Curriculum Development for a Graduate Program on Maritime Safety, Security and Environmental Management

Author Name(s): E. Asyali [1)], A. G. Cerit [2)], S. Nas[3)], M. Kalkan[4)]

[1)] D.E.U. School of Maritime Business and Management, Turkey, ender.asyali@deu.edu.tr

[2)] D.E.U. School of Maritime Business and Management, Turkey, gcerit@tnn.net

[3)] D.E.U. School of Maritime Business and Management, Turkey, snas@deu.edu.tr

[4)] D.E.U. School of Maritime Business and Management, Turkey, mustafa.kalkan @deu.edu.tr

Abstract

"Curriculum development" has recently been an issue of increasing significance, particularly at higher maritime education and training. Curricula are the basic means through which goals and objectives are set. If the learners are to be well-equipped with such skills as reasoning, critical thinking, problem solving, information processing, independent working, and life long learning, curricula are to be developed accordingly. Considering the fact that maritime industry is one of the few industries where safety, security and environmental protection issues are vital elements while performing the activities, Dokuz Eylül University School of Maritime Business and Management (SMBM) responded to the need with an executive graduate program in the field, namely "MSc Program in Maritime Security, Safety and Environmental Management". In 2003, SMBM got into effortful work to develop the curriculum emphasizing an integrated approach on the safety, security and environmental management for satisfying the needs of practitioners and candidates for management level positions in the industry. This study aims to analyze the requirements for graduate studies in the maritime discipline and describes the curriculum development process of the MSc program in Maritime Safety, Security and Environmental Protection. This is a descriptive study where the program is described in detail being supported by the interviews with the participants of the program.

Keywords

Curriculum; maritime; graduate; safety; security; environment

1. Introduction

As the curriculum is the path which is supposed to lead the learners involved to the final target, it should be designed with utmost care. The core of this design is to be based on the basic needs of the learners who will be the outcomes of the relevant education process, "a creative process on the part of the student, … a process of personal development, … a process of individuals becoming more individual, more of persons, in the sense that they become their own person…" (Barnett, 1994). Barnett highlights the target to be destined, in the same study mentioned, as follows: "If we want our students, on leaving their courses, to be able to make their way in a changing world, with its unforeseen patterns of demand and expectation, with its shifting relationships between work and non-work activities and with the complexities of global citizenship becoming more insistent, a narrow acquisition of pure knowledge it offers, hardly seems to provide an adequate basis for framing a curriculum for the 21st century… curriculum adequate to the modern age has to be one of the both *thought* and *action*… General intellectual capacities and the student's wider personal skills have to be developed. … Typical of the general intellectual skills that are invoked are: *analytical skills, being able to integrate* (synthesize) material and see relationship within it; being able to *form critical evaluations*…" The skills to be enhanced with the students are also thought to include "*interpersonal skills, the ability to work in a team, decision making, problem-solving, communication skills, risk taking and leadership*." Barnett rightly highlights the forms of curriculum objectives in two basic views, theoretical and practical, each of which is then regarded through specific and general viewpoints.

Borich (2004) introduces an interesting term, *thinking curriculum*, "one that focuses on teaching learners how to think critically, reason, and problem-solve in authentic, real world contexts" and recommends a curriculum reform in the next decade that will enable learners to work independently and to attain more high-level thinking, conceptual, and problem-solving skills. This is inevitable particularly for the curricula to be framed for graduate maritime education and training, for this industry is remarkably international and multi-disciplinary in

nature.

2. Basic Requirements in Effective Adult Learning

The extensive and prevalent changes in technology, the extraordinary speed in exchange of information and widespread knowledge seem to have given birth to the emergence of new approaches, in education favoring life-long learning. "As we approach the 21st century, education has become a life-long activity." (Smith and Pourchat, 1998). Rather than confide education to schooling alone, the new approach gives priority to acquiring certain basic competence over graduation (Davies, 1998), having enhanced the requirements for effective self-directed learning. Such noticeable changes on teaching and learning issues have brought about certain shifts from *behavioristic* to *cognitive* approach. Both conceptual and empirical studies, having emerged in cognitive psychology, seem to have emphasized the use of pre-existing knowledge as the initial basis of learning, integrating the new knowledge with the existing one, restructuring it, and, while doing this most challenging part of the process, using deep processing approach (Brown and Atkins, 1994)

The search for more effective education, triggered in mid 20th century, has also shed lights on the distinction between child learning (pedagogy) and adult learning (andragogy), though "the earliest roots of educational psychology's interests in adult learning can be traced to the World War I" (Smith and Pourchat, 1998). The issue has been focused more since the last quarter of the century through the certain learning theories developed by such educational physiologists as Knowles (1980), Houser (1985) and Bolton (1985).

