

The Need for Engineering Education for Non-Engineering Students in Vietnam National Economics University (NEU) during International Integration and its Implications

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ABSTRACT

Vietnam may be seen as one of the emerging countries in the Southeast Asian region with a golden population structure. This is an opportunity for Vietnam to take high economic growth rate. The labour force of Vietnam, especially the majority of young people, need an engineering education to be effective in the highly competitive working environment to be closely internationally integrated. For NEU, the largest university in economics and business in Vietnam, the need for engineering education for non-engineering students is very high, and perhaps there is no discrimination between engineering and non-engineering students when faced with the requirements of jobs in the field of economics and business during the integration. The software implementation to complete the office works becomes common. Such a need makes a change in the perception of the ways to equip non-engineering students with the knowledge and skills of engineering. The ways are very diversified such as the class delivery or learning by doing or interacting among students and professors. The paper focuses on the identification of the need for engineering education for non-engineering students in NEU by conducting a random survey on about 500 non-engineering students and on how their needs are satisfied in the optimal way. The result of survey is a valuable contribution to the improvement of the teaching curriculum and educational environment in NEU and it may be applicable to other universities with faculties in economics and business. So far, there has been little research on this issue in Vietnam.

Key words: *need, engineering education, non-engineering education student, implications*

INTRODUCTION

Engineering education plays a very important role for non-engineering students in Vietnam generally and in NEU particularly to effectively respond to the new working conditions of the information society under increased globalisation. So far, there has been little research on the evaluation of engineering education for non-engineering students in NEU. This paper aims to evaluate the need for engineering education for non-engineering students in NEU to find the ways to

change the teaching curriculum to improve the qualifications of the cadre in line with the developmental direction of the labour market. The paper uses both quantitative and qualitative methods to solve the research objective. NEU is a typical university in economics and business in Vietnam, and therefore, its experiences and experiments are a very valuable reference for other universities, not only in Vietnam but also in other similar education institutions of other countries.

CHANGES IN ENGINEERING EDUCATION IN THE LABOUR MARKET

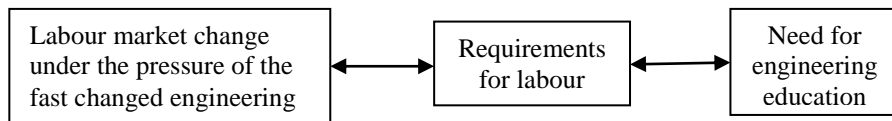
The labour market in Vietnam for engineering education has changed very quickly due to the widespread use of engineering equipment in all human activities. Working with computers and the internet have become the common definition even in Vietnam, a country with a low level of development in terms of engineering. Here, the definition of engineering is given a professional meaning that includes programming, information processing and utilisation of software to solve a specific task. By such tools, all of the tasks may be completed more effectively and productively than those done without engineering. Therefore, engineering students have their methodology to provide a “package solution” for the management system on the basis of an engineering platform. The engineering students referred to are those students majoring in information engineering. The non-engineering students are ones not majoring in information engineering who are faced with some disadvantage of scant knowledge of engineering to do with tasks requiring engineering skills. In other words, the need for engineering education is important for all students in all majors although the curriculum for each is different at the remarkable level.

In Vietnam, there have been some projects to equip students in all universities with the knowledge and skills of engineering from the very first step. The Vietnamese Government has even launched a national program on the information engineering or e-government but its performance is very limited. In fact, the students must study to acquire engineering knowledge. The results of their self-study greatly depend on their own efforts; the differences among them are great. So far, there has been no research on the need for engineering education for non-engineering students in Vietnam. The data collected from the survey on the need for engineering education for non-engineering students have not been built by official agencies. The funds available for these jobs has been limited.

As estimated, in Vietnam, human resources is being in front of the great shortage of the engineering skills educated in a systematic way specifically the cadre trained in the centrally planned economy. The fact reflects the high need for engineering education for non-engineering people. This is the reason of the situation of booming of the centres for training engineering for non-engineering people in Vietnam.

