A STUDY ON THE EFFECTIVE ENGINEER EDUCATION SCHEME IN DEVELOPED COUNTRY

(CM-120)

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ABSTRACT

One of the critical issues in the developed countries like Japan is that young generation losing motivation and social withdrawal. Why do they not keep strong motivation and social withdrawal? They live in a country where the people do not feel physical difficulties. It means that they do not feel inconveniences and/or critical phases. This living circumstance creates the problems to the young generation difficult to realize what one's desire is. This study suggests the method to provide engineering students in university in developed countries to realize own way and mission based on corroboration activities with universities in developing countries.

Keywords: Human resources development, university education, engineering education

1. INTRODUCTION

Japan is a country that has human resource but basically has not natural resources. After the Meiji Restoration, the new government set up new education system for creating effective engineers who had a national perspective and were able to integrate the various techniques. It can be seen the same situation in the World War II recession period. The people in the country advanced various technical innovations in each industry and supported high economic growth called "the miracle of Asia". A country under evolving, it is big possibility that effective engineers will be appeared.

In year 2005 Japan has changed to a country decreasing population. The decreasing population creates problems such as the labor force reduction and the aging of the labor force. In addition a critical issue the country is facing now is that young generation losing motivation and social withdrawal, loss of interest, lack of assertiveness. It creates a big social problem like increasing number of part-time jobbers (not have steady job) and NEET (not education, employment, or training). It becomes severe to secure human resource year by year. Under these circumstances, it is necessary to re-build the education program to maintain national strength and continue to develop.

2. ANALYSIS OF THE UNIVERSITY EDUCATION SYSTEM IN JAPAN

2.1. Problems faced by university education

In the 2000s, the situation has changed significantly in Japanese university education because of the decline in the number of 18 years population. Consequently, it has come as the total number of prospective students who want to go universities is less than the number of all university admission acceptances.

Normally a university has selected students that have appropriate qualifications and attainments in university-level education. However this principle begins to change and the university is required to educate the students who do and/or do not have appropriate university education level. Furthermore, even though they have academic capability, the students who do not be able to recognize the direction of their own futures or find the purpose and interest of learning have been increasing. For perceiving the actual situation, it is necessary that the universities are required to keep not only the normal education programs but also a sort of human resource development method.

2.2. The counter masers for the education system issues

As a starting point for corresponding to the problem, it must be considered why the numbers of students (young generation) who cannot recognize the direction of their own futures or find the purpose and interest of learning have increased. The conscious of goal setting for life is concerned as the intensity of the desire to live. Abraham Harold Maslow (1908 –1970) was an American psychologist who created Maslow's hierarchy of 5 needs, a theory of psychological health predicated on fulfilling innate human needs in priority, culminating in self-Actualization.

As shown on the Chart No.1, Maslow created 5 hierarchies of need such as 1. Physiological need, 2. Safety need 3. Social need/ Love and belonging, 4.Esteem, 5.Self-actualization.Maslow defined four needs which are from Physiological need to Esteem as Deficiency-needs and defined the last need which is Self-actualization as Being-needs. People in developing countries must fulfill their needs step by step from

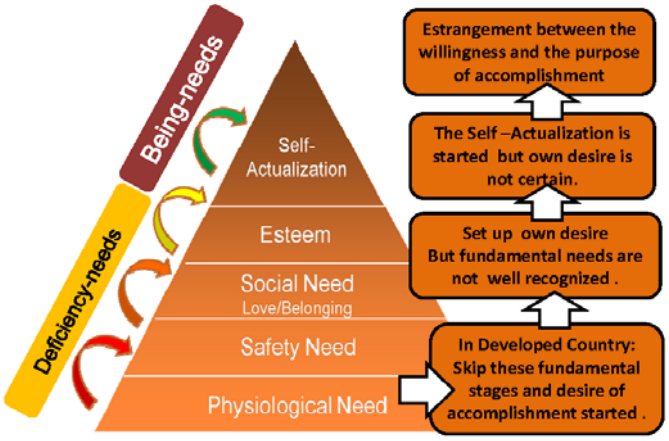


Figure 1, Maslow created 5 hierarchies of need

Physical need to secure food and water and ensure sleep, Safety need to ensure the safety and health, and Social Need / Love and Belong. "Hungry spirit (Motivated spirit)" which is considered to be meant as strong consciousness of achieving the objectives is formed at this stage. Thus, in developing countries it is the fact that proceeds to Esteem and Self-actualization after being fulfilled the three-step basic needs.

