

# **Evaluation of Maritime Universities/Faculties Based on the Qualifications of the Academic Staff**

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## **ABSTRACT**

Globalization of Maritime Education and Training has been accelerated since the international maritime community adopted the revised STCW95 convention and Codes. Several maritime institutions including universities have keenly been searching for the best solution to meet the requirements of STCW95 and demands for their graduates from shipping industry. Since the demands from shipping industry, however, varies in the economic states from country to country, it becomes difficult to obtain the only consensus to harmonize the level of education and training, especially in the community of maritime universities in the world. In such a current situation, the author has recently realized that evaluation of the academic curriculum and academic staff at the maritime universities should be definitely needed before obtaining the consensus.

The purpose of this paper is to propose an evaluation method for maritime universities based on the academic staff. Considering the current situation of the international MET system, the four criteria that are Academic Degree, Teaching Experience, Certificate of Competency and Seagoing Experience will be selected for the evaluation. Furthermore, Geometric analysis will be introduced for fair and objective evaluation. And usefulness and issues on this method will also be discussed in this paper.

## **1. Introduction**

In general, effective education is achieved with having a well-organized curriculum for teaching objectives, well-planned teaching methodology in the classroom and high competence of academic staff for subjects concerned. The issues of teaching curricula and methodology for a field of education have been developed with the agreements between related educational institutions and industry. Consequently, accreditation of teaching curriculum at educational institutions for engineering education by regulating bodies, such as Accreditation Board for Engineering and Technology (ABET), Japan Accreditation Board for Engineering Education (JABEE), has recently attracted a great deal of attention [LATORRE, (1997)]. Moreover, the program of accreditation of which the philosophy is based on the quality assurance has been regarded as one of the approved methods for external evaluation of highly educational institutions.

Reflecting these trends in the field of Maritime Education and Training (MET), STCW95 and the Code, especially in the tables of sections A-II/1, 2 for Deck officers and A-III/1, 2 for Engineer officers, clearly define the requirements on the competence for being a license holder. The IMO Model courses provide the administrators of maritime institutions with a well-constructed template for syllabi of maritime subjects concerned even though they are just guidelines and not strict criteria such like the accreditation programs mentioned above. However, STCW95 that also adopts the concept of the quality assurance mentions not only the teaching curriculum at maritime institutions but also the qualifications and experience of instructors and assessors at the maritime institutions, as provided in the sections A-I/6 and A-I/8. With the progress of implementation of STCW95, a target of evaluation will shift from the MET and certification systems for the whole of a country to individual maritime institutions that have undertaken education and training aiming at the Certificate of Competency approved by STCW95 and the Code.

It can be acceptable for experienced lecturers at educational institutions that the contents of a subject provided by several lecturers will not exactly be the same even if they refer to the same syllabus as well as the same textbook. This suggests that the contents which the students have learned from the lecturers depend entirely upon the lecturers competence and methodology in teaching. Therefore, comprehensive evaluation of a maritime institution cannot appropriately be achieved without evaluating the qualifications and experience of the academic staff at the maritime institution.

Considering the current situation of MET at maritime universities, the qualifications and experience of the academic staff are discussed in this paper. Additionally, an analytical evaluation method for the maritime universities based on

the qualifications of the academic staff is proposed and applied to an example. Furthermore, usefulness and issues of the proposed method are also pointed out and discussed in this paper.

## **2. The current situation of MET and the target of evaluation**

What is the main purpose of Maritime Education and Training for the undergraduate course at an advanced Maritime university? The answer to this question has long been discussed with educationalists at maritime universities in the world. However, it seems to be difficult to find the only consensus which all of the maritime universities in the world can accept. In this section, the target of evaluation will be examined after discussing the current situation of MET at maritime universities.

### **2.1 The current situation of MET for the undergraduate course at a maritime university**

There is a traditional perspective that the purpose of MET is to educate people for ships officers, that is to say, to obtain the Certificate of Competency issued by authorized organizations. To achieve this purpose, most of the maritime universities have keenly made great efforts to find out their educational level suitable for being a university—not a training center. However, after the preparation of revising the STCW convention, inconsistency in the level of MET at the maritime universities has been emerged. Because the level required by the revised convention was the minimum, which was just the opposite of the direction they had done so far. Consequently, most of the maritime universities have arguably lost sight of the direction.

In addition to this current situation, the author have realized from his experience to attend several discussions about this matter that the reason for making this issue more complicated may lie in the following two facts;

MET systems in several countries have their own historic background.

Having developed over a period of hundred years, the MET system in each country varies in its philosophy and methodology. To take an example, it is known that there were two major approaches to establish the relationship between the academic degree program and the license program at maritime universities during 1960 s/1970 s [LEWARN, (2002)]. Such different perspectives based on the historic background in each country have often delayed finding a mutual consensus of the issues on developing the international MET system.

MET has an aspect of vocational education.