In addition, Vietnam has been being in the chance of the golden age and the labour force accounts for 45% of the population which needs much fund for improving the engineering knowledge and skills in order to, on the one hand, increase the effectiveness of their works and on the other hand, change their standard of living in the information society.

The labour market change under pressure from fast-changing engineering leads to the fast change of the requirements of the cadre in line with the direction of the engineering applied. Under the pressure of globalisation, Vietnam has proactively integrated into the world, the domestic labour market becomes an inevitably organic part of the world labour market. The requirements for knowledge and skills of engineering have been put on the top of the criteria of human resource selection that can be seen as the normal international standard. In turn, such requirements are the basis for upgrading and updating the training program for education servicing to meet the needs of the labour market. (See Figure 1). By nature, the model reveals the interaction between demand and supply in the labour market in terms of engineering education.



Note: Two-way arrow shows the interaction among the elements of the model
Source: Author

Figure 1: Labour market change sets direction of engineering education

More recently, research on foresight and foresight approach to building the strategy of training human resource to teaching the information engineering (Dat, 2013) in Vietnam has provided the first picture with regard to staff teaching engineering by the year 2020. The research also emphasises the application of the foresight technique to clarify the vision, mission for human resource teaching the engineering in Vietnam in the long-term. The content of teaching engineering has been concerned to catch up with the change of the need of the labour market. The framework of the labour market for engineering knowledge and skills has been establishing not only to adapt to the change of the domestic labour market but also to the fluctuations of the international market.

The other short articles only focus on every specific dimension of training the engineering knowledge and skills to evaluate the impacts of the change of the policy to facilitate the suitable environment for training engineering. The evaluations are based mainly on the Vietnamese standard; therefore, they are inappropriate and inadequate compared to international standards. Moreover, the systematic research related to the evaluation of the engineering education for non-engineering students has not been realised.

THE NEED FOR ENGINEERING EDUCATION FOR NON-ENGINEERING STUDENTS IN NEU

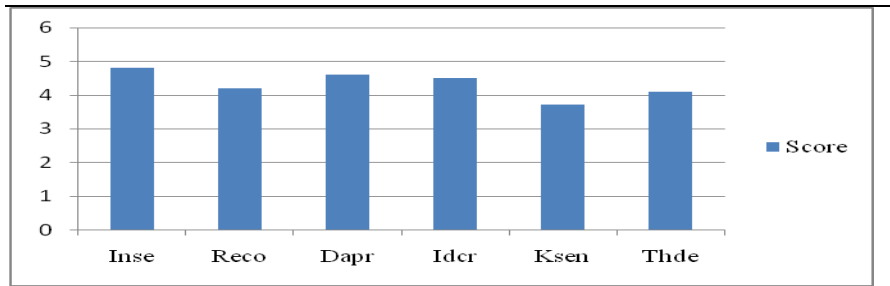
NEU is the largest university in economics and business in Vietnam with about 45,000 students of different types of training including undergraduate, graduate and postgraduate. It is the leading university in Vietnam's education system providing qualified management resources not only for Vietnam but also for Laos and Cambodia. Many leaders of the Vietnamese Government and managers of big general state-owned corporations are former students of NEU. The engineering specialty in NEU contains two majors, namely computer science and information engineering. The number of students majoring in engineering accounts for about 1-1.5% of the total numbers of student of NEU. Clearly, the need for engineering education for non-engineering students is huge.

In order to understand the need for engineering education for non-engineering students of NEU in detail, a random survey of 500 non-engineering students has been conducted. In addition, some in-depth interviews have been undertaken with students and lecturers to clarify the concerned issue in the subjective view. All these respondents belong to the non-engineering category. Such methods provide a comprehensive view for the research objective.