The distinctive characteristics of adult learners underlined in the relevant studies could be highlighted on such basic concepts as *experience*, *awareness*, *practice* and *motivation*. In other words, adults have a relatively great wealth of experience and background which is likely to be exploited in promoting the learning quality. Besides, adults are well aware of the actual need for improving their learning in certain particular respects, which could be attributed to the benefits of getting promoted in their profession or access to better living conditions. Furthermore, adults are usually willing to put any knowledge into practice so as to enjoy the awards as early as possible. Such willingness is thought to be setting the sound basis for *intrinsic motivation*, a must for effective learning to take place.

Considering the above-mentioned basic distinctive characteristics of adult learners, Smith and Pourchot (1998) draw such a conclusion that "adults generally have greater metacognitive knowledge and are better able to regulate their cognitive skills than children". The overall conclusion also covers that "personality traits, interests and motivational skills are three domains that are likely to have some influence on adults' intellectual abilities."

Schommer (1998), who discusses adults' beliefs about the nature of knowledge and learning, states that "there is enough evidence to make it clear that epistemological beliefs are an integral part of being an adult and dealing with the complexities of an adult life." Having emphasized the role of developing sophisticated epistemological views in cognitive development, Schommer claims that epistemological beliefs guide individuals to cope with complex, contradictory, and illusive knowledge that allows them to think dialectically, play a substantial role in the regulation of cognition …and may comprise an executive control system that "guides one's planning for strategies, their monitoring of ongoing comprehension, and the evaluation of their accuracy of comprehension."

Another distinctive characteristic of adult learning could be attributed to the fact that "practical" abilities grow over the years (Torff and Sternberg, 1998). In other words, the more the individuals are experienced the more able they are to think, reason, and solve problems. This ability is also believed, through the same study, to be covering the tacit knowledge "practical know-how that is usually not directly thought or even openly expressed or stated"… with three such characteristic features as "*taking the form of 'knowing how'* (procedural knowledge) rather than '*knowing that*' (declarative knowledge); directed toward attainment of goals that people value; and acquired under conditions of low environmental support… without much direct instruction."

Considering the characteristic features of adult learners, the studies on androgogic approach highlight the specifications of adult learning in such a seven-element requirements (Cerit, 2004, Knowles 1979- 1980, Howser 1985, Bolton 1985):

- The teaching and learning environment should provide a decent medium for interpersonal respect, support, openness, sincerity, trust and confidence, cooperation and collaboration. In other words, adult learners should feel at rest, comfortable, free from anxiety and safe while studying.

- Adult learners should be allowed and encouraged to get involved in the prevalent planning process.

- Adult learners should be encouraged to set their own needs which would act as a basis for the learning objectives.

- Adult learners <u>do</u> want to formulate their own learning objectives.

- Adult learners <u>do</u> prefer to design themselves the pacing schedule/syllables to be implemented.

- Adult learners would appreciate being guided and scaffolded rather than directed and instructed, while implementing the pacing schedule agreed on.

- Adult learners should be encouraged to get involved in the overall assessment/appraisal process.

3. Development in Maritime Education and Training

The safety of life at sea, the favorable marine environment and over 80% of the world's trade depend not only

on the professionalism and competence of seafarers on board of ships but also on the ones that are supporting all maritime activities on shore. Today seafarers need more and more proper and effective support from shore.