The target of vocational education is generally to educate people for qualified experts on an industrial activity. Taking this fact into account, MET as one of vocational education has always been affected by the demands of shipping industry, which vary according to the economic situation of each country. Consequently, the following facts have been found in the world; a maritime university in Seafarers Supply Countries has to emphasize the necessity of the educational program leading the students to be the qualified marine officers onboard ship in compliance with STCW95 or higher regulations, while another maritime university in Seafarers Demand Countries has certainly to emphasize the necessity of the additional educational program leading the students to be the managers and administrators of maritime industry in the country.

Under such complicated situations, it might be impossible to find the only consensus on the issues of MET among maritime universities in the world. The author would therefore like to suggest that maritime universities should have high potential for both academic education leading the students to be those who can contribute their knowledge to maritime industry and practical training leading them to be qualified ships officers, in order to cope with the demands from maritime industry which always vary according to the economic state of the country. The key point to meet this requirement must be the qualifications and experience of academic staff.

### **2.2 The target of evaluation**

Although the main purpose of a maritime university is to educate the students either for officers on ships or managers of maritime industry on shore, the contents of the curriculum have to be sufficiently high. By this reason, academic staff is required to have sufficient knowledge and experience for the subjects they are providing. For such an avaricious requirement, another consideration will be needed, that is to say, it is difficult for an academic staff to have high knowledge and enough experience for both academic education and practical training if each of the levels to be achieved becomes higher and more sophisticated.

Generally speaking, education is accomplished by some instructors each of whom has specialized field. In other words, education is supported by a team of instructors which consists of several specialists. Therefore, the solution to this consideration can be obtained by shifting the target of evaluation from an instructor to an entire team of instructors. This can also give us expectation that the result of evaluation shows potential of a maritime university because competence of academic staff as a team of instructors dominates the implementation of the curriculum for MET.

### 3. Evaluation of a maritime university based on the qualifications of the academic staff

To prevent difficulty in evaluating a human and meaningless criticism for ranking the academic staff, items for evaluation should carefully be selected and the evaluation has to be done by a logical method. In subsequent sections, the proposed evaluation method will be explained with taking an example.

#### 3.1 The four criteria for evaluating the academic staff

The fields of academic education and practical training are selected as the focus of evaluation since it is quite obvious from its name that MET consists of these two fields. Regarding the selection of appropriate criteria for evaluating the academic staff, paragraph 7 of the section A-I/6 gives us a great hint, which is Each Party, shall ensure that the qualifications and experience of instructors and assessors are . . . With referring to this sentence, the academic degree and teaching experience may be appropriate as the qualifications and experience for academic education. In the same way, the certificate of competency and seagoing experience may also be appropriate as those for practical training. Then, the four criteria for evaluating the academic staff have been selected as follows;

For academic education

- Academic Degree
- Teaching Experience in year

For practical training

- Certificate of Competency
- Seagoing Experience in year

To make the evaluation logical, a grading system using numerical calculation should be introduced. After collecting data from each of the academic staff, the data should be converted in accordance with the table 1. Then a fundamental data table for a maritime university is obtained with calculating the average number of each criterion, as shown in table 2.

**Table 1. Conversion table for the grading system**

	Criterion	Grading number				
		0	1	2	3	4
AE	Academic Degree	Non	Dip.	BSc	MSc	Ph.D
	Teaching Experience	0y	_1y	_3y	_7y	15y_
PT	Certificate of Competency	Non	Dom.	3O/4E	CO/2E	MM/CE
	Seagoing Experience	0y	_1y	_5y	_10y	15y_

Abbreviations:

AE: Academic Education, PT: Practical Training, Dip.: Diploma, Dom.: License for Domestic voyage

**Table 2. Fundamental data table for a maritime university as an example**

No	Position	AD		TE		CC		SE	
1	Professor	BSc	2	18y	4	MM	4	10y	3
2	Ass. Professor	MSc	3	5y	3	2E	3	5y	2
3	Research Assist.	Ph.D	4	2y	2	Non	0	0y	0
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
Average		-	2.2	-	2.2	-	2.8	-	3.4

#### 3.2 Geometric method to evaluate a maritime university

Potential of a maritime university based on the qualifications of the academic staff is geometrically analyzed by plotting each of the averaged numbers of the four criteria explained in the section 3.1 on the *X-Y* coordinates as shown in fig. 1, of which the average numbers are A=2.2, T=2.2, C=2.8 and S=3.4, respectively. A set of index numbers are defined in order to make it clear that the relations between the geometric characteristics and their meanings on the evaluation.

