English Vocabulary Spectrum Analysis for the Technological and Vocational College/University Programs in Non-Native English Speaking Nations

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Abstract-**The purpose of this study is to systematically design the English course in school-based curricula (SBC) in Technological and Vocational College/ University (TVCU) programs, to make the graduates communicate with the professionals in the native English speaking nations (NESN) smoothly. The first step of the systematic design of the English courses is to make the spectrum analysis of the English vocabulary for vocational use in the TVCU programs. Compute the adequate vocabulary for vocational use and put them to the contents of English textbooks will make the students learn English more practically. The English abilities in TVCU programs are based on the 17 occupational families (OFs) according to the Ministry of Education in Taiwan. This study is divided them into 7 occupational groups (OGs). All vocabulary in the TVCU programs through the spectrum analysis can be organized into the common English and 7 OGs. The textbooks of English courses can be based on this vocabulary through the spectrum analysis. The English courses are designed by the object-oriented principle. This method is helpful to the curriculum design of TVCU programs which will be put into practice in 2005 and gives the English curriculum overview for technology and vocational education systems. Due to the analysis and the curriculum design, the globalizing pace in Taiwan will be speeded up.**

Keywords: English, globalization, curriculum, spectrum analysis, technological, and vocational education

I. INTRODUCTION

The essential element of globalization is communications in English. Technology and social science will influence the non-native English speaking nations (non-NESN) through the English communication. These kinds of communications are very important to these countries, because some information will make the non-NESN a great deal progress.

In Taiwan, the globalizing policy has been proposed and stressing for a long time. Because Mandarin and some dialects are widely used in daily life, the general English level in Taiwan isn't as good as that in some native English speaking nations (NESN). From the viewpoints of globalization, the English level in Taiwan should be elevated to approach the level of the NESN. The Ministry of Education in Taiwan has planned to design the English courses from elementary schools to elevate the English level in order to bridge the gap. Therefore, English courses should be well designed during the process of globalization.

The English teaching effectiveness directly affects the globalizing pace. The school-based curricula (SBC) in the technological and vocational education systems are developed by the Ministry of Education to cope with the rapid changes in the Age of Knowledge-based Economy [1-2]. These curricula are divided into 17 occupational families (OFs) are shown in Appendix [3-4]. This new SBC is going to work in practice in 2005. The 18 year-old students at the moment will work on the 2-year technological and vocational college/university (TVCU) program, and 16 year-old students will work on the 4-year TVCU program. Since they study English at the junior high school (about 12 years old), their English level could not be good enough to handle all globalizing things related to English after they graduate from 2-year or 4-year TVCU program. When they study in SBC, instructors can't teach them in the same way as those in NESN. English is one of the core courses of the 17 OFs. It is needless to say that English plays the very important role in the Age of Knowledge-based Economy [5]. Therefore, English courses should be systematically designed. The purpose of this study is to systematically design SBC for the students in TVCU programs. After they graduate, they can cooperate with several OFs to communicate with the professionals in NESN smoothly, and speed up the globalizing pace.

II. METHODS

The first step of the systematic design for the English courses is to make the spectrum analysis of the English vocabulary in the TVCU programs. Vocabulary is the basic element of the English courses. Compute the adequate vocabulary for vocational use and put them to the contents of English textbooks will make the students learn English more practically. The English vocabulary in TVCU programs could be based on the 17 OFs to divide into 7 occupational groups (OGs). The vectors of the spectrum analysis are shown in Fig. 1. All vocabulary in the TVCU programs through the spectrum analysis should be organized into the common English and 7

OGs. Therefore, the English textbooks of the 7OGs should be respectively designed according to the respective vocabulary of the 7 OGs, common phrases, and grammar. The English courses are designed by the objective oriented principle in this study.

Figure 2 illustrates the concept of this principle: an electronic product engineer (EPE) in NESN wants to communicate with one EPE in non-NESN. English is naturally to be the means of the communication. Generally speaking, the EPE in NESN uses the common English, and professional English including ECE, MEC, MBH, and DSN to communicate with the EPE in non-NESN. In this case, how should we design the English courses for the EPE in Taiwan? There are two ways to achieve the goal. The first one is to design the electives depending on vectors of the spectrum such as ECE OG English, MBH OG English, etc. The full-time students who want to be an EPE or the part-time students who are EPEs just take the electives we design, they can elevate their English level rapidly and effectively. The other one is for the full-time EE students who don't know what kind of job they will take, they can take the common English courses and their professional ECE English. After they graduate, they may be an EPE. Their English level may be not good enough to work with the EPE in NESN. Therefore, they should cooperate with some people who have the abilities of MEC, MBH, and DSN to work with the EPE in NESN.

III. RESULTS

Figure 3 is shown the English curriculum overview developed from the spectrum in Fig. 1 for technology and vocational education systems. The technological and vocational vocabulary and terminologies are added to the curricula in TVCU programs little by little. The common English is taught at high school (VH) and vocational high school (VHS). The common English courses should be adequately added some technical and vocational material related to several OGs in TVCU programs, especially some simple professional terminologies. Due to this kind of curriculum design, the common English curriculum links between VH, VHS and TVCU will be helpful a lot. Some electives of technological and vocational English depending on individual OGs (TVE(OG)) are designed in the 2nd year of TVCU programs to elevate the students' English in their fields. Each semester, we can select some basic professional courses in English textbooks, handouts and multimedia.