Adaptation to technological and regulative changes, improving service quality to stay competitive, promoting the awareness towards safety, security and environmental concerns, need highly motivated and trained human resources in maritime industry. Traditionally maritime industry is widely relied on ex-seafarers as a source of skilled labor on shore based occupations. Human resources play a vital role in effectiveness and efficiency of maritime operations. Training and development is becoming a key function of HR activities. The role of training and development in improving safety security and environment protection in maritime is vital. Education institutions should be one step ahead for satisfying the training demands of the industries

Training is defined as any attempt to improve employee performance on a currently held job or one related to it. This usually means changes in specific knowledge, skills, attitudes, or behaviors. To be effective, training should involve learning experience, planned activities, and a design in response to the identified needs. Development refers to learning opportunities designed to help employees improve. Such opportunities do not have to be limited to improving employees' performance on their current jobs. Training helps employees do their current jobs; development, in contrast, helps the individual handle future responsibilities, with little concern, for current job duties (Werther and Davis,1996). The focus of development is on the long term to help employees prepare for future work demands or career goals, while training focuses on the immediate period to help fix any current deficits in employees' skills (Bernardin and Russel,1998).

As a general definition, a *system* is a set of interrelated and interdependent parts arranged in a manner that produces a unified whole (Robbins and Coulter,2005). Maritime Transportation system is an open system where there is a dynamic interaction with the environment. When we apply system approach to maritime transportation, improving safety, security and environment awareness needs coordination of work activities of the various parts and ensuring that all the interdependent parts are working together.

4. The Approach Adopted by School of Maritime Business and Management

Considering the fact that maritime industry is one of the few industries where safety, security and environment protection issues are vital elements while performing the activities, SMBM responds to the need for an MSc program in that field, through offering a program called **Maritime Security, Safety and Environmental Management.** In 2003, SMBM got into effortful work to develop curriculum designs emphasizing an integrated approach to the safety, security and environmental management for satisfying the needs of practitioners in the industry.

Starting in 2003, the studies on the curriculum development for the program has been concentrated on both 1) researching and evaluating the existing programs, and 2) determining the requirements of the industry.

Researches on the existing programs have revealed that World Maritime University (Sweden) is specialized in an area named "Maritime Safety and Environmental Protection" (www.wmu.se).

Hogeschool Zeeland (Holland) applies a modular system for the MSc program in "Integrated Quality, Safety and Environmental Management" and their system has been analyzed (www.hz.nl).

Arab Academy for Science, Technology and Maritime Transport College of Maritime Transport and Technology (Egypt) offers two specialization areas in "Protection of the Marine Environment" and "Ship Operation and Safety" and the contents of these areas are examined (www.aast.edu).

The IMO's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 78/95 was the first internationally-agreed Convention to address the issue of minimum standards of competence for seafarers. But there are not any common standards for shore-based maritime occupations. Legal, technological and commercial forces generally create those competence standards.

Although with the introduction of the STCW convention, the educational requirements of the operators on the "sharp end" of the shipping operations are defined, there is still a lack of educational standards and requirements for the personnel who are supporting these activities staying at the "blunt end" of the operations.

SMBM offers this program to the maritime industry as a tool for enhancing maritime management practices and further supporting safe and secure management in the operation of ships and prevention of pollution. The general management system principles embodied by the ISM and ISPS Code, ISO 9001, OHSAS 18001 and ISO 14001 are studied in this program

The program, a balanced combination of theory and practice that allows students to apply what they are learning immediately to their work, has been designed to enhance the professional competence of participants and satisfy the operational needs of the maritime industry with a full understanding of the theoretical and technical background

The objectives of the program are as follows:

- To provide a focused and specialized education in managing safety, security and environment management with a global perspective.
- To strengthen interdisciplinary approaches in maritime industry,
- To teach students to recognize and solve problems likely to appear in maritime industry,
- To provide maritime industry with scientific pro-

jects on security, safety and environmental protection issues.

- To provide students with the strengths of the science of management to deal with global technological, economic, political and legal aspects of the maritime safety, security and environmental protection issues.

After effortful studies the curriculum of the program was developed as be seen in Table 1. A Minimum of one elective course in to be elected each term.