For the survey, the questionnaire has been designed using a 1-5 scale, in which 1 means "not important" and 5 means "very important". The dimensions surveyed are the role of engineering knowledge and its composition. It is also evaluated at the level of student satisfaction met by NEU's provision of engineering knowledge, the needed knowledge and skills should be educated, the ways to deliver students the additional knowledge and skills. According to the dimension "role" of engineering, there are six measures used to measure it including information research, relationship connecting, data processing, idea creating, knowledge and skill enhancing, thought deepening in all aspects of life. For the level of satisfaction of the students coming from the knowledge and skills, there are six measures including use of computers, software exploiting, website building, internet searching, informatics product producing and others like game playing or entertainment.

By using 500 questionnaires for 500 non-engineering students majoring in international economics and international business management in NEU, the number of valid returned questionnaires is also 500. The number of missing or invalid questionnaires is zero. This is the random survey for undergraduates of NEU in 2013 and the statistical method used here is descriptive and simple.

The surveyed result of the dimension "the role of the engineering knowledge and skills" is presented in Figure 2.



- *Note: Inse- Information searching, Reco- Relationship connecting, Dapr- Data processing, Idcr-Idea creating, Ksen- Knowledge and skill enhancing, Thde- Thought deepening.*
- *Source: Survey*

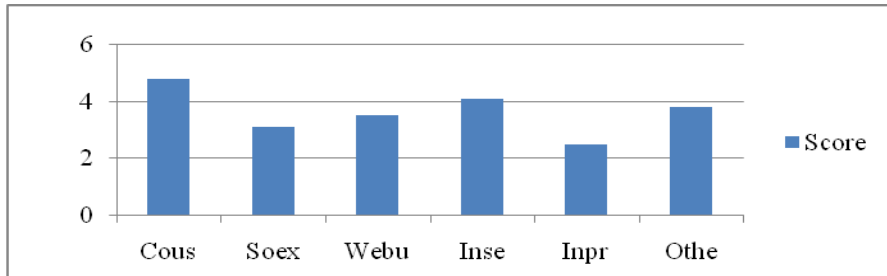
Figure 2: Perceived role of non-engineering students in engineering education

Figure 2 shows that the measure of information searching to update news, facts and figures and to do exercise is at the highest level, 4.8 points, then four other measures of data processing, idea creating, relationship connecting and thought deepening are 4.6, 4.5, 4.2, 4.1 points respectively. The lowest level of the remaining measure of knowledge and skill enhancing is 3.7 points. Perhaps the value added by knowledge and skill enhancing conceived by non-engineering students is not as high as that of other measures. The main reason for the lowest level of the measure can be explained in two aspects. The first is that the engineering textbooks and the training program have not been updated. The second is that the practical excises for enhancing skills for non-engineering students has not been sufficient to assist them to create the software program as they had expected. The high level measures, possibly, contain partly such a measure. Generally speaking, the role of engineering education for non-engineering students majoring in economics and business has a very high need of engineering education for their effective learning in NEU.

The surveyed result of the dimension “level of satisfaction of the non-engineering students” is reflected in Figure 3.

Figure 3 shows the level of satisfaction of non-engineering students with the served engineering knowledge and skills in NEU. Of the six measures, the measure of informatics product producing getting the lowest level-2.5 points shows a lack of knowledge and skills for non-engineering students. The measure of software exploiting stands at 3.1 points that refers to a lack of knowledge and skills for software programming. NEU non-engineering students cannot themselves create a new program to solve the complicated problem in management from the engineering application to the specific cases. The measures of computer using, website building, internet searching and others take the levels at 4.8, 3.5 and 3.8 points respectively. In fact, students are equipped with software exploiting techniques like Excel, Mfit, SPSS, EVIEW, LIMDEP, etc. to run the

econometric models or test hypotheses. However, they cannot write a program to solve a specific case. If they would create the package solution for management of a given enterprise, the efficiency of their study would be high. In fact, there are some students who use computers as a most attractive entertainment tool while studying at university.



