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INNOVATION OF EDUCATION SYSTEM TOWARD 21ST CENTURY AT KOBE UNIVERSITY OF MERCHANTILE MARINE

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Abstract

It is the time for Kobe University of Mercantile Marine (KUMM) to promote the projects toward 21st century. KUMM strongly hopes to be *the center of excellence* of maritime science and related areas, both domestically and internationally. The final goal of KUMM is not only to be the *core* of education and research, but also to play an important role as an information processor and distributor on maritime science.

In Japan, the total number of applicants for admission to universities is gradually decreasing. Thus, the universities are forced to alter the concepts of educational activities. To overcome such serious problems, KUMM decided to form five task-oriented working groups in 1998 under the slogan called *VISION 21*.

In this paper, the outline of KUMM's strategy is briefly explained with emphasis being placed on the innovation of curriculum and educational system for undergraduate student.

1. Introduction

In Japan, most universities are facing a great difficulty, which has never been experienced before. As a whole, the number of applicants for admission to each university tends to decrease, because the total number of young people aged 18 is continuously decreasing since around 1990. Additionally, only 14% of the high school students in Japan study physics according to the recent statistics, which means that some universities based on science and technology are forced to accept such students with various educational background. Figure 1

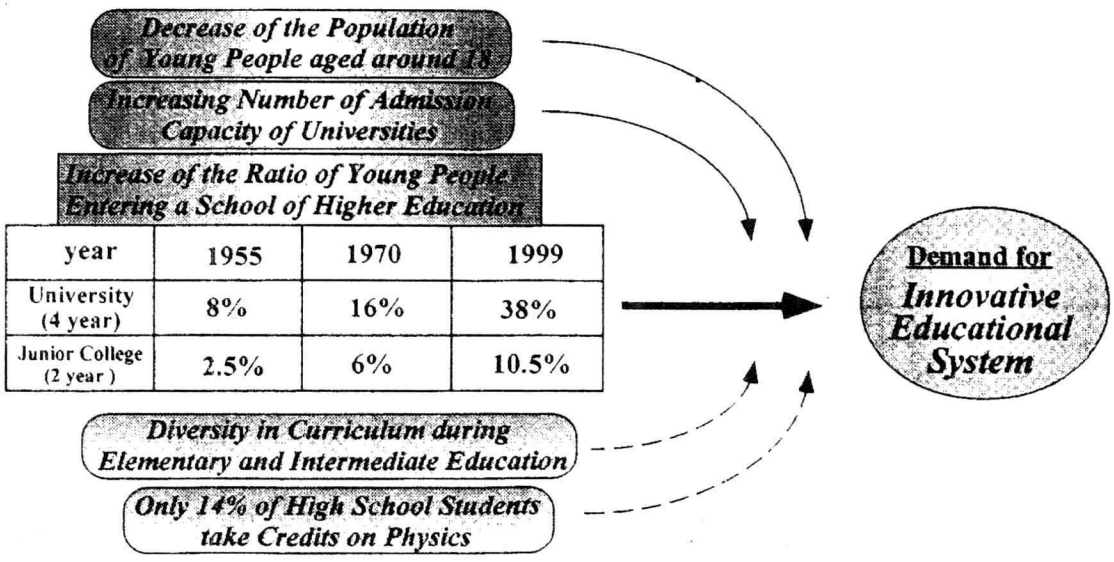

Fig.1 Change of Surroundings around Universities in Japan

explains the phenomena in detail, which causes lots of problems for the universities to solve. Consequently, the conventional educational system, which has been employed for a long time, needs to be reviewed. KUMM is also facing the same problem as in the case of the other universities whose educational background is primarily based on science and technology.

It is therefore strongly desired to establish an innovative educational system to cope with the difficulties mentioned above. Thus, KUMM formed five task-oriented working groups in 1998 under the slogan of *VISION 21*, which deal with such important issues as improvements of curriculum and educational system, MET system in 21st century, the advertisement and applicant acquisition. The basic concepts of *Vision 21* project are given as follows:

1) Conservation and Utilization of dark blue sea for human beings for 21st century

2) Bringing up highly educated international maritime leader

3) To be the core university of the marine transport and the marine science and related areas

In this paper, the emphasis is placed on the innovation of curriculum and educational system for undergraduate students.