Table 1: Curriculum of the Graduate Program

Title	Credit
1st Semester	
Business Administration	3+0
Admiralty Law	3+0
Maritime Safety and Risk Management	3+0
Electives:	
Maritime Technology	3+0
Maritime Policy	3+0
Operations Research	3+0
2nd Semester	
Organization and Management in Maritime Companies	3+0
Shipping Management	3+0
Maritime Quality, Safety and Environmental Management	3+0
Electives:	
Multimodal Transportation Systems	3+0
Maritime Law	3+0
Maritime Information and Communication Systems	3+0
3rd Semester	
Human Resources Management in Maritime Companies	3+0
Marine Survey and Inspection Principles	3+0
Maritime Security Management	3+0
Electives:	
Marine Insurance Law	3+0
Marine Engineering	3+0
Transportation of Dangerous Goods	3+0

After completion of the courses an MSC Project is to be prepared with an advisor, submitted in hard and soft copies, and presented in front of a jury of 3 instructors for approval.

In Turkey shipping has traditionally relied on ex-seafarers as a source of skilled labor. The number of the members to the Turkish Chamber of Shipping has risen from approximately 300 in 1984 when it was established up to 6578 today. Such a rapid and dynamic development has eventually brought about an obvious shortage in the well-equipped and well-experienced human resources in the industry. On the other hand, Maritime administration has become an important employer for the ex-seafarers. Besides, following the highly raised concerns for safety in navigation and the resultant effort along with certain practices throughout the world, the struggles for managing the navigational safety through share-based installations has greatly been accelerated. Related with such recently accelerated efforts, Turkish Straits have been provided with a well-equipped VTS, which is thought to be complemented with a further VTS. Such new installations for sure are in need of employing a certain number of ex-seafarers. Furthermore, the newly emerged maritime education and training institutions in Turkey, particularly increased in number following the adoption of STCW 95, do need to employ a considerable number of well-experienced and well-equipped staff in order to offer quality education and training.

After working at sea in positions at various levels many seafarers want to put their skills and experience to use in shore-based occupations, which need people with practical experience of working as an officer at sea. It is a common case for seafarers to continue their career progress at shore-based maritime occupations e.g. in - ports, marine insurance and finance. Ship management and fleet operations, ship surveying, lecturing in maritime school, regulatory and classification authorities, maritime administration, shipbuilding, ship repair and equipment, marine insurance, maritime law, towage, salvage operations, shipping agents .So not only the shipping but a wider maritime sector offers ex-seafarers a variety of alternatives where they can use their experience that they have gained on board of vessels.

Within the scope of this analysis in mind, the Program targets ex mariners working ashore, human resources managers, DPA's, safety officers, superintendents, active and ex-navy officers, port managers, ship and port facility security officers, officers working at government institutions related to maritime operations, port authorities, harbor masters, and those who want to have a career in maritime industry.

In 2004, the program commenced with 12 participants, 8 of whom were active navy officers, 1 pilot, 2 master mariners, 1 manager at a pilotage and towage company. In 2005 there were 8 participants 5 of whom were navy officers, 2 insurers and 1 technical superintendent.

5. Evaluation of the Program: Methodology

Evaluation is one of the major steps involved in training efforts. The goal of the evaluation phase is to examine whether the training program has been effective in meeting the stated objectives. The evaluation phase requires the identification and development of criteria which should include participants' reactions to the training, assessments of what they learned in the training program, measures of their behavior after the training (Bernardin and Russel, 1998).

A questionnaire was drafted by using sample training evaluation forms. (Dessler 2002; Bernardin and Russel, 1998; Noe,1999) and the questionnaire was applied to

the graduates of the program to evaluate the effectiveness of the program. The content validity was applied to the questionnaire by using the experts on this subject. 20 questionnaires were sent to the graduates, a total of 13 have replied which means a 65% rate of return.

The questionnaire has 5 parts. The first part covers profile questions. Three parts are designed on a 7 point Likert-scale to evaluate the performance of, (1) the instructors (2) the learning environment, and (3) the curriculum. The last part includes open-ended questions for the recommendations to improve the program.

6. Findings and Discussions

The average age of the participants is 34,67. The reasons for attending this program are, self-development, to have better job opportunities, and to have knowledge about maritime industry and merchant shipping. The means of being informed about the program are stated as Internet, flyers, word of mouth messages distributed through organizations and friends.

The answers given to the statements regarding the performance of the instructors are shown in Table 2.

