term, such attitude has brought a considerable number of problems which could even worsen for future generations. Being deeply concerned with the increasing number of environmental and social issues, the United Nations have raised awareness and have taken certain actions to stop threatening trends and to restore equilibrium, which are now embraced under the paradigm of sustainable development.

Discussions on the essence of sustainable development were conducted during numerous intergovernmental and non-governmental forums[4]. Special institutions were created at local, national, regional and international levels, which prepared a variety of documents, reports, and scientific publications[5]. Nevertheless, no universal legally obligatory international agreement has been adopted.

A literature review confirms the lack of a uniform understanding of sustainable development[6]. This problem is caused by objective reasons such as the complexity of its subject matter, its multidisciplinary nature[7] and different beliefs in the ability of technology to substitute for natural resources, as well as subjective reasons such as misunderstanding, deliberate speculation, connotation and frequent incorrect references to this term as a synonym of "ecological" or "environmental". For this reason, sustainable development is often characterized as vague, ambiguous, undefined, and contradictory[8].

The World Commission on Environment and Development formulated probably the most quoted definition of sustainable development as "development that meets the needs of the present without

[4] See for instance Intergovernmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of Biosphere, 1968, Meeting of international experts in Founex, 1971, UN Conference on the Human Environment in Stockholm, 1972, UN Conference on Environment and Development (Rio Conference), 1992, UN Conference on Environment and Development (Johannesburg Conference), 2002, UN Conference on Sustainable Development in Rio de Janeiro, 2012.

[5] See for instance Declaration of the UN Conference on the Human Environment (Stockholm Declaration) and Action Plan for the Human Environment, 1972, Report of the World Commission on Environment and Development "Our Common Future" (Brundtland Report), 1987, Programme of Action for Sustainable Development (Agenda 21) and the Rio Declaration on Environment and Development, 1992, Johannesburg Declaration on Sustainable Development and Plan of Implementation of the World Summit on Sustainable Development, 2002, "Future we want", 2012.

[6] Chichilnisky, G. (1997). What is sustainable development? *Land Economics, 73* (4), *Defining sustainability,* pp. 467-491, p. 467; Jabareen, Y. (2008). A new conceptual framework for sustainable development. *Envision Dev Sustain, 19*, pp. 179-192, p. 179; Fergus, A. H. T. & Rowney, J. I. A. (2005). Sustainable development: lost meaning and opportunity? *Journal of Business Ethics, 60* (1), pp. 17-27, p. 17; Kates, R. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment, Science and Policy for Sustainable Development, 47 (3),* 8–21, p. 8; Lele, S. M. (1991). Sustainable development: a critical review. *World Development, 19*(6), pp. 607-621, p. 607; Scottish Executive Social Research. (2006). *Sustainable development: a review of international literature*. Retrieved June 8, 2013 from http://www.scotland. gov.uk/Publications/2006/05/23091323/0, p. 23; Voigt, C. (2009). *Sustainable development as a principle of international law: resolving conflicts between climate measures and WTO law*. Leiden: Martinus Nijhoff, p. 11.

[7] The lack of terminological uniformity is observed even among UN agencies.

[8] Fergus, A. H. T. & Rowney, J. I. A. (2005). Sustainable development: lost meaning and opportunity? *Journal of Business Ethics, 60* (1), pp. 17-27, p. 19.

compromising the ability of future generations to meet their own needs"[9]. The definition of this term is proposed by almost every author presenting research in the area of sustainable development; however, it is believed, that correct understanding of the paradigm rests upon proper appreciation of its content.

Considering the content, sustainable development has three pillars: economic growth, environmental protection and social equality. The perception of the relationship among these pillars has changed over the years: from three equal interactive areas to a hierarchy, where economic activities should be conducted taking into account social progress, which, in its turn, must be accomplished within environmental limits[10]. The relationship among the pillars is crucial for appreciating the whole paradigm. To demonstrate the importance of the relations, Morin gives an example of isomers – compounds with the same chemical formula but different structure, which result in different properties of such compounds. The philosopher believes that "a structure of relationship between components produces a whole with qualities unknown to these components outside the structure"[11]. Hence, a new perspective on the relationship among the three pillars of sustainable development as a whole rather than as a sum of its parts, gives to it different qualities and properties, which will be discussed later.