2. Outline of Present Educational System at KUMM

2.1 Organization of Undergraduate Course

The undergraduate course of KUMM has four departments as follows.

- *Maritime Science*
  Nautical Science Course (50)
  Marine Engineering Course (40)
- *Transportation & Information Systems Engineering* (40)
- *Ocean Electro-Mechanical Engineering* (40)
- *Power Systems Engineering* (30)

The figures in the parentheses represent the admission capacity of each department or course. Students graduated from Department of Maritime Science receive the degree of B.Sc. in Maritime Science, while the students graduated from the other departments acquire the degree of B.Sc. in Engineering. It should be pointed out that such three groups as Marine Engineering Course, Departments of Ocean Electro-Mechanical Engineering and Power Systems Engineering have a number of common subjects as far as introductory subjects are concerned.

KUMM also has Graduate School of Maritime Science and Technology, four divisions in the master course and two divisions in the doctoral course (Ph.D. course). Detailed discussions on the Graduate School are to be presented by Prof. Inoue.

Master Course:

- *Maritime Science* (8)
- *Transportation & Information System Engineering* (8)
- *Ocean Electro-Mechanical Engineering* (11)
- *Power Systems Engineering* (11)

Doctoral Course:

- *Maritime & Transportation Systems Science* (4)
- *Ocean Mechanical & Energy Engineering* (4)

2.2 Chairs (Faculty Organization)

There are nine faculty chairs at KUMM, as listed below.

- Nautical Studies
- Maritime Studies
- Transportation Systems Engineering
- Information Systems Engineering
- Ocean Mechanical Engineering
- Electro-Mechanical Engineering
- Marine Engineering
- Nuclear Engineering
- Cross-Cultural Studies

Each chair consists of approximately 10 staff members. *Cross-Cultural Studies* chair is mainly in charge of *general arts*. The other eight chairs are mainly teaching the subjects on science and technology. Currently, KUMM has about 100 faculty members, and they belong to one of the nine chairs. To innovate the educational and research systems at KUMM toward 21st century, it was concluded as the results of the working group activities that the present faculty chairs and the department organization should be reconstructed.

3. Concepts of the New Educational System Proposed by *Vision 21* project

Figure 2 illustrates the concepts of the new educational system proposed by *Vision 21* project. Detailed descriptions of the present situations and environments surrounding KUMM are presented in the figure. Our goals consist of the drastic improvements of the educational system for undergraduate students and MET. It is considered that those purposes can be attained with help of *Education Supporting System* to be established. *The Education Supporting System* has two tasks, i.e., the inspection and estimation of education