- *Note: Cous- Computer using, Soex- Software exploiting, Webu-Website building, Inse-Internet searching, Inpr- Informatics product producing, Othe- Others.*
- *Source: Survey*

Figure 3: Perceived level of satisfaction of non-engineering students

Almost non-engineering students in NEU feel the lack of professional engineering knowledge and skills. Exploring this weak point, some computer companies of Vietnam and that of foreign countries deliver many training courses on engineering. They attract a lot of students and earn a lot of money from Vietnam. Some NEU non-engineering students have followed such courses to improve their engineering knowledge and skills. Those students have high adaptability to the fast changes of the working environment and receive high wages just after their graduation.

By in-depth interviewing, some NEU non-engineering students proposed that NEU should add more knowledge and skills to the present program to match the requirements of their future jobs because their self-study cannot achieve such results with assistance from teachers. Some students find the internet café to be their engineering class for self-study. The role of the education institution should take advantage of this.

Some graduates and postgraduates need a knowledge of engineering and skills to themselves run software to complete their thesis or dissertations in their own ways. This segment of the market of qualified education services in NEU is emerging when NEU changes from a training-oriented strategy to a research-oriented strategy to be a region-class university.

CONCLUSION

The paper explores the need for engineering education for non-engineering students in NEU, the largest and leading university in economics and business in Vietnam during integration. Vietnam's international proactive integration opens opportunities for close links between the domestic and the international labour markets. The standards for human resource in the field of economics and business in both the domestic and the international market become identical as engineering knowledge and skills are vital for performing all tasks. The social deep awareness of the role of the engineering education for non-engineering students to build effective teaching strategies is fundamental to obtain a consensus of all stakeholders. Indeed, the need for it is very high in NEU, and this can be considered as the typical case for other situations.

The need for the engineering education can be seen through its role and values acquired with their interactions. The role of engineering education can be measured in six ways, namely information searching, relationship connecting, data processing, idea creating and thought deepening. Each measure with different weight describes every specific influence of engineering education in NEU that can be generalised for other cases. For the values acquired from engineering education, there are six measures, namely, use of computers, software exploiting, website building, internet searching, informatics product producing and others. All six measures demonstrate the necessity to improve the training curriculum of engineering for non-engineering students to help them discover their jobs easily after graduation. They need much knowledge and skills on engineering to catch up with the fast changes of the labour market and international competition on a global scale. To meet the needs of non-engineering students, many engineering service providers from Vietnam and from foreign countries organise many training courses on engineering and they are successful.

The education institutions in Vietnam should improve their curriculum on engineering knowledge and skills in the direction towards the catching up with fast changes in engineering science. In parallel with keeping the traditional ways of teaching, it is necessary to learn experience from advanced universities in the world where engineering science has been highly developed. Books and updated software should be imported to apply to NEU in appropriate ways. Many foreign experts who come to NEU to work for some time should be used for capacity building the engineering education for non-engineering students. This brings more opportunities for non-engineering students to frequently refresh their knowledge and skills on engineering to increase their labour productivity. The students have enough knowledge and skills to respond to the increased need of the domestic and international labour market. For NEU, it is necessary to improve the graduation standards in term of non-engineering students for non-engineering ones that place strong pressure on restructuring the teaching curriculum and the students.

It is necessary for international cooperation between NEU and other universities in foreign countries in engineering education on the basis of mutual benefit in which NEU provides the clients (students) and the foreign partner supplies the qualified

and professional engineering services. This way can be realised by building joint projects or implementing integrated programs to provide engineering education for non-engineering students. The degree or certificate must be recognised internationally. By applying this approach to NEU, the teaching staff of NEU will be improved in both knowledge and skills and in the use of foreign languages.

The survey is random so the results achieved partly represent the whole picture of the research objective. To obtain a full evaluation of the need for engineering education for non-engineering students, the survey should be expanded to graduates and postgraduates and in-service training even in other universities. Clearly, the result will be more generalised and some new approaches will be achieved.

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