Sustainable maritime development[12]. Shipping has a direct and substantial influence on sustainable development. Firstly, it facilitates global commerce by transporting 80 % of global trade by volume and 70 % by value[13] in the most financially effective and energy-efficient manner. Secondly, maritime transport is important from the social perspective as it creates vast job opportunity for almost 1,4 million seafarers[14] and even more shore-based personal. Thirdly, shipping tremendously impacts both marine and air environment. Finally, in all the mentioned aspects, developing countries play a crucial role and constantly increase their share in shipping[15].

The RIO+20 Conference initiated new campaigns on sustainable development and the maritime industry was not an exception. The 2013 World Maritime Day theme was announced as "Sustainable development: IMO's contribution beyond RIO+20". In this regard, the Secretariat prepared the "Concept of a sustainable maritime transport system" (hereinafter referred to as "the Concept") aimed to cover all activities of IMO in the context of sustainable maritime development. The document defines the goals of a sustainable maritime transport system, set of actions and stakeholders responsible for their implementation.

Nevertheless, there are a few critical observations to this document. First of all, the Concept seems to anticipate the UN's effective action strategy to implement sustainable development in accordance with "The Future We Want"; however, unsuccessfully. The IMO's document falls short in the interpretation and application of the sustainable development paradigm, emphasizing the economic element. Second, the Concept has not been endorsed by IMO Member States through existing mechanisms of validation (circulars or resolutions); therefore, it is for the time being a visionary statement that needs further upgrading. Third, even though goals are clearly stated, actions are defined as "activities" in broad and general terms without proper delineation of an effective action plan, meaning what, why, who, how and

[9] UN. (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Retrieved May 26, 2013, from http://www.un-documents.net/wced-ocf.htm.

[10] Scottish Executive Social Research. (2006). *Sustainable development: a review of international literature*. Retrieved June 8, 2013 from http://www.scotland. gov.uk/Publications/2006/05/23091323/0, p. 23.

[11] Morin, E. (1999). Organization and complexity. *Annals of the New York Academy of Sciences, 879*, 115-121, p. 116.

[12] Due to the complexity of oceans, various aspects of their sustainable development are managed by different UN agencies. For this reason, it is necessary to distinguish the broad term "sustainable development of the ocean" and narrow notion of "sustainable maritime development" or "sustainable shipping", which are mainly related to activities of the IMO. Terms sustainable maritime development, sustainable maritime transport system, sustainable shipping, sustainable waterborne transport, maritime sustainability for the purposes of this article are considered as synonyms.

[13] UNCTAD. (2012). *Review of maritime transport 2012*. New York – Geneva: United Nations, p. xiii.

[14] Drewry Maritime Research. (2014). *Manning. Annual Report 2014*. London: Author, p. 2.

[15] In 2013 developing economies loaded 61 % and unloaded 60 % of world seaborne trade. See UNCTAD. (2014). *Review of maritime transport 2013*. New York – Geneva: United Nations, p. 6.

when. Finally, no follow up actions were assigned to measure the implementation and increase the effectiveness of the Concept.

Despite the fact that the main shipping areas that require sustainable measures are listed, the Concept does not provide a definition of sustainable maritime development or sustainable maritime transport system. Cabezas-Basurko et al. describes sustainable shipping as "a cost-effective commercial activity, in which the environmental load is not bigger than that which the environment can currently and in the future bear, and that the social community (directly and indirectly) in contact with it is not being negatively affected"[16]. Svensson defines three pillars of sustainable development in the maritime domain as follows:

- environmental protection – the environmental load of shipping should not be bigger than that which the environment can currently and in the future bear;
- social development – incorporates the wellbeing of people who are directly or indirectly in contact with shipping (including education, training and skills, manpower and recruitments, working conditions and rights);
- economic development – the economic growth of shipping without adversely affecting social and environmental development[17].

To summarize, sustainable maritime development gained significant international consideration and has been well reflected in related political documents. Krause et al. fairly argue that sustainable maritime development depends on knowledge about the marine environment and on access to this knowledge through training and other means[18]. In this regard, MET is not just one of the aspects of sustainable maritime development, but also an instrument to accelerate the proliferation of the paradigm in the maritime industry.

