Chapter 15
Maritime Education and Training (MET)
Curriculum Challenges in the Twenty-First Century

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15.1 Introduction

Maritime education and training (MET) has become the key contributor in the development of the maritime industry given that maritime operations play a crucial role in improving the economy of many countries. Over the years trade has increased, competition intensified, cargo volume grew, and ships became larger and more specialized [9]. Due to these changes, seafarers had to realign their responsibilities and adapt to the changes.

Nowadays, education is influenced by technological advancement and globalization. The shift from traditional methods to modern methods of education and training is upon us. The fourth industrial revolution is changing the roles of seafarers and the way maritime industry as a whole operates. Alop [1] highlights that the distinctions between the fourth industrial revolution and the previous industrial revolutions are extent, systemic impact and speed. Currently, the world is witnessing an increase in levels of autonomation on vessels. Smart Ports such as the Port of Singapore (Singapore) and Port of Rotterdam (Netherlands) are already in operation [3]. This is an indication that some parts of the world are already preparing for the fourth industrial and innovation wave.

Education has to take a lead in alleviating the challenges of the fourth industrial revolution, and in this case, maritime education and training is no exception [1]. This disruption requires maritime education and training institutions to relook at their skill set and curriculum development and design. Moreover, with the rise of digitalization, investment in education is becoming more important. According to Lunenburg [8], “Curriculum development is the process of planning, implementing, and evaluating curriculum that ultimately results in a curriculum plan”.

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developing a curriculum, there are factors to be considered of which without these, the product would be incomplete and inconsistent.

15.2 Problem Statement

According to HRDC [6], South Africa is faced with skills crisis, and there is a need for skills development in the maritime sector. Today, about 98% of South Africa’s total trade is carried by sea which shows the significance of shipping. It is estimated that South Africa’s maritime industry may contribute about R129 billion and R177 billion to GDP by 2033, therefore creating between 800,000 and 1,000,000 jobs.

More challenges were discovered within the maritime industry in South Africa, and they include disconnection between higher education and training institutions and the maritime industry which results in outputs that do not match the demands of the industry [6]. The disconnection between the two mentioned parties led to curriculum developers getting confused on what is required in the maritime sector. There has also been an issue of poor governance which leads to poor quality for education and training, and it can be assumed that poor education stems from not properly developed curriculum.

The study intends to highlight challenges of maritime education and training curriculum and emphasize the importance of curriculum presage.

15.3 Aims and Objectives

The aim of the study is to examine underlying challenges of maritime education and training (MET) curriculum in the twenty-first century. The specific objectives of this research are as follows:

- To identify possible and existing challenges of maritime education and training curriculum
- To assess curriculum development and design and its implementation
- To assess roles of government in responding to technological advancement

15.4 Research Question

To conduct this study and address the aim and objectives of the research, the following questions were used to drive this study and find the specific areas for analysis:

- What are possible and existing challenges of maritime education and training curriculum?
- What strategy is used for curriculum development and its implementation?
• What are the roles of the government in responding to technological advancements?

### 15.5 Applied Methodology

**Research Design** The study is based on the curriculum challenges for maritime education and training in South Africa with reference to Norway. In obtaining data the researcher will use descriptive and exploratory research designs. According to Shukla [18], exploratory research design deals with the collection of either primary or secondary data using informal procedures to interpret them. Moreover, exploratory research design includes focus groups, in-depth interview and projective techniques. The researcher will employ this research design with the aim of investigating sources of challenges related to maritime education and training curriculum. “The goal of descriptive research is to describe a phenomenon and its characteristics” ([12] p.129). In this study the researcher will use descriptive research design to gain opinions of participants on the challenges of maritime education and training curriculum.

**Research Method** The study will employ qualitative research approach as the aim is to examine existing and potential challenges of MET curriculum in the twenty-first century. Monsen and Van Horn [11] state that qualitative research approach generates narrative data that can be explained in spoken and written words rather than in figures. Furthermore, Nassaji [12] explains that one of the main aims of qualitative research is to obtain initial insights into decision issue and opportunities.

**Data Collection** Data collection is a process by which scholars, researchers and other professionals collect data to check their hypotheses and arguments in order to answer research questions. Gathering of data can be done through interviews, visual observations, surveys, interpretations and experiments. Due to Covid-19, data will be collected through reading of reports, articles, journals, interviews (telephonic) and questionnaires (mostly through Google Forms). Participants will include officials from the South African Maritime Authority (SAMSA) and Department of Higher Education and Training (DHET) and university officials from the Durban University of Technology (DUT), Nelson Mandela Metropolitan University (NMMU) and University of South-Eastern Norway (USN).

