Available online at www.elixirpublishers.com (Elixir International Journal)

Social Sciences

Elixir Soc. Sci. 76 (2014) 28381-28387

ISSN: 2229-712X

Conceptual approach of the teaching port towards a new phase in the maritime education

Mohamad Rosni Othman

School of Maritime Business and Management, University Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia.

ARTICLE INFO

Article history:

Received: 28 September 2014;

Received in revised form:

27 October 2014;

Accepted: 7 November 2014;

Keywords

Maritime Education,

Teaching Port, Port Simulation,

Port Operation.

ABSTRACT

Maritime industry provide the basis for the growth and development of marine-related activities such as: ocean and coastal shipping, port services, offshore oil and gas, inshore and offshore fisheries, marine culture, renewal energy (current, wave, wind), naval defence and other marine related activities that need competence human capital enrolment to manage, explore and exploit this resources in a sustainable manner. Maritime education provides competence, highly skill and professional worker mainly in the shipping and port sector. Even though the maritime industry is dynamically changing their environment (Facilities, technology and system), the present maritime educations are of traditional manner with limited capacity of maritime facilities such as ports and ships. Until now, not much on training work has been done at rationalising the number and optimizing the facilities in the maritime education due to the escalating of the cost to maintain these facilities. Therefore the aims of this paper are to determine the rationale to develop an offshore integrated teaching port as a new approach for the maritime education system. The system via simulation approach is a tool for teaching maritime students how to be a professional and ready to work on a real ship or port environment. This approach will offer alternatives to an audience or maritime students hungry for fresh thinking in the maritime studies with a fresh training angle. In this paper we will mimicry as closely as possible on real port environment, duplicating everything in the real port operation towards an innovative approach in the Maritime Education and to determine the rationale of designing offshore Teaching Port.

Introduction

Seaport is a land facility designated for reception of personnel or materiel moved by sea, and that serves as an authorized port of entrance into or departure from the country in which located. Seaports are important to a trading nation like Malaysia because their economy depends on port efficiency. Therefore, a competence and trained worker are important to the port operator. Training new worker is essential, it is costly but necessary. Port employer may hired an experienced worker who has worked from another port but it will cost more in terms of salary, the number of workers qualified are lower and there is no guaranty that their previous port equipment and working flow are the same with new port. That where teaching port come to play their role, teaching as "An interactive process, primarily involving class room talk which takes place between teacher and pupil and occurs during certain definable activity (Edmund,1966). By providing a proper training and lesson to new trainees, number of workers with the right qualification added with skills and experience needed, port operator able to provide a better services with their best conditions.

In the past, all new trainees will used real machinery for example a real crane for their training. These new trainees doesn't have experience in using heavy equipment, pressuring trainees on a new environment without a right steps are dangerous and it may lead to a disaster due to a small mistakes. Safety is at risk, it included both the equipment and workers safety. During training session, port operator need to shut down a few of their operation line or provides a space for trainees to practice. This idle operation line, used machinery for practice and space used by trainees will reduce port operator's net profitability. They also need to pay for all the training expenses such as fuel cost, machinery breakdown due to inexperience equipment use/control. Therefore, it is important for the port operator trying a new method to reduce cost and ensure that trainee got the best experience from the teaching. The best solution for this problem is by using a simulation during training sessions.

Simulation is the act of imitating the behaviour of some situation or some processes by means or something suitably analogous (for personal training).The introduction of simulators enables practice to be repeated, doing the same steps again if they unable to master it in the first try. Trainees able to carry out in a variety situation, such as day and night and bad weather such as rain and windy. With this simulations trainees will be trained with different level of difficulties start with (1) beginners, slowly climb to (2) intermediate and finally (3) the expert level. With this simulation, it can keep down overall training cost and increase safety of the workers and equipment. The STCW Convention 1978 has been amended by the 2010 Manila Amendments and contains new training requirements particularly in competency of using a new technology such Electronic Chart and Information System (ECDIS), human element, leadership and management courses.