II. Current challenges and future demands for maritime professionals

Current trends and challenges in shipping appear as a set of variables allowing a wide range of future scenarios rather than a clear development path: "the long-term fate of global ocean governance remains as uncertain as before"[19]. The situation is complicated by frequent misunderstanding, misapplication and speculation of basic principles of sustainable development and as a consequence contradiction between them and current perceptions on development in the maritime industry, which are seen as the biggest threats to true transformation towards sustainable maritime development. Additionally, forecasts for the maritime labour market are methodologically built on the existing practices[20] and do not effectively consider a sustainable scenario.

In these circumstances, it seems impossible to define future demands for maritime professionals, the exact functions of MET and required competences apart from the need for the proliferation of the sustainable development paradigm, relevant research and nurturing related soft skills (such as flexibility, envisioning, critical thinking and others. Nevertheless, whatever perception of sustainable development is going to be accepted, it is expectedly going to influence all maritime professions, imposing new responsibilities.

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[16] Cabezas-Basurko, O., Mesbahi, E., & Moloney, S. R. (2008). Methodology for sustainability analysis of ships. *Ships and Offshore Structures*, 3(1), 1-11, p. 2.

[17] Svensson, E. (2012). *Sustainable shipping in the European Union*. Retrieved August 15, 2013 from http://www.chalmers.se/gmv/EN/projects/epsd/downloadFile/attachedFile_f0/Sustainable_Shipping_in_the_European_Union?nocache=1361441035.61, p. 5.

[18] Krause, D. S., Diop, S., Brown, B. E., & Troost, D. (1993). Sustainable development and future of marine science education and training. In A. Couper, & E. Gold (Eds.), *The marine environment and sustainable development: law, policy, and science* (pp. 609-632). Honolulu: University of Hawaii, p. 627.

[19] Forum for the Future. (2015). *Changing Context - Global Trends 2012 to 2015: How global trends have progressed and moving towards our vision for shipping in 2040.* London: Author, p. 2.

[20] See, for instance, Drewry Maritime Research. (2014). *Manning. Annual Report 2014*. London: Author, p. 18.

As predicted by IMO, new equipment together with evolving shipboard procedures will lead to crews performing new or different functions and, therefore, necessitate follow-up training. Therefore, according to IMO, the first goal of sustainable MET is properly trained and educated seafarers with an emphasis on refresher training and education upgrades[21]. The second goal is derived from the increasing role of developing countries in shipping and also the need for qualified shore-based personnel. Hence, the IMO objective is training and education of non-seagoing maritime professionals (legal, engineering, ship management and port careers), especially in the developing world. Another important challenge identified by IMO and other maritime stakeholders is how to attract and retain a sufficient number of adequately trained and qualified seafarers and maritime industry professionals[22]. Thus, another goal is improving the welfare of seafarers as an important precondition for a better and more attractive work environment. However, there are no discussions on whether MET institutions need to adopt any changes to their curriculums or other processes in light of sustainable development.

A comprehensive SWOT analysis in relation to future demands of maritime professionals was conducted by the KNOWME project[23]. In order to define requirements for human capital in modern shipping, the project carried out a survey among maritime administrations, ports, shipping companies, and transport agencies from Sweden, Germany and Greece[24], which reveals valuable information that should be taken into account during the development of a sustainable model for MET. In light of sustainable development the survey reveals the following:

- environmental aspects are not appreciated neither by employees nor by employers; regulatory measures, through which environmental requirements are imposed on shipping, are generally seen as a threat;
- social issues remain the biggest concern among seafarers, decreasing the attractiveness of maritime professions; nevertheless, employers do not mention it as a threat, being occupied mainly by economic factors;
- current economic conditions are mentioned as satisfactory while future developments are seen as ambiguous and mainly threatening with a belief in technological advancement.

Thus, although sustainable goals for MET were partially defined and communicated on a political level, little progress is observed in implementing these goals among maritime actors. Most importantly, there appears to be insufficient cultural preconditions for sustainable goals to be implemented effectively.

Above all, development of human resources is a precondition to any form of development. Hence, the function of MET should not be determined narrowly – as a derived demand from the shipping aimed merely at satisfying needs of the industry, both in quality and quantity of seafarers and other maritime specialists. In addition, MET has a transformative capacity and is capable of initiating changes in current business practices, as well as designing and implementing a future vision in the maritime industry.

III. Extrapolation of the education for sustainable development in MET

From the initial inception of sustainable development, education and training were endorsed as the foundation for effective implementation of the paradigm. Consequently, educational aspects were covered throughout all strategic documents devoted to sustainable development. Although there were notable achievements in promoting primary education and literacy, another significant aspect – the reorientation of education curricula – was largely under-considered[25].