**Data Analysis Method** The researcher will use Google Forms to collect and analyse data as this will be a simple way to reach participants from Norway and other provinces of South Africa. Narrative analysis will be the main analysis method to analyse unspoken and spoken words obtained from reports, journals, interviews and questionnaires related to the study. Narrative analysis is defined as a strategy that recognizes the extent to which the stories people share give insights to their
experiences [4]. In the later stages of narrative analysis, researchers turn into storytellers because of the interpretation of gained data [16].

15.6 Curriculum Presage and Foundation of Curriculum Development

Curriculum presage is defined as “Those activities and forces which influence curriculum developers in their curriculum decision-making tasks. These activities and forces are brought with the developers when they come to the task of constructing a curriculum. As such they consist of the curriculum backgrounds, curriculum conceptions, curriculum representations, curriculum foundations of the various curriculum developers and the curriculum context in which they work. This combination of past activities and current forces will have a profound effect upon the final curriculum through the nature of the input from the individuals involved” ([14], pp. 25–6).

Philosophical Forces According to Paul Hirst, philosophy involves interpretation of ideas and theories in which one’s experiences and undertakings are intelligible (as cited in Print [14]). Philosophy is essential for selecting appropriate learning objectives. Furthermore, curriculum developers have to understand their own beliefs of the learning process, knowledge and the world in order to make informed decisions regarding curriculum. Therefore, it is vital to realize the importance of philosophy in education. There are three questions to be considered in understanding the influence of philosophy: (1) what is real? (ontology), (2) what is good? (axiology), and (3) what is true? (epistemology). Differing answers to the mentioned questions have an effect on how curriculum developers reckon of the curriculum.

Sociological and Cultural Influences Print [14] states that culture and society have a huge effect on the development and design of the curriculum. One cannot separate education from society and culture as the purpose is to equip societies with necessary skills and knowledge. Curriculum developers have a responsibility of considering these influences in the formation of the curriculum, meaning their task entails transforming traditional knowledge, attitudes, values and assumptions into curriculum learning activities, content, objectives and evaluation. The important influence of sociological factors is on the content of the curriculum because all the objectives are connected to activities taking place in societies. Curriculum formed must complement multicultural societies.

Psychological Considerations Sharma [17] defines psychology as the science of human behaviour and experience. There are psychological factors to be considered when planning for curriculum development [2]. Psychological factors assist developers in determining on types of approaches for learning, objectives and evaluation procedures to be employed at the end of the lesson [15]. According to Print [14], curriculum developers should consider the following psychological forces before forming the curriculum:
• **Educational objectives** – The understanding of the principle of psychology assists curriculum developers in setting suitable objectives for learning.

• **Learning processes** – Psychology helps in improving an understanding of how people learn and behave in a learning setting.

• **Student characteristics** – It is crucial to understand learners’ personality and background so as to know what objectives to set.

• **Teaching methods** – By understanding learner’s background and personalities, the decision of choosing suitable teaching methods becomes easier.

• **Evaluation procedure** – Psychology also contributes to the evaluation procedures for both learners and teacher performance.

### 15.7 Curriculum Development Model in the Twenty-First Century (Phases)

**Organization** The model recommends that the starting point for the curriculum development is formalizing measures of curriculum presage, meaning a closer look at those individuals who will undertake the role of developing the curriculum should be made – this entails checking their background and factors that form the way they think [14]. Maritime education and training institution would involve instructors, curriculum committee and officials from the Ministry of Maritime Affairs. Factors such as philosophical, social and psychological play a vast role on how curriculum developers perceive knowledge.

**Development** In this phase the group entrusted with the responsibility of forming the curriculum begin to plan for curriculum development document and the required material. In order to achieve the aim of this phase, curriculum developers follow the trail in the middle of the model being situational analysis, aims, goals and objectives, content and instructional evaluation. Print [14] asserts that, through performing situational analysis, educators get the opportunity to be aware of the needs of the students and resources available to meet those needs. Moreover, situational analysis also assists them in devising useful and proper aims, objectives, goals and appropriate content for meeting the philosophical, social and cultural and psychological needs of students. In terms of instructional evaluation, curriculum developers have the responsibility of planning effective assessment processes, and this is done to determine the level at which students have met the intended learning objectives. The focus of instructional evaluation is on the product; in other words it evaluates how well learners have understood during the learning process.