The area of the square *\_CSAT* may be indicate the comprehensive potential of the academic staff. An index number *P* is introduced for easy comparison with other data, which is shown as the ratio of the area enclosed by solid lines *A*, to that enclosed by the dotted lines *A<sub>max</sub>*,

$$P = \frac{A}{A_{\max}} = \frac{1}{64}(S+T)(C+A) \quad (\%) \quad (1)$$

The location of the center of gravity,  $G(x_G, y_G)$ , of the square  $CSAT$  may indicate the balanced point of the comprehensive potential of the academic staff. The coordinates at  $G$  are respectively obtained as;

$$x_G = \frac{1}{3}(S-T) \quad \text{and} \quad (2)$$

$$y_G = \frac{1}{3}(C-A) \quad (3)$$

In addition, the length between the origin  $O$  and the center of gravity  $G$  may indicate the deviation from the even point at where the four criteria are completely balanced. Another index number  $D$  is also introduced in accordance with the previous way, which is shown as the ratio of the length between the center of gravity and the origin  $OG$  to the maximum length  $OD$  at the angle  $\theta$ ,

$$D = \frac{OG}{OD} = \frac{\sqrt{2}}{4} \cos(\theta - \frac{\pi}{4}) \sqrt{x_G^2 + y_G^2} \quad (\%) \quad (4)$$

where the angle  $\theta$  is given as;

$$\theta = \tan^{-1} \left( \frac{y_G}{x_G} \right) \quad (5)$$

The relation between the location of  $G$  and the characteristics of the academic staff, namely those of the maritime university is illustrated with fig.2. In the case of this example, the location  $G$  has the coordinates  $(0.4, 0.2)$ ,  $P=43.8$ ,  $D=15.0$  and  $\theta=26.6^\circ$ . The results of evaluation are briefly listed as follows;

- There is even more possibility to improve comprehensive potential.
- The field of MET emphasized in teaching has a tendency to practical training and the deviation is 15%.
- The method of teaching students has a tendency toward experience based.

#### 4. Discussion and conclusion

The purpose of the proposed evaluation method is not to rank maritime universities in the world, but to identify their comprehensive potential according to the qualifications of the academic staff. Hence, this method may be suitable for self-evaluation or internal evaluation to identify strengths and weaknesses of a maritime university, faculties or departments. The index number  $P$  shows comprehensive potential for MET as mentioned before. The index number  $D$  of the advanced maritime university should be close to zero, however, a little deviation to the first quadrant could be allowed if there is a great demand for marine officers, but the angle  $\theta$  have to be close to 45 degree because the balance of education between knowledge base and experience base should be even.

Following an idea that potential of an educational

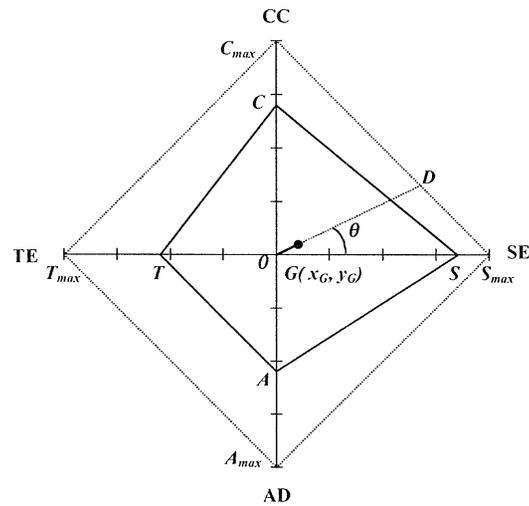


Fig. 1 Geometric analysis for the maritime university as an example

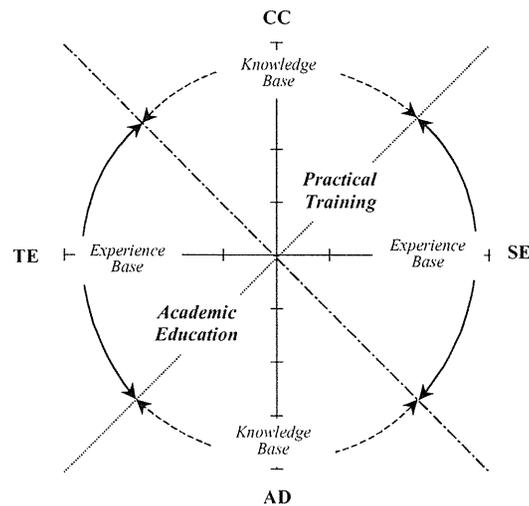


Fig. 2 The relation between the location of  $G$  and the characteristics of the maritime university

institution has to be dominated by the qualifications of the teaching staff, this method for maritime universities has been proposed in this paper. Evaluating a human is, needless to say, difficult and sensitive. However, fair and objective evaluation for educational institutions is never achieved without evaluating both academic curriculum and the staff.

Since the author has always attempted to be fair and objective in the consideration of this method, some issues of this method may appear as follows;

- The four criteria are inadequate to evaluate the academic staff. Other criteria should be added.
- Teaching experience in year is not directly in proportion to capability in teaching. If so, the older, the better.
- The relation between the academic degree and teaching experience is not directly connected, while that between the certificate of competency and seagoing experience is closely connected.
- Justification of the grading numbers in table 2 should be discussed.

These issues should be considered in comparison with ease of investigation. Complicated investigation may give us sophisticated results but it will cause difficulty in collecting complete data from the majority of maritime universities in the world. However, even more discussions should be needed to modify this method.

### **References**

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