On the other hand, in developed countries, the economy and society are in stable condition and young generations' Physiological need, Safety need, and Social need / Love and Belonging are automatically fulfilled. Without having to spend a lot of energy to fulfill Deficiency-needs by themselves, young people try to achieve Self-actualization which is Being-needs.

Viewed from the opposite side, consciousness of self-actualization begins to work as the foundation-needs of Self-actualization are in uncertain condition.

This mechanism can be considered as the reason that why young generation in developed countries has difficulties to have clear vision of achieving goals and objectives, and also their consciousness of Self-actualization is fragile. The problem is that young generation tries to work on Self-actualization unaware of unclear condition of achieving goals and objectives. They suffer discrepancy between ideal and reality and it would lead to a loss of confidence. If the mechanism that young generation tries to achieve Self-actualization without spending a lot of energy to fulfill deficiency-needs is common in developed countries, the education systems to regress and understand foundation of needs would be necessary. The authors called it as "NRES; Needs regression education system".

Also the education method can be considered to be tied to the decline of motivation of young generation'. The contemporary young generation in Japan has been educated as how quickly and directly to reach the right answers to solve the problems since elementary school. It means that the essential part of education philosophy in Japan is learning methodology that is "How to do it". However the essential philosophy of education and human development should be let them think about themselves "Why have to do it" to derive their own answers.

3. THE EFFECTIVE ENGINEERING EDUCATION SCHEME IN DEVELOPED COUNTRIES

3.1. Education program cooperated with developing countries

It has been almost 30 years since Japan got into the group of developed country (high income countries) and living environment has become almost the same as advanced Western countries.In Japan, young generation is feeling that infrastructure such as roads, railways, water supply, and power is the same as the natural air. In the purpose of civil engineering and its importance only can be recognized when they encounter big catastrophe. It can be said that in the other fields of science, like medicine, electricity and mechanical have become a similar situation. It should be noted that developing countries is place for practical education.

In developed countries, for the young generation, it is very difficult to feel Deficiency-needs such as Physiological need, Safety need, and Social need / love and belonging that is the motivation and professional challenge required for their living life. It is important to recognize the situation of their own and find a challenge and objective to be considered by themselves.

3.2. Counter measure for improving academic interest

Dr. Takeshi Youro, Japanese anatomist, mentioned in his book titled “Baka no kabe” about Japanese university education. Universities provide valuable knowledge and information to students; however they fail to get satisfied result. He says that the faculties have been always lamented students’ lack of interest in study since the era of Aristoteles. He also says that even though people get valuable knowledge and information they do not move into action without interests. The authors try to describe what he say by using simple formula as follow (1):

$$Y = a X \quad (1)$$

Y ; magnitude of action

a ; interest factor

X ; educational activities = provision of knowledge and information

Faculties are always required to improve value of ***X*** but according to Dr. Youro’s opinion, value of “***a***” should be more focused on. However, many faculties say that it is difficult to find out the way and the scheme for improving value “***a***”. It can be observed that most of faculties believe that value of “***a***” will be increased in accordance with increasing value X. Is it correct? It should be understood that basically, interest will come out from experience but not directly come out from knowledge and information.

It should also be understood that the purpose of education is not to provide valuable knowledge and information to students but let them students to have intention to move into action.

One considering way will be to increase value ***Y***, this is to provide opportunities to the students to get “actions” first. Like the formula is sifted as follow (2);

$$Y = a X \Rightarrow \quad a = Y/X \quad (2)$$

Figure No, 2 is showing interaction of 3 values and the mechanism of education system. People have interests when they experienced things with their five senses, then they desire to earn knowledge and information and move into next action. For example when a child looks up the sky and has question “why is the sky blue?” He/she move into action to try to find out the answer.