[21] IMO. (2013). *World Maritime Day: a Concept of sustainable maritime transportation system*. London: Author, pp. 9, 14.
[22] Based on expected manning levels and terms of employment, there would be an additional demand for 38,500 officers by the end of 2018. See Drewry Maritime Research. (2014). *Manning. Annual Report 2014*. London: Author, p. 4.
[23] KNOWME. (n.d.). *Welcome to KNOWME project*. Retrieved September 2, 2013 from http://www.know-me.org/
[24] Despite the fact that the survey was conducted within Europe, which definitely limits its application, research outcomes are valuable as an example and a model for analysis of global, regional and national contexts.
[25] Scottish Executive Social Research. (2006). *Sustainable development: a review of international literature*. Retrieved June 8, 2013 from http://www.scotland. gov.uk/Publications/2006/05/23091323/0, pp. 126-127.

ESD is occasionally taken in simplified denotation with connection to the environmental issues only. However, this educational concept is extremely immense: "education [for sustainable development] is more than traditional practice of environmental education, which focuses on teaching and learning about, in and 'for' the environment. Instead, education for sustainability seeks a transformative role for education, in which people are engaged in a new way of seeing, thinking, learning and working"[26].

As defined by UNESCO, ESD is aimed at acquiring "the knowledge, skills, attitudes and values necessary to shape a sustainable future"[27]. It should not be seen merely as a separate subject or programme, but is rather an educational concept, which affects policy, legislation, teaching, learning, curriculum, assessment and other educational components.

In order to facilitate the acceptance of sustainable development values in the maritime industry, it might be useful to explore the possibility of extrapolation of ESD achievements in MET and contextualise pedagogical measures developed by ESD to the maritime domain.

One of the key aspects in reorienting MET towards sustainable maritime development should be curriculum revision. A broadly accepted vision of curriculum design is that its first and foremost purpose is to equip students with knowledge and skills required to build/improve their qualification and competence[28]. In practical terms, this standpoint means that the aim and learning outcomes of a course have to be relevant to on-the-job responsibilities and, therefore, are defined by the way the maritime industry operates and its needs. Thus, curriculum design and education in general are considered as derived from industry demand, where MET institutions are suppliers of maritime human resources. Needless to say, the overall aim of a curriculum in such a scenario would be to fit the existing processes of the maritime industry[29]. Notwithstanding, as any other area of education, MET has to be considered in a broader context – as a pathway to science and a precondition of advancements in the maritime industry.

Wiek et al. emphasize the lack of scientific research in competencies required for maritime professions in light of sustainable maritime development[30]; however, there are numerous examples available on competences and curriculums for bachelor's and master's programmes in sustainable development, which could be extrapolated for MET[31].

Shipping practices and maritime policies are important for curriculum as they basically identify the current stage of the industry and objectives for future development, while the role of MET in this process is to prepare competent professionals to be able to complete the transformation. In any specific context such as sustainable maritime development, a maritime policy additionally defines the objectives of development and instruments to reach these objectives and thereby transmits to curriculum designers information on competency requirements – particular knowledge and skills needed for transformations.

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[26] Tilbury, D., & Wortman, D. (2004). *Engaging people in sustainability*. Gland, Switzerland: IUCN Commission on Education and Communication, IUCN-the World Conservation Union, p. 9.

[27] UNESCO. (n.d.). *Education for sustainable development.* Retrieved June 18, 2013, from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

[28] Fisher, D., & Muirhead, P. (2005). *Practical teaching skills for maritime instructors*. Malmö: WMU Publications, p. 13.

[29] It is believed, that this is the perspective not only of vocational education and training, but increasingly becoming the trend in academic educational establishments. See Gadotti, M. (2010). Reorienting education practices towards sustainability. *Journal of Education for Sustainable Development, 4,* 203-211, p. 204; Robinson, K. (2010). *Changing educational paradigms* [Video]. Retrieved September 22, 2013 from http://www.youtube.com/watch?v=zDZFcDGpL4U.

[30] Wiek, A., Withycombe, L., Redman, C. & Mills, S. B. (n.d.). *Moving forward on competence insustainability research and problem solving*. Retrieved September 9, 2013 from http://www.environmentmagazine.org/Archives/Back%20Issues/2011/March-April%202011/moving-forward-full.html.