The highest frequency for the performance variables about the instructors appears at the statement "gives learners opportunities to ask questions". This variable is focused on principles of the androgogic education. In this manner instructors have met the expectations of the androgogic education. The lowest frequency for the variables on the instructors is 6.00 and although it is quite a high frequency it could be seen that it is focused on the experience of the instructors. As a further research the instructor performance should be measured separately. Considering the performance results of the instructors, instructor development programs may be planned and performed.

Table 2. Performance of the Instructors

Performance Variables of The Instructors	Mean*	Standard Deviation
Gives learners opportunities to ask questions	6,67	0,651
Explanations in lecturing are neat and comprehendible	6,42	0,669
Encouraging discussions	6,42	0,793
Competent in his/her field	6,33	0,888
Effective in educating and training with his/her rich experience	6,00	1,200
Good at integrating the related parts due to his/her experience and pre knowledge	6,00	1,128
Effective at providing subject-related sources	6,00	1,044

* 1: absolutely disagree, 7: absolutely agree

The results of the evaluation of the learning environment is shown in Table 3. The highest grade of the performance variable of the learning environment is "learners are given chance to involve their subject-related experience". This variable is focused on principles of the andragojic education as stated in performance of the instructors. In this manner again, learning environments have met the expectations of the androgojic education. The lowest grade of the performance variable of the learning environment is "physical conditions are appropriate". This indicator shows that the physical conditions need to be developed.

Table 3. Performance of the Learning Environment

Performance Variables of The Learning Environment	Mean*	Standard Deviation
Learners are given chance to involve their subject-related experience	6,67	0,651
No barriers against presenting contrary opinions	6,67	0,888
Favorable communication skills are encouraged	6,17	1,193
Encouraging learner involvement	6,17	1,337
Learners feel themselves safe and ease	6,50	1,000
Encouraging effective listening skills	5,83	1,586
Session hours are well-arranged to ease attendance	5,75	1,210
Physical conditions are appropriate	5,58	1,240

* 1: absolutely disagree, 7: absolutely agree

The evaluation of the program contents is shown Table 4. The highest grade of the performance variable of the program contents is "new knowledge is proper to be used in my profession". This indicator shows that the knowledge originated from the program contents meet expectations of the professional life. The lowest grade of the performance variable of the program contents is "well arranged to be put into practice". This indicator shows that the instructors must develop their knowledge and experience on the specific contents.

The open ended questions and the answers given to them are stated below:

Any further subjects /topics you would suggest to be included in the curriculum:
Operations Research,
Brokering, Chartering,
Admiralty law,
Carriage of Dangerous Goods,
Risk assessment,
Marine engineering operations

Any subjects/topics you will suggest to be removed:
Time spent for the ISPS Code could be shortened
Organization and Management in Maritime Companies
Maritime policy

Table 4. Performance of the Program Contents

Performance Variables of The Program Contents	Mean*	Standard Deviation

New knowledge is proper to be used in my profession	6,25	0,965
Contributing to my career development	6,00	1,044
Subjects and examples involved are updated	6,00	1,128
Adequate in easing to access new information sources	5,92	0,793
Theoretically well equipment	5,92	0,996
Good enough to complement my existing knowledge	5,92	1,084
Well prepared to correct certain mistakes in my existing knowledge	5,92	1,165
Well-planned and well ordered	5,83	1,115
Well-equipped to meet my expectations	5,75	1,138
Well arranged to be put into practice	5,33	1,303

* 1: absolutely disagree, 7: absolutely agree

Multimodal Transportation Systems
Maritime Law
Admiralty law

Any alternations /amendments regarding to learning environments

Circular tables in classroom,
Improving computer infrastructure,
Courses could be held in the city center,
Field studies could be added,
Courses could be held on weekends,
Simulators could be used,

Any unfavorable attitudes you have observed at the instructors

Workload of instructors

6. Conclusions

Shipping is perhaps the most internationalized of all the world's great industries. It has been recognized that the best way of improving safety, security and environment protection at sea is developing international regulations that are implemented by all shipping nations in full compliance with the relevant requirements. Implementing these regulations needs a deep understanding not only the contents but also the relations among them.

The lifelong education and training requirements of seafarers and the employees at different levels of the shipping practice force universities to develop graduate programs for those at management positions or aiming such positions at their career plans.