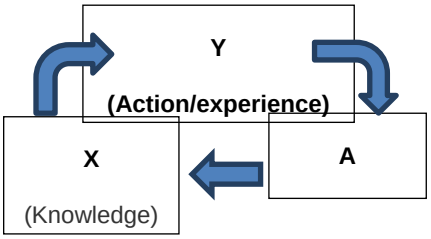


Figure 2. Interaction of 3 values and the mechanism of education system

That can be approach from the outcome that student expands opportunitiesto do activities such as social contribution in real world. It means that a practice education program is very important.

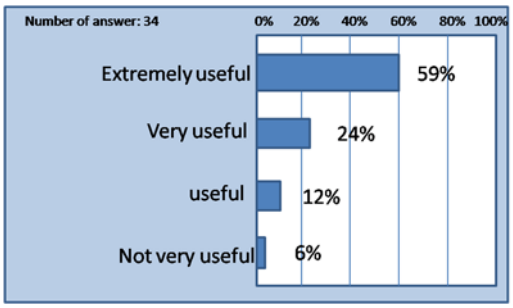
3.3. Effectiveness of Summer School Program

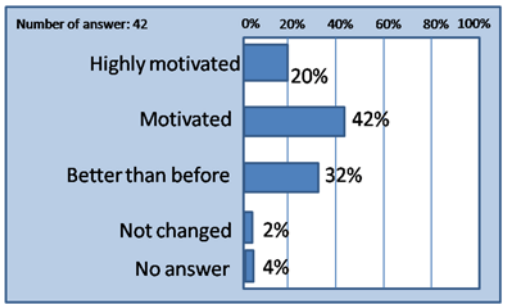
Since 2003, Construction Management laboratory in Kochi University of Technology, Japan has continued to conduct “Summer School”, the theme of “Seeing other countries to understand your own country”. It is the human resource training program in developing countries among the students in the lab to understand the actual condition of the countries, visit social infrastructure project sites, and meet to exchange opinions with local students and faculties of the universities in engineering. The total number of students who studied in the construction management laboratory from 2003 until 2011 is 120, and the number of under graduate and master's students is 81. The actual number of students who participated in the summer school is 51, and it is 63% of the students participated. In 2011, the authors have conducted a survey to

participants to verify effectiveness of the summer school as human resource development and education effect.

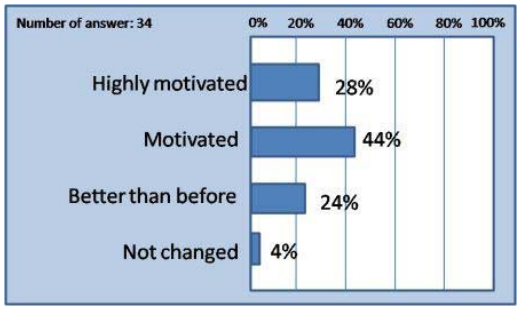
Number of requests questionnaire 46,

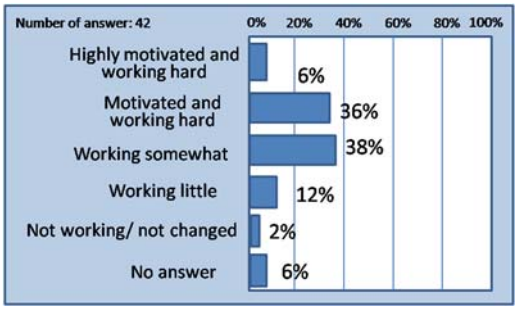
N*umber of responses 42*: *(7students / graduated 35 students/ response rate* 91%) *Number of questions 20 / Free answer question*