The introduction of modern technology such as simulators helped reduce the number of vessels and crane breakdowns and also significantly reduced occupational health and safety risks

Tele:

E-mail addresses: rosni@umt.edu.my

during training, adding that fewer hours now need to be spent on using real vessels or cranes for training purposes. Simulator enables manoeuvres and exercises to be repeated, while training can be carried out in a wide variety of simulated conditions. These include bad weather, such as wind and rain; working with broken down equipment; or at night, it would not be viable to gain this experience using real cranes. With this new breed of training will increase the good experience obtained by maritime students, terminal operators and port authorities that could prompt modernising of ships or ports, the closer we can get to the real training environment, the greater the immersion and therefore the more realistic the training to ensure that trainees acquire the necessary knowledge and skills. The Port simulators are an essential part of training, because they keep down overall training costs, whilst enhancing safety once the operator starts working on the quay. In this paper we will introduce the concept of teaching port toward a new approach in the maritime education and proposed offshore teaching port infrastructure.

Maritime industry provide the basis for the growth and development of marine-related activities such as: ocean and coastal shipping, port services, offshore oil and gas, inshore and offshore fisheries, marine culture, renewal energy (current, wave, wind), naval defence and other marine related activities that need competence human capital enrolment to manage, explore and exploit this resources in sustainable manner (Miles, 1999). Maritime education provides competence, highly skill and professional worker mainly in the shipping, port and marine related sectors. Even though the maritime industry is dynamically changing their environment (Facilities, technology and system), the present maritime educations are of traditional manner with limited capacity of maritime facilities such as ports and ships.

Nowadays, not much on training work has been done at rationalising the number and optimizing the facilities in the maritime education due to the escalating of the cost to maintain these facilities. Therefore the aims of this paper are to determine the rationale to develop a teaching port as a new approach for the maritime education system. The system via simulation approach and embedded with the port facilities is a foundation for teaching maritime students how to be a professional and ready to work on a real ship or port environment. In the competitive maritime market, a new breed of approach will cause waves among the traditional maritime education and training (MET) providers or universities. This approach will offer alternatives to an audience or maritime students hungry for fresh thinking in the maritime studies with a fresh training angle. The system is a tool for teaching maritime students how to be a professional and ready to work on a real ship or port environment.

Proposed offshore teaching port system

Background

Marine transportation is vital to the economy, trade and national security (Langen, 2003, 2004). Since colonial times, waterborne commerce has been crucial to the economic growth and vitality of the nation. Ports are nation's gateways to domestic and international trade. Port linked businesses to water transportation and help ensure that a wide variety of low cost goods and services are available to consumers. Ports, as the gateways to a nation, tend to reflect its economy. As the Malaysian economy grew and developed over the years, Malaysia's ports also grew and developed to reflect the changes in the economy, especially the country's industrial development. New ports were established while the older ones acquired new capabilities. Catalyst for port development has been closely related to industrialization and the growth in containerized trade (Baird, 1996). The Malaysian port sector is now equipped with sufficient infrastructure and equipment to cope with the projected expansion in seaborne trade (Othman, 2011). Its overall capacities are projected to grow faster (22.2%) than cargo throughput (15.24%). On the whole, Malaysian ports are already quite specialized and have aligned themselves into the national and regional shipping networks. The obvious fact is that Port Klang and Port of TanjungPelepas will continue to dominate the containerized trade sector, while other ports particularly Penang Port, Kuantan Port and Bintulu Port fit in strategically within the feedering networks of the region. However, the developments of this industry are not tandem with the human capital development in this sector.

MET or Universities currently are competing with each other in order to produce graduates complete with qualification and experience. Lately a new problem arise where an over qualification workers start to increase. A student with higher qualification settle with a lower job offer and lower salary are a waste of talent, resources and money. It even worst when the new graduates to start as a trainee for half a year or a year. (Felix et al 2004).

Therefore it is important for universities and private sector to sit the same table and develop new courses (academic courses and commercial courses) that meet the requirement from the private sector. With this approach, students may reduce unnecessary subject not related to their field of interest and concentrated on the area that will be used a lot when they start to work, the new approach to innovate local contain in the higher education environment should be developed to ensure local universities are in same plying field with their counterpart. Improving competitiveness is central to raising the underlying rate of growth of the quality of local higher education especially in the maritime education field.