[31] Prylipko, A. (2013). *The paradigm of sustainable development in maritime education and training* (Masters thesis), p. 94.

Once competencies are identified, there is sufficient information to develop curriculum. During this process, designers should use methodologies proposed by the concept of ESD in regard to course aim, learning outcomes, teaching materials, and most importantly assessment, which remains to be one of the strongest motivators in learning. Additionally, curriculum has to reflect a relationship to the subject goals of sustainable maritime development and build the capacity to achieve them.

In the initial stage of designing MET curriculum when new concepts are not yet well reflected in literature, preparation of teaching materials is most likely to be one of the problems restraining educators. To create knowledge, management of an MET institution might use such instruments as research, conferences and seminars on sustainable maritime development issues together with horizontal and vertical collaboration.

An indispensable step in the process of developing and implementing a new model of MET is to ensure that administrators, managers and educators appreciate the concept of ESD as well as principles of sustainable development in general.

Development and implementation of curriculum related to sustainable development might impose other specific strengths and weaknesses as well as opportunities and threats, which have to be identified with the help of relevant analytical instruments and addressed[32]. Overall, it is important to realize that success in implementing sustainable development principles in MET will, to a large extent, depend on the international and national political perceptions of sustainable maritime development.

Therefore, designing and implementing a curriculum related to sustainable development imposes considerable challenges on MET institutions. Firstly, it requires a reorientation of institutional policy and a review of the overall aim of education. Secondly, it examines the understanding of sustainable development by management and educators along with their critical approach towards existing practices. If these challenges are overcome successfully, knowledge and skills in sustainable development might be introduced in MET as a separate bachelor's or master's programme, as an additional course in existing programmes or a topic within the most relevant course.

Successful proliferation of sustainable maritime development depends on participation and accurate understanding among all actors in the maritime industry. Consequently, a certain degree of education and training has to be distributed among all occupational levels: from policy makers, governmental officials and maritime administrators to professionals in shipping and port management. Therefore, the need for knowledge and skills in sustainable maritime development will vary significantly among MET programmes depending on:

- the level of educational programme (undergraduate or postgraduate);
- character of responsibilities for future profession (managerial or operational);
- relevance of the profession to sustainable maritime development;
- particularities of the national, regional and international maritime policy and practices of the industry.

In determining the needed amount of knowledge, the relevance of a profession to sustainable maritime development has to be considered as it will significantly vary among programmes on maritime administration, maritime law and policy, maritime ocean and costal management, marine environment, maritime commercial law, port management, navigation, and engineering. This is the crucial factor to be taken into account by management of MET institutions in making a decision as to whether sustainable maritime development is going to be implemented as a separate programme, as a discipline or just as a topic within a relevant discipline.

[32] An example of SWOT analysis in developing curriculum on sustainable development is given in Smith, G. (2011). Developing sustainability plan at a large U.S. college of education. *Journal of Teacher Education for Sustainability, 13(2),* 5-16, p. 9.

Knowledge of sustainable maritime development might be introduced in MET as a separate bachelor's or master's programme[33]. Another way to introduce knowledge related to sustainable maritime development is through a separate discipline, which would be crucial for programmes related to policy making, ocean and costal management, and maritime spatial planning. For these specialisations, courses on sustainable maritime development could offer an overview of selected current challenges in the maritime industry and tools to deal with such challenges on the basis of an interdisciplinary approach. It would not be enough to teach *about* sustainable maritime development as one the most important tasks for these professions is to define objectives for sustainable development. Hence, teaching *for* sustainable development is required.

Principles of sustainable maritime development should also be introduced in programmes, graduates of which are expected to implement policy measures such as shore-based maritime professions including port management. Presentation of this knowledge could be done as a separate topic in a related course, short professional development course or seminar.

The need to integrate a separate course on sustainable maritime development in the education of merchant marine officers is not yet generally accepted. Certain principles of ESD are indeed appropriate for this type of MET such as problem-solving, system thinking, and interdisciplinary approach[34]. Merchant officers are also expected to have knowledge and skills related to implementation of legal instruments and company policies related to sustainable development; however, the appreciation of interrelation between those aspects is to be yet improved.

A literature review demonstrates that understanding of "sustainable development" and "sustainability" in MET is often reduced to a continuous supply of qualified seafarers[35], which does not correspond to the initial meaning of sustainable development in education as proposed by UNESCO. That is not to deny the deficit of qualified seafarers, but rather an invitation to consider additional measures fundamental for MET in case of transition towards sustainable maritime development.