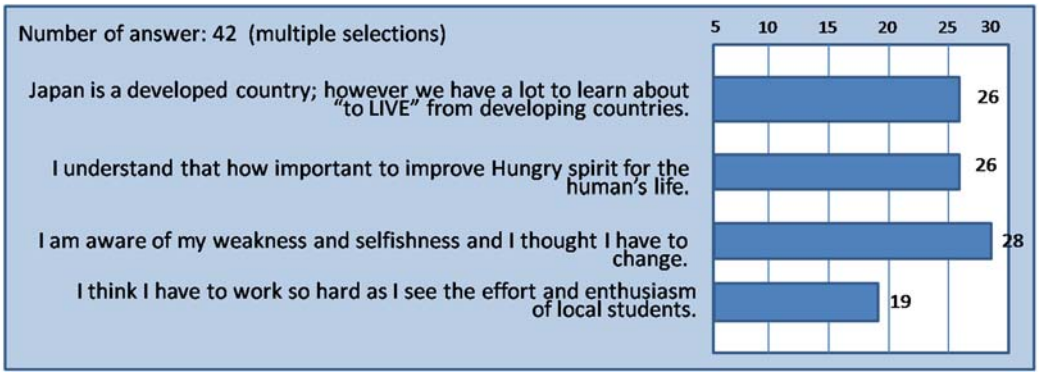


Q1. Motivation for studying in college *Q2 Summer School program was useful for job hunting*





Q3 Motivation for activities after-employment *Q4 Motivation to improve English communication skills*



Q5. Things that have changed and the things you felt after Summer School program (multiple selections)

3.4. Analysis of the effect of summer school programs

The survey results shows that the summer school program to visit developing countries has the effect of creating motivation to study in university, improve language skills, act for job hunting and act for after-employment.

As you can see from the result of survey analysis, it can be said that the summer school program in which students can realize their own situation and rethink their life with seeing and understanding the real situation of Deficiency-needs in developing countries produces the great effect.

4. COOPERATION WITH UNIVERSITIES IN ASIAN COUNTRIES

In year 2008, the authors organized the faculties and engineers who specialize in construction management in 13 different countries in Asian and established the International Construction Management Forum in Asia (ICMFA) which aims to promote research, education, and human development project. The main activity of ICMFA is to establish appropriate education program for construction management and human resource development. Universities facilities who are taking charge of construction management will make joint work to set up prototype education program which shall be modified and customized suit to the situation in each country.

With the assistance of members from the ICMFA, the Summer school program can be more productive activities and also is great effect as an engineering education in developing countries as well. In 2012, ICMFA decided to conduct the exchange student program which based on summer school. In accordance with this decision, ICMFA student member system will start and the student forum based on construction management in Asia can be expected.

In this study, the author aims to establish more sustainable and productive human resource development program by linking the Summer School program and ICMFA

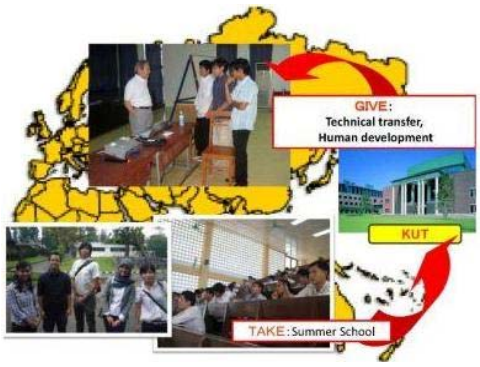


Figure 3. Human resource development education program linking the summer school program and ICMFA

5. CONCLUSION

After having experience of the summer school program, attitude of students have changed and devoted to study and research. Young generation always have vitality at any periods of times.The starting point of the education and human resource development must be to recognize the vitality of young people and provide opportunities that they can bring the best out of their abilities and can be impressed.By realizing education system such as“NRES; Needs regression education system” and “Why have to do it” in student exchange program, more students can experience to cultivate the power of finding out their own role in their lives. With this education system, it is expected that young people will play important roles to support and develop country’s future.

6. REFERENCES

[1] The Japan Institute for Labor Policy and Training. Labor Policy Research Report 2005. No.35.

[2] Takeshi Youro.*Baka no kabe.*Shinchosha

[3] Kusayanagi S. *Developing appropriate construction management education for infrastructuredevelopment and management.* 4th CECAR Taipei 2007 T3D-1 pp129

[4] Japan international cooperation agency. http://www.jica.go.jp/jica-ri/publication/archives/jica/field/pdf/200311_01_02.pdf.

[5] Ezra F. Vogel.(1999/06). *Japan as Number 1: Lesson for America*, Universe, 292p