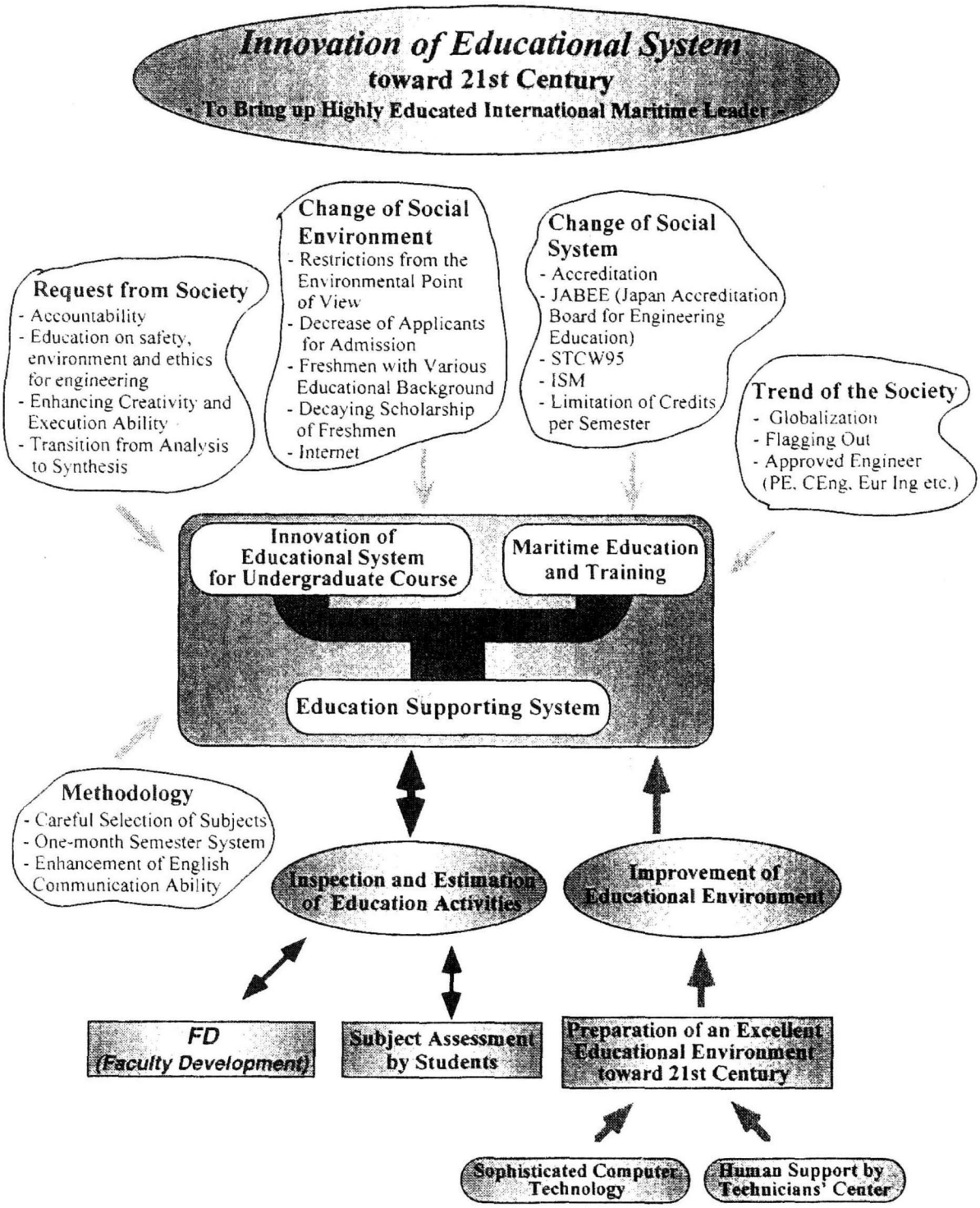

Fig.2 Concepts of the Innovation of Educational System

activities and the improvement of educational environment.

1) Inspection and estimation of education activities

So-called faculty development (FD) and the subject assessment by students are planned. *FD* and the *subject assessment* have not been adopted positively in Japan, especially at national universities. It is considered that the simultaneous promotion of *FD* and the *subject assessment* could be a great help to accomplish *Vision 21* project. Incidentally, *an accreditation* has been accepted mainly by private universities in Japan. Recently, The Japanese Government has decided to accredit all the national universities by a newly established organization. Prior to such compulsory accreditation, it is the intention of KUMM that all the activities of KUMM are to be approved by Japanese University Accreditation Association (JUAA) in 2001. JUAA has accredited many universities since 1947.

2) Preparation of a ideal educational environment

An innovative educational environment must be prepared to cope with the education in the 21st century. It is expectantly realized with help of the sophisticated computer technology now available and human supports. Continuous introduction of the rapid progress in multimedia technologies and Internet can be useful means to improve the present educational system drastically. On the other hand, it is commonly recognized that education is essentially and desirably supported by human labors. Fourteen technicians are now working for KUMM except for the crew of the training ship *FUKAE MARU*. Each technician has belonged to a specific laboratory so far, which has been usually headed by a professor. According to the concepts of *Vision 21* project, all the technicians belong to a newly organized *Technicians' Center*. They are counted on to be powerful supporters for various activities of KUMM especially for the undergraduate education program.