Requirements

University is an institution of higher education and research, which grants academic degrees in a variety of subjects. A University is a corporation that provides both undergraduate and post graduate education; the Word*University* is derived from the latin*universitasmagistrorum etscholarium*, roughly meaning "community of teachers and scholars". Ocean sciences span multiple disciplines and at teaching port campuses will offer premier ocean knowledge and outstanding opportunity to study issues confronting the global, island and peripheral and also coastal oceans.

Mapping of the maritime courses in the Malaysian local universities has been carried out to identify the relevancy and viability of the courses offered and to be adopted in the Teaching Port program by using computer assisted learning techniques especially for marine logistics and transport sector.

University is an institution of higher education and research, which grants academic degrees in a variety of subjects. Maritime education span multiple disciplines and the ideal MET will offer premier ocean knowledge and outstanding opportunity to study issues confronting the global scenario in climate change, maritime trading and economic fluctuation, island and peripheral and also coastal oceans and offshore studies. Mapping of the maritime courses in the Malaysian local universities has been carried out to identify the relevancy and viability of the courses offered as a guide and can be adopted for the new MET programs. Further, there are three (3) major fields in the maritime cluster consists of; maritime studies (See Fig. 1.0), marine science (See Fig. 1.1), maritime engineering and nautical science (See Fig. 1.2).

Figure 1.0. Maritime Studies Speciliazation

Maritime Studies		
Maritime Policy and Law	Maritime Management	Maritime Operation
i. International Maritime Trade Policy and Law. i. Port and Shipping Poliicy. i. Maritime Policy and Resources Management. v. Marine and aquatics Resources Policy . v. Admiralty Law and Marine Insurance. i. Law of Carriage of Good by Sea.	i. Shipping and Port Management. ii. Maritime Human Resources Management. iii. Maritime Marketing Services. iv. Maritime Logistics and Distributive. v. Broker Charter, Maritime Economics and Finance. vi. Maritime Strategic and Information System. vii. Maritime Safety and Security.	i. Port and Shipping Operation. i. Maritime Transports. i. Short Sea Shipping and Hinterland Operation. v. Warehouse and cargo handling. v. Multimodal Transportation. i. Ship Operation (Nautical and Maritime Transportation).

Figure 1.1. Marine Science Specialization

Marine Science			
Marine Biology	Marine Geology	Marine Chemistry	Marine Physics
i. Marine Microbial Ecology. i. Marine Conservation. i. Marine Ecology. v. Marine Biotechnology. v. Marine Ecosystem Dynamic.	i. Coastal Processes. ii. Marine Geochemistry. iii. Marine Mineroloogy. iv. Coastal geomorphology. v. Paleontology.	i. Inorganic Pollution. ii. Organic Pollution. iii. Aquatic Toxicology. iv. Radionucleid chemistry. v. Ocean Acidification. vi. Biochemical Processes.	i. Ocean Circulation. ii. Coastal Dynamic. iii. Weather Forecasting

Figure 1.2. Marine Engineering and Technology Specialization

Maritime Engineering and Technology				
Coastal Engineering	Naval Architecture	Marine Engineering and Coastal System	Offshore Marine Structure	Marine Renewable Energy
i. Coastal Structure. ii. Hydrodynamic and sediment transport – Modelling and Phyzical. iii.Marine Corrosion.	i. Ship Hydrodynamics. ii. Resistance and Powering. iii. Seakeeping and Maneuvering.	i. Acoustic. ii. Powering. iii. Fluid Power. iv. Control and Instruments. v. Sub-sea.	i. Offshore Structure. ii. Ship Structure.	i. Wind Energy, Wave Energy, Current Energy, Tidal Energy.