**Application** In this phase the actual application of the curriculum commences, and it includes implementation, monitoring of and feedback from the curriculum and provision of feedback data to the presage team. For the curriculum project, change is likely to take place, and if it does happen, developers should ensure that they avoid confusion and disturbance by developing a plan for implementing the change.
However, the successful implementation lies in the ability and willingness of curriculum developers to accommodate adjustments to the curriculum [14]. Monitoring stage is very important because it measures the success of the curriculum undertaking; following that, evaluation of the effectiveness of the curriculum takes place. In addition, feedback from evaluation process will be obtained, and it normally takes a number of years. Figure 15.1 below depicts the curriculum development model; each and every phase is important as they are interrelated, and curriculum developers cannot skip the first phase and begin with application.

15.8 Challenges of Curriculum Development

Diversity. Gosper and Ifenthaler [5] highlight that in the twenty-first century, student profile in higher education is more diverse than that of the previous decades. Furthermore, higher education institutions have become more internationalized
than in the previous years. Gosper and Ifenthaler [5] further state that diversity is challenging because it comes with different backgrounds, professional experiences and beliefs about teaching and learning. MET is a complicated and dynamic discipline that requires professionalism when it comes to design and development of the curriculum especially now that education is internationalized.

Conflicting Ideas Curriculum design and development involves a number of stakeholders with different perceptions about educating and training. They also have different views in terms of where to best begin with the development process [14]. Different views tend to cause conflict in the process, and in return the quality of the curriculum is compromised.

Resistance to Change Change can cause despair because people fear that their roles will change and some fear to move from their comfort zone. To some, change brings hope and strength [7]. With regard to maritime education and training, resistance may come from lecturers/instructors and seafarers because they are familiar with traditional methods of operating. Manuel [10] asserts that if the need for change is clearly defined and explained to affected individuals, chances of resistance to change are minimized.

Lack of Resources As much as the rise of digitalization presents positive impacts in terms of creativity and innovation, some maritime education and training institutions still lack adequate resources. According to Phewa [13], it is difficult for countries with inadequate resources to train globally competitive maritime personnel in the technological world. Furthermore, maritime education and training institutions particularly in South Africa are still in need for effective funding models for seafarers and other maritime personnel. The study “Maritime Education and Funding Models in Different Jurisdictions: Challenges and Opportunities in South Africa” showed that out of 44 participants, 13 were funded by their employers and another 13 were funded by their parents/guardians through loans. This is an indication that there still needs to be an investment in resources in order to grow and uplift maritime education and training institutions.

15.9 Government Role

Government has a critical role to play in order to ensure that South Africa’s maritime education and training is of good quality and that maritime personnel are internationally recognized. The issue of restructuring the maritime education and training curriculum should make it to national government agenda in order for it to get attention, and this is where the legislative institutions from different spheres of government, administration and other public officials come in.

In addition to the above, government has to ensure that maritime education and training personnel are well equipped with relevant skills in order to adjust to the digital world so that technology does not become a burden to them; in this way resistance to change is unlikely to occur. HRDC [6] points out that South Africa’s
government should ensure that student enrolment standards are aligned with the industry requirements and that there is a closer cooperation between industry and TVET colleges in respect of funding, curriculum development and performance management.

15.10 Conclusion

Selected individuals should be fully aware of the impact they have on the final product and the future of students. This will minimize challenges of curriculum development and conflict during the process. Moreover, communication between involved individuals should be clear and transparent; this will avoid barriers to progress.

Roles and responsibilities of curriculum developers should be well stated in order to reduce confusion; this will help everyone to understand and work towards the common goal. Additionally, there must be a direct communication between maritime education and training institution and the shipping industry in order to ensure that curriculum meets the needs of the industry.

Due to changes in our social settings, education, economy and technology curriculum requires some modification. This is to ensure that aims, objectives and content are in line with the trending issues in the world; thus this also helps learners in adapting to change, and it is even helpful for the growth of their careers. The process of curriculum change is very critical; that is why individuals involved in designing and developing should not skip any of the phases. Additionally, readiness of governments to embrace digitalization or rather technological advancements in the maritime sector determines the success of the curriculum. Issue such as resistance may hinder the success of the curriculum.

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