Maritime safety, security and environmental management is a complex and continuously developing section of the maritime industry. Education and training requirements in that area spreads to several competencies however it is obvious that only competent leaders may direct a competent work force. Maritime education institutes are responsible with the higher education and training requirements of the leading professionals in the maritime, safety, security and environmental management area. Considering that these leading professionals are all equipped with BSc degrees, developing effective MSc programs will supply the needs of the industry in this field.

Keeping in mind that the students attending MSc programs are adult learners, not only the curriculum, but also the learning methodologies for these programs should be developed in the scope of andragogic principles. Adult learners should be included in the development process of graduate programs to increase the efficiency and effectiveness of the program. Maritime industry requires developed levels of teamwork at all levels and this experience should be considered as a strength in higher maritime education as well.

References

Barnett, R (1994). “Improving Higher Education”, The Society for Research into Higher Education and Open University Press, London. pp 157.

Bernardin, H.J. and Russel, J.E.A. (1998). “Human Resources Management, An Experimental Approach”, Irwin McGraw-Hill, pp173-175,193.

Bolton, B (1985). “Book Review on Andragogy in Action: Applying Modern Principles of Adult Learning, by Malcolm S. Knowles and Associates- San Francisco: Josey Bass 1984”, Personnel Psychology, Summer, Vol. 38, Issue 2,pp 403-407.

Borich, G. D. (2004). “Effective Teaching Methods”, Fifth Edition, Pearson Education Inc., Upper Saddle River, New Jersey, 07458, USA, pp 92.

Brown, G. and Atkins, M. (1994). “Effective Teaching in Higher Education”, British Lbv. Cataloguing, Routledge, London, pp 150-156.

Cerit, A. G. (2004). “Andragogic Learning Principles and the University Students’ Perceptions on Maritime Education”, The International Association of Maritime Economists Annual Conference 2004 Conference Proceedings, 30 June-2 July 2004, Izmir, pp.109-119.

Davies, D. (1998). “The Virtual University”, Journal of Workplace Learning Vol-10,Issue 4, MCB Univ Press. pp 3-4.

Dessler,G.(2002).”Human Resources Management”, Ninth Edition, Prentice Hall, pp211.

Houser, H. F. (1984). “Book Review on The Adult Learner, a Neglected Species, by Malcolm S. Knowles- Houston: Gulf Publishing, 1984”, Personnel Psychology, Summer, Vol. 38, Issue 2, pp 407-410.

Knowles, M. S. (1979). “Speaking from Experience: The Professional Organization as a Learning Community”, Training and Development Journal, May, pp 36-42.

…… (1980), “How Do You Get People to be Self-directed Learners?”, Training and Development Journal, May, pp 96-101.

Noe, R.A.(1999). “Employee Training and Development”, Irwin McGraw-Hill, pp.158

Robbins, S.P. and Coulter, M. (2005). “Management”, Eight Edition Pearson Prentice Hall, pp 35.

Schommer, M. (1998). “The Role of Adults Beliefs About Knowledge in School, Work and Everyday Life, Adult Learning and Development-Perspectives From Educational Psychology”, Edited by M. Cecil Smith and Thomas Pourchot, Northern Illinois University, Lawrence Erblaum Associates, Publishers, London, pp 140.

Smith, M.C. and Pourchot, T. (1998). “What Does Educational Psychology Know About Adult Learning and Development?” Adult Learning and Development Perspection From Educational Psychology(edited by M. Cecil Smith and Thomas Pourchat, Northern Illinois University) Lawrence Erlbaum Associates, Inc., Publishers, New Jersey, pp 3-9.

Torff, B. and Sternberg, R.J. (1998). “Changing Mind, Changing World: Practical Intelligence and Tacit Knowledge In Adult Learning, Adult Learning and Development-Perspectives From Educational Psychology”, Edited by M. Cecil Smith and Thomas Pourchot, Northern Illinois University, Lawrence Erblaum Associates, Publishers, London. pp 112-117.

Werther, W.B. and Davis, K. (1996). “Human Resources And Personnel Management”, Irwin McGraw-Hill, pp 282.

www.aast.edu

www.hz.nl

www.wmu.se