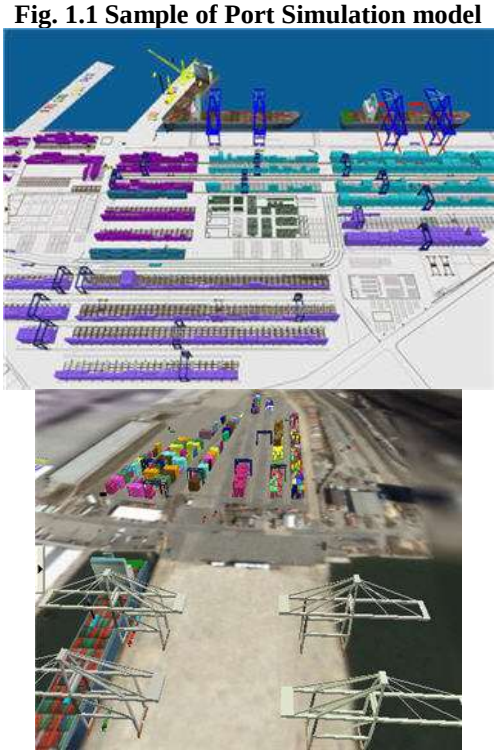
Source: Author

Quote by Pablo Picasso: Everything you can imagine is real. The simulation defines as an Imitation or representation, as of a potential situation or in experimental testing and representation of the operation or features of one process or system through the use of another (American Heritage® Dictionary, 2009).Simulation models built can be used to improve many facets of a port terminal operation. In general, this program helps in to: Improve equipment utilization; reduce waiting time and queue sizes in the port; balance workload allocating resources efficiently; study alternate investment ideas; and train maritime students in overall system behaviour and job related performance. The ideas for improving a process in the port can be simulated, tested, and justified prior to implementing them in the actual system and excellent for port studies.

The port teaching curriculum applying modern didactic teaching methods using port simulation model, for an example by using *Flexsim*model building software for complete port simulation (See Fig. 1.1) and adoption of serious game module, embedded teaching and learning process via simulation and hand-on training (Teaching Port) .The following sequence acts as framework:

i. Introduction to the teaching port model;
ii. Introduction to and application of port simulation;
iii. The use of port simulation during training courses;
iv. Structuring group discussion, work and case studies;
v. Individual work and exercises; and
vi. Evaluations.

Fig. 1.1 Sample of Port Simulation model



Source*: http://www.flexsim.com*

In this paper the simulation module integrated teaching port focused on the daily port operations consists of port operations module (See Table 1.1).

Elements for consideration

Development of a new phase in the maritime education based on the teaching port concept and strategy will require of actions to improve the focus, coordination, planning, research, and management for the maritime education infrastructures. Investment in the teaching port concept will take several forms:

I. Technology assessment and application;
II. risk management development and application;
III. active involvement at all levels with the user community, environmental interests and Government;
IV. recognize the teaching port module as a critical element in the maritime education; and,
V. foundation to explore and exploit the South China Sea resources in a sustainable manner.

Proposed mega float forteaching port infrastructure an innovation approach

The future is certain for the South China Sea. These relatively narrow ocean zones, which produce nearly 95% of useable marine biomass. The development of teaching port is an initiative representing a multidisciplinary effort to develop a facility towards a more holistic approach to the maritime

education, research, monitoring and management of South China Sea particularly on her marine resources and ecosystems.

The South China Sea currently exhibits more than 250 small islands, atolls, reefs, shoals, skerries (small rocky islands) and sandbars, most of which are uninhabited; these fall into the categories of fully submerged, tidally submerged and fully emergent. These island landforms can be classified into a few major archipelagos, notable of which are the Macclesfield Bank, Spratly Islands, Pratas Islands, Paracel Islands and Scarborough Shoal.