4. Strategies to Attain the Goals of *Vision 21* project

To improve the quality of undergraduate education, *Vision 21* project has proposed a number of strategies. Representative six strategies are tabulated in Table 1, and each strategy is explained in detail in the following.

1) Improvement of lecture systems with *Compact Class*

To enhance and improve the educational quality, each class should be as small as possible. It makes possible such important issues as interactive lecture, imposing a number of exercises and homework, which may be disliked by the recent students in Japan, because they have scarcely experienced such an educational system. Judging from the present student organization of KUMM, each class is desired to consist of about forty students. The *Compact Class* system is particularly effective for the fundamental subjects of science and technology. Most of those subjects are provided for freshman and sophomore.

2) Introduction of *One-month Semester System*

KUMM adopts two-semester system in the similar manner to the most universities in Japan. Students studying in the Department of *Maritime Science* must experience a one-month ship-training annually in the first three years. The training system is sometimes detrimental to make up a flexible and effective

Table 1 Strategies to Attain the Goals of *Vision 21* project

1. Improvement of lecture systems with *Compact Class*
2. Introduction of *One-month Semester System*
3. Limiting the number of credits for one semester
4. Enhancement of communication English ability
5. Careful selection of the subjects requiredto be maritime officers
6. Taking a new look at the subjects on general arts

curriculum, particularly for the other three departments, because each department is closely related from the curriculum point of view. *One-month Semester System* has high promise to solve this problem. It could be a useful means for constructing the curriculum with high flexibility.

3) Limiting the number of credits for one semester

Recently, The Ministry of Education in Japan strongly demanded every university to limit the number of credits which a student can register for one semester. It is the intention of the authority that credits should be given under the substantial achievement. According to the Japan standard, one credit needs 45 hours study including the lecture in the classroom. The rule means that corresponding to one-hour lecture, students must study at least for two hours. To accomplish the substantial credit system, the number of credits, which a student can resister for one semester, must be limited to some extent. It is predicted that this system works well when being introduced together with *proposal* 1).

4) Enhancement of *communication English* ability

In Japan, every freshman has learned English at least six years before entering universities. However, their ability in English is not necessarily sufficient as far as oral communication is concerned. This problem is fatal for Japan to continuously develop in the fields of science and technology under the present circumstance of *globalization*. KUMM has two strategies. First, the score of the qualified test on *communication English* is regarded as the credits in KUMM. Secondly, it is strongly recommended that introducing English into an ordinary lecture in various ways as much as possible. The rating may be given to each subject according to how much English is introduced. However, there are still serious problems to be solved. KUMM has only one faculty of native English speaker for teaching communication English. That is to say, who teaches *communication English*, and how is it taught?

5) Careful selection of the subjects required to be maritime officers

The present curriculum for *Maritime Science Course* demands the students to take a number of credits for graduation, say, more than 140 credits. In addition, lots of credits are required to be a candidate of maritime officer. The graduation requirement is to be reduced as small as 130 credits in the new curriculum. As far as the maritime certification is concerned, *Vision 21* project proposed that the number of credits should be reduced as small as possible, hopefully to the minimum value of 35 credits, which exactly coincides with the minimum requirement specified in Japan law.

6) Taking a new look at the subjects on *general arts*

It is now strongly demanded that every university should have its own uniqueness in the educational system. On the other hand, the importance of general arts cannot be ignored. It is sometimes said that the subjects on *general arts* be a great help in the future. Consequently, it is a vital matter for KUMM to discuss how the subjects on *general arts* are taught.

5. Future Plans and Prospects

A new curriculum system is to start from April 1, 2001. Reconstruction of the faculty organization is now being discussed intensively. In addition, the department organization is also being re-examined.

As for a student level, every student is possibly asked to take the examination of TOEIC (Test of English for International Communication) in the very near future, which can estimate the ability of *communication English*. In these days, many companies in Japan tend to impose *TOEIC* and its score is sometimes used as the index for the promotion of personnel. Thus, it is expected that the introduction of *TOEIC* may stimulate the students' motivations toward polishing up the ability in *communication English*.

KUMM believes that only the *synthetic innovation in education, research and management* leads to the success of *Vision 21* project.

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