IV. Implementing sustainable practices in management of an MET institution

Apart from curriculum, success in the proliferation of sustainable maritime development in MET is considerably related to the way educational institutions operate in terms of their overall policy, namely planning, structure, faculty and staff development, research, scholarships and awards. The importance of implementing sustainable practices in management of educational institutions is one of the core principles of ESD, according to which the best learning outcomes are achieved in active learning.

Commitment to sustainable development by MET institutions is most likely to be made through policy documents[36] together with other voluntary commitments taken within corporate social responsibility. Nevertheless, sustainability principles have to be reflected not only on paper, but most importantly

[33] For instance, this approach was accepted by the Australian Maritime College (Bachelor's degree in Marine Engineering with specialization in Sustainable Design and Risk).

[34] Benton, G. (2009). The interdisciplinary curricular model: adaptation for a fluid future. *Proceedings of the 10th Annual General Assembly and Conference of International Association of Maritime Universities: MET trend in the XXI century: shipping industry and training institutions in the global environment – are of mutual interest and cooperation, Admiral Makarov State Maritime Academy, Saint-Petersburg, Russia, 19-21 September, 2009,* 297-305, p. 302.

[35] KNOWME. (2012). *Future demand of maritime professionals in the maritime and port industry.* Retrieved August 30, 2013 from http://www.know-me.org/images/outputs/2.1%20future%20demand%20of%20maritime%20professional_v2.0_published.pdf; IMO. (2013). *Renewing IMO's commitment to sustainable maritime developmen*t. Retrieved February 13, 2013, from http://www.imo.org/About/Events/Rio2012 /Documents/Sustainable%20Maritime%20Development%20leaflet.pdf.

[36] For examples see Prylipko, A. (2013). *The paradigm of sustainable development in maritime education and training* (Masters thesis), pp. 105-106.

throughout processes of an MET institution, organizational structure, educational programmes, research, scientific events, campus management, operations and procurement. Rapid reorientation of educational establishments towards sustainable practices might be facilitated by the emergence of networks that are sharing experience and practical recommendations as well as instruments to manage, measure and improve their sustainable performance[37].

To initiate the transition towards sustainable development, the following actions are recommended:

1) to review policies and other strategic documents in order to introduce principles of sustainable development (preferably by reviewing existing documents rather than adopting separate documents) including procedures related to planning, operations and procurement, faculty and staff development;
2) to proliferate knowledge about sustainable maritime development among managers of MET institutions, lecturers and instructors (train-the-trainer programmes, conferences and seminars on related topics);
3) to analyse the need and possibility for introducing separate programmes on sustainable maritime development or courses within respective programmes;
4) to review existing curriculum in order to reflect the sustainable maritime development issues and ESD concept:
    4.1) to ensure coverage of sustainable maritime development issues in existing courses (hard skills);
    4.2) to nurture related cognitive skills including critical thinking, system and complex thinking, envisioning, and problem solving (soft skills);
5) to encourage research on sustainable maritime development issues.

Concluding remarks

The 2015 World Maritime Day theme "Maritime education and training" has brought the issue of adequacy and quality of MET to the consideration of the maritime sector once again. Despite all the efforts of the international maritime community in developing maritime human resources, some issues remain to be unsolved, among which is the problem of transition towards sustainable maritime development.

Sustainable development in MET is frequently perceived as synonymous to continuous supply of qualified seafarers and maritime professionals or MET institution's financial stability. This perspective was established as a result of a simplified understanding of MET, as demand derived from the maritime industry. However, considering MET in a broader context – as a precondition of advancements in the maritime industry, sustainable development would have more complex implications for MET. Sustainable MET model would require additional measures, including:

- reviewing policy objectives;
- changing organizational structure;
- adopting new educational concept;
- introducing new programmes;
- reviewing curriculum;
- encouraging relative research areas;
- planning additional scientific events;
- updating personal development plans;
- improving campus management and procurement.

[37] For instance, The Sustainability Tracking, Assessment & Rating System, Learning for Future Environments, The International Sustainable Campus Network, the Association of University Leaders for a Sustainable Future, the Association for Promoting Sustainability in Campuses and Communities, the Association for the Advancement of Sustainability in Higher Education Academic Programs, Guide to Universities with Environment Sciences Degree Programs, Sustainable Design Consulting.