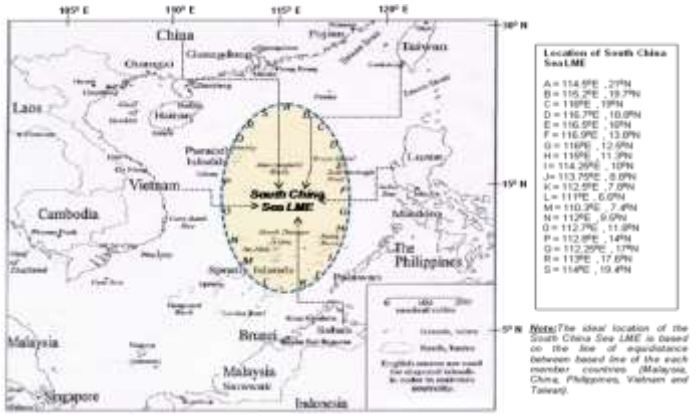


Diagram 1.0 Recommendation for South China Sea Gazetted Area for Large Marine Ecosystem (LME)

Source: Authors

Marine ecosystems and their contributing freshwater basins are transboundary in nature by virtue of interconnected currents, pollution, and movement and migration of living marine resources. Eighty percent of the global marine fisheries catch comes from marine ecosystems delineated along the continental shelves and coastal currents that represent multi-country, ecosystem-based management units for reversing fisheries depletion (Duda and Sherman, 2002). The lack of attention especially in the East Coast Peninsular Malaysia to developed a hup for maritime studies facilities, policy, legal, and institutional reform and low priority given to public investments, now place at risk not only coastal and South China Sea areas but also maritime communities that depend on them for economic security and social stability. Thus, the concept of the offshore teaching port is viable in this area namely in Bidung Island that will based on the viability of the economic, social and sustainability of the environment.

Location factors are very important and significant for gaining a competitive advantage in the maritime industry (McCann, 2003). Industry would be at a disadvantage if they were located outside from universities, maritime training centres, maritime organizations, and government agencies possess, gather and 'distribute' knowledge and information, have the advantage of being able to access knowledge (Langen, 2005). Thus, the design of teaching port infrastructure should be in a very strategic place, meet for future requirements, sustainable and green manner. Based on the Blue Ocean Strategy, Bidung island (Lat.5°36'51.69"N, Long.103° 3'31.03"E),distance is only 33 Nautical miles from the capital of Kuala Terengganu and in a strategic location, due to this factors Bidung island has been proposed as a strategic location for development of the teaching port based on the mega float concept (See Fig. 3).

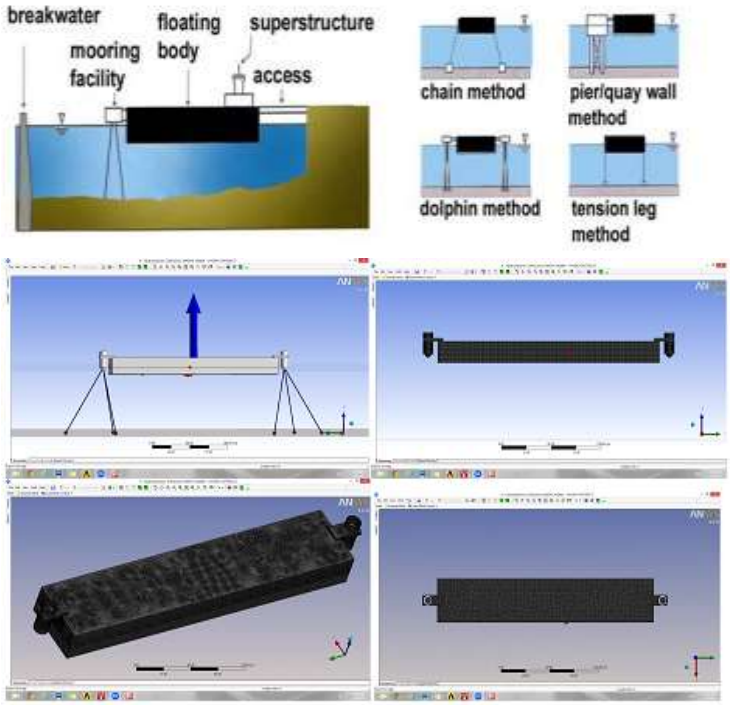
Fig. 1.2 Conceptual Site Placement for Teaching Port Float Platform in Bidung Island

Source: Google earth

Mega-Floats or pontoon-type very large floating structures lie on the sea level like a giant plate floating on water. This kind of floating structures are suitable for use in calm waters, often inside a cove or a lagoon and near the shoreline or island. These very large floating structures (VLFS) are not only floating structures with large length dimensions but also having lengths larger than the characteristic length that depends on the ratio of structural stiffness and buoyant spring stiffness (Fujikubo, 2001). Owing to these structural dimensions, elastic responses in these large floating structures are more dominant than their rigid-body motions. Referring to Fig. 1.3, a VLFS system consists of a (a) large floating structure, (b) mooring facility to keep the floating structure in place, (c) an access bridge, gangway or a floating road to get to the floating structure from shore, and (d) a breakwater (usually needed if the significant wave height is greater than 4 m) for reducing wave forces impacting the floating structure (Wang, 2011).

Fig. 1.3 Left: Components of a Floating Pontoon Structure. Right: Mooring Methods.

Below: Proposed Mooring System Concept



Source: Authors

Table 1.2 Simulation Module of the Teaching Port

Module	Description	Methodology
Dry Bulk Handling 	Different dry bulk commodities require different terminal layouts and different storage arrangements. These aspects will be introduced in a general way first and then developed towards the specific layout of the ports. An introduction of different mechanical bulk handling equipment for discharging and stacking, and for reclaiming and delivering will follow, including quantity estimation and control. Aspects of monitoring and control of productivity as well as quality control and environmental protection of the handled commodities will conclude this topic.	Lectures and exchange with practitioners. Port simulation utilization and exercises.
Port Equipment Training 	In order to provide the port with an adequate number of well trained personnel it is inevitable to conduct further training activities. Such training measures must explicitly aim at the increase of technical skills and job-related knowledge in order to achieve an increased efficiency.	Students will understand how to speed up terminal cargo by the optimal handling of equipment as this has been demonstrated using port simulation approach
General Cargo Handling 	The students will have the opportunity to observe advanced cargo handling in a major modern international seaport and get acquainted with cargo handling techniques of different technological levels, from traditional to advance. The efficient use of men, machinery and cargo handling gear for different cargoes and on different type of vessels will be explained in detail.Work on the quay and in the shed will also be introduced.	Instruction under this heading consists of lectures, but to a greater extends of practical simulation demonstrations at different general cargo and multi-purpose terminals in the simulated port.
Port Management Information System 	Today an invaluable management tool supporting the economic growth of a port, the students will know the basic principles of the facilitation of administrative and operational tasks by integrating EDI-based information from agents, shippers and other related parties in a centralized in-house database in order to enable the port's managers to perform detailed ad-hoc queries or generate a variety of standard reports and statistics.	It is the purpose of the lecture to make the participants acquainted with Port MIS design and usage. The students will learn how to obtain information by examples of computer based information flows andSimulating data for information flow and data analysis.
Berth Planning 	For modern shipping industry time means money. In order to reduce berthing time all technical conditions which must be put into consideration when allocating berths (i.e. depths of berth, vessels draft, and data of cranes) must be known. The students will be able to effect efficient berth allocation for all vessels, based on data retrieved from external and internal sources (i.e. port administration, agents, etc.).	After theoretical lectures the students will learn in port facilities simulation environment to minimize equipment movements by optimal berth planning and to solve problems occurring by short-term schedule changes of feeder vessels and by delay of ocean carriers.
Operating Container Freight Stations (CFS) 	On completion of the course, the participants understand the importance of centrally located Container Freight Stations on container terminals as physical interface(s) between internal transport and LCL-containers and know how to operate them.	The students will be introduced to efficient CFS management by lectures combined with simulation environment and practical on-the-job work
Container Yard Storage Control 	Since cargo volume increases and port equipment becomes more sophisticated such as EDI supported information systems, employees with extensive knowledge of various port functions and port related activities are indispensable to face future demands. Against this background it is the sense of this course to make the students understand how a terminal is organized and proficient in operating EDI-supported yard planning systems.	The participants will be introduced to different terminal operating concepts via simulation approach, which will be demonstrated in practice, and be given the opportunity to discuss the characteristics of each system.

Source: Authors

The parameter mooring based on mooring in wave condition (See Fig. 1.3 Below: Proposed mooring system concept), the floating object response due wave presence is considered insix-degree-of-freedom i.e surge, sway, yaw, heave, pitch and roll motions. The tension in mooring is easy to estimate as well as the floating object's response. Floating Pontoon Structure has advantages over the traditional land reclamation solution in the following respects:

i. they are cost effective when the water depth is large;
ii. environmental friendly as they do not damage the marine eco-system, or silt-up deep harbors or disrupt the tidal/ocean currents;
iii. they are easy and fast to construct (components may be made at different shipyards and then brought to the site for assembling – Ferro cement of steel construction);
iv. they can be easily removed (if the sea space is needed in future) or expanded (since they are of a modular form);
v. their positions with respect to the water surface are constant and thus facilitate small boats and ship to come alongside when used as piers and berths;
vi. their location in coastal waters or near island provide scenic body of water all around, making them suitable for developments associated with leisure and water sport activities; and they are not affected by global warming.

Implementation process

The following is the implementation of the agenda as proposed for the realization of the Teaching Port concept;

CONCEPTUAL COMPONENT	ACTIONS
Implementation of a more comprehensive maritime education based on teaching port concept	1. Overall discussion of this concept with the Malaysian Ministry of Higher Education and other ministries and / or agencies involved; 2. Fabrication of the terms of reference(TOR) Teaching Port concept based on discussions and input from the stakeholders; 3. Formation of the organization and operation structure in the short, intermediate and long run; 4. Economic analysis of the teaching port concept – The economic feasibility studies for a path forward for the teaching port concept, economically feasible but also could potentially be economically beneficial; 5. Technical feasibility of the teaching port concept – computer simulation, engineering research and small scale wave testing of the proposed platform, it would be focus on structural integrity, wave attenuation, buoyancy limitation and other key engineering issues facing the design, deployment and operation of an teaching port; 6. Implementation of physical infrastructure in a modular and packaged based (mega float port). Public – private partnership for construction the estimated $200 million of teaching port, the Federal government could raise the financing and private firms would do the construction;
Accelerate the process of setting up the Teaching Port	7. Identify the needs of scientific research relating to maritime studies and marine science and develop new program orcurriculum in related disciplines;
Add other courses suitable for teaching port concept	8. Strategic planning for Teaching Port in terms of expanding the scope of marine science research and more comprehensive training structure; 9. Strategic alliances with private, public and professional bodies locally and overseas; and,
Provides appropriate human capital for the job market	10. Developing incubator centre.

Teaching Port as a centre of the premier maritime learning quality and high-impact facilities as support to the development of the eastern region's maritime industry (east coast Peninsular Malaysia).The production of human capital present and future through learning and training process are more effective to provide skilled and professional in the maritime sector. The graduates of this specialization are expected to be the main input talent to the companies and government agencies in the maritime field.

Lack of skilled workers trained and lack of exposure to the hand-on training in shipping and port management to be a major cause of shipping and port development especially in Malaysia is quite slow and not in line with the development of internal and external trade. Significantly is a lack of trained executives and personnel to operate a ship trading, warehousing, logistics, maritime business and in marine research. Thus, teaching port is the main driver with innovative way to enhance the maritime education process toward future human capital in the maritime industry and in marine science research.

Conclusions

Being a littoral state, Malaysia maritime industry provide the basis for the growth and development of marine-related activities such as: ocean and coastal shipping, port services, offshore oil and gas, inshore and offshore fisheries, naval defence and other related maritime activities.

Malaysia is going to continue its efforts to promote maritime education and provide competence, highly skill and professional worker in the port sector. In relation to that, Malaysia has several maritime institutions that provide maritime training and education. As an example, Malaysian Maritime Academy (ALAM) provides training for new entrants to the shipping industry, retraining and subsequently enter advance courses and programs as they progress through their career. In addition for degree programs related to maritime studies, University Malaysia Terengganu (UMT) and University Technology Malaysia (UTM) already provide the faculty to produce future human capital in the Malaysian maritime industry.

Even though the maritime industry is dynamically changing their environment (Facilities, technology and system), the present maritime educations are of traditional manner with limited capacity of maritime facilities such as ports and ships. Until now, not much on training work has been done at rationalising the number and optimising the facilities in the maritime education due to the escalating of the cost to maintain these facilities. Therefore this paper determines the rationale to develop a new system. The system is a tool for teaching maritime students how to be a professional and ready to work on a real port environment.

Effectiveness of the Maritime Education and Training provider toward human capital competency in maritime industry plays a vital role in international trade, global logistics and supply chain. This industry is associated with a high level of uncertainty due to operate in a dynamic environment in which risk may affect their performances, thus the competency of workers is vital important. With the era of unprecedented global change, the maritime industry faces a variety of risks that not only can be seen internally but also result from uncertain environments due to that exposure of this element and should be taken seriously by the Maritime Education and Training (MET) provider. These external risk events are directly and indirectly influencing shipping and port performances in terms of business sustainability, service reliability and financial aspects.

Systematic recruitment drive that matches available jobs with available skills, providing ample training and development programs, favourable employment conditions, safety of working environments and career growth prospects.

If nation wants to become a developed maritime nation with knowledge based economy, productivity-driven growth and enhanced competitiveness, much will depend on how the maritime sector is managed and how the strength of the industry is sustained. Indeed, the maritime sector has a major role to play in enhancing the knowledge based economy, productivity-driven growth and competitiveness. Important aspects that will affect efforts to sustain competitiveness by develop expertise in maritime-related science, technology and management by strengthening maritime education and the labour market.

The offshore teaching port may also include a fixed platform that house various support facilities and at least two jetties that provides docking spaces for load and unload cargo, and this will become iconic tourist attractions in and outside the country based on function, design and location, and, it is also a serine environment and conducive place to do research especially in maritime studies and marine science and will become a hub for the maritime education and ocean research especially in the Southeast Asia region.

References

Alfred, M. D., and Sherman, K., 2002. A new imperative for improving management of large marine ecosystems. J. Ocean. Coas.Manag. 45, 797–833.

Baird, A.J. and Lindsay, A.J., 1996, Strategic choice in the Global Container Shipping Industry: A resource-based approach, *IAME '96 Conference*, International Association of Maritime Economists, Vancouver.

C. M. Wang, Z.Y. Tay., 2011. Very Large Floating Structure: Application, Research and Development. Procedia Engineering 14:62-72.

Edmund. J. A and Hunter. E., (1966).Improving teaching: the analysis of classroom verbal interaction. Holt, Rinehart and Winston, University of Michigan, United State.

Fujikubo M, Yao T. Structural Modelling for global response analysis of VLFS.Marine Struc. 2001;14:295-310.

De Langen, P.(2003). A Framework To Analyze Cluster Performance And A Application To The Seaport Clusters Of Durban, Rotterdam And The Lower Mississippi. Erasmus Research Institute of Management. Holland.

De Langen, P.(2004). Governance In Seaport Clusters. Maritime Economics & Logistics. vol. 6: 141-156.

De Langen, P.(2005). Collective Action Regimes In Seaport Clusters: The Case Of The Lower Mississippi Port Cluster. Journal Of Transport Geography vol. 13: 173-186.

McCann, P., Sheppard, S. (2003). The Rise, Fall and Rise Again of Industrial Location Theory. Regional Studies 37(6/7): 649-663.

Miles, E. L. (1999). The concept of ocean governance: evolution toward the 21st century and the principle of sustainable ocean use. Ocean and Coastal Management 27: 1–30.

Othman, M.R., Bruce, G.J. Saharuddin, A.H., 2011. The strength of Malaysia maritime cluster: The development of maritime policy. J. Ocean Coast.Manag. Ref. OCMA 2820.

The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000 by Houghton Mifflin Company. Updated in 2009.Published by Houghton Mifflin Company.