For example, the vocabulary classification according to the spectrum is shown in Table I. The vectors of the spectrum are the 7 OGs. All of the vocabulary in the TVCU programs should be designed in the common English and the 7 OGs. The column of the "common professional vocabulary" is shown that some of the words are simple. In fact, the real meanings of the vocabulary are difficult to the students. We should teach those vocabulary in professional courses or electives such as ECE English, and MBH English. This kind of design will help the communications between professionals in NESN and those in non-NESN. Applying to the combinations of the spectrum in non-NESN can help the communications with the people in NESN shown in Fig. 3. The teamwork in non-NESN for professional English communications is very important. The design for English courses in TVCU programs will speed up the globalizing pace and increase prosperity in Taiwan.

IV. DISCUSSIONS

English is the language of social empowerment: as knowledge of English is a passport to a better job and, conversely, the inability to speak and write in English is a disadvantage, millions of young people spend thousands of hours trying to come to grips with the English language. Some researchers warn, though, that the majority wastes their time learning English, because they will not have the chance to use it in their future careers [7]. The spectrum gives the pathway of self-study. For example, the junior EPE mentioned above whose English level may be not good enough to work with the EPE in NESN. Therefore, they should cooperate with some people who have the abilities of MEC, MBH, and DSN to work with the EPE in NESN. However, they can cite Fig. 4 and Table I to study the MEC, MBH, and DSN English vocabulary by themselves. Besides, this spectrum helps the part-time students study in SBC of TVCU programs to elevate their English level on their jobs.

The technological and vocational vocabulary and terminologies are added to the curricula in TVCU programs with the object-oriented principle little by little. Some vocabulary and terminologies in the common English courses will be repeated in the technological and vocational courses again and again. These will make the students learn technological and vocational English effectively to arouse the interests in English study.

This curriculum design is based on the spectrum analysis of vocabulary. The teaching materials of the 7 OGs are made up of the classified vocabulary, grammar, and phrases. Therefore, the teaching contents are suited to the 7 OGs respectively. From the students' viewpoint, it makes them learn directly and effectively. One of the methods to find the vocabulary for vocational use is to build the vocabulary database. We can individually compute the frequency of vocabulary for vocational use and classify the words into the 7 OGs, respectively. The source can be the professional textbooks, documents, manus, user guides, webs, and technical notes et.al. After the computing, we can give the credit points to each vocabulary. Moreover, the higher credit point words in this vocabulary database should be presented in the English textbooks for individual OGs. The further researches will take much time and need some more experts to take part in the program.

A questionnaire [6] is shown that in Taiwan, the salary of employees is dependent on their English abilities. English is a passport to get a better job [7]. That means the better their English is, the higher their salaries they get. This phenomenon

is shown English abilities play an important role in globalization. We think it is very common in most non-NESN. Therefore, the effective English teaching is the shortcut to globalization. Classification from the spectrum of the vocabulary illustrated in Table I could be a pathway to help them learn English effectively to increase their qualifications and income as well.

The four processes of globalization are mobility, simultaneity, bypass, and pluralism [8]. This study help the members of the multinational enterprises communicate face to face. It makes more people directly take part in the activities in these kinds of companies to increase the efficiency. The better English level the people have, the more acceptance of the globalization the people will gain. Therefore, we can cope with the language prerequisite of the four aforementioned processes.

V. CONCLUSION

The essential element of globalization is communications in English. We proposed the spectrum analysis of English vocabulary for the professionals to communicate between NESN and non-NESN. The English curriculum overview of TVCU program is developed from the spectrum in Fig. 1. This method is helpful to the curriculum design of TVCU programs which will be put into practice in 2005. Due to the analysis and the curriculum design, the globalizing pace will be accelerated.

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APPENDIX

The 17 occupational families (OFs) of the school-based curricula (SBC) in the technological and vocational education system [3-4]:

Occupational families	Abbreviation
Mechanical Engineering	ME
Power Mechanical Engineering	PME
Electrical and Electronic Engineering	EE
Chemical Engineering	CHE
Civil and Architecture Engineering	CAE
Management and Business	MB
Agriculture	AG
Home Economics	HE
Hotel Management	HM
Marine and Fishery	MF
Water Fowl	WF
Medicine and Pharmacy	MP
Nursing	NS
Arts	ART
Industrial and Commercial Designs	ICD
Food	FD
Foreign Languages	FL

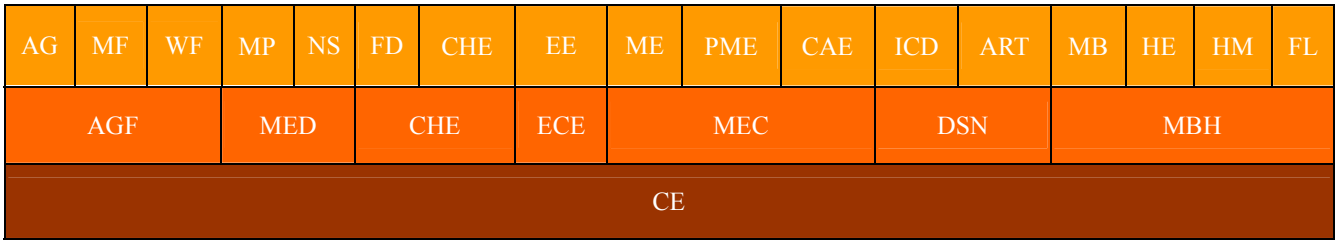


Fig. 1 The vectors of the spectrum analysis of English for the school-based curricula for technological and vocational college/university programs. Occupational groups (OGs): AGF: Agriculture and Fishery OG., MED: Medicine OG., CHE: Chemistry OG., ECE: Electrical and Computer Engineering OG., MEC: Mechanics OG., DSN: Design OG., MBH: Management, Business, and Hotel OG., and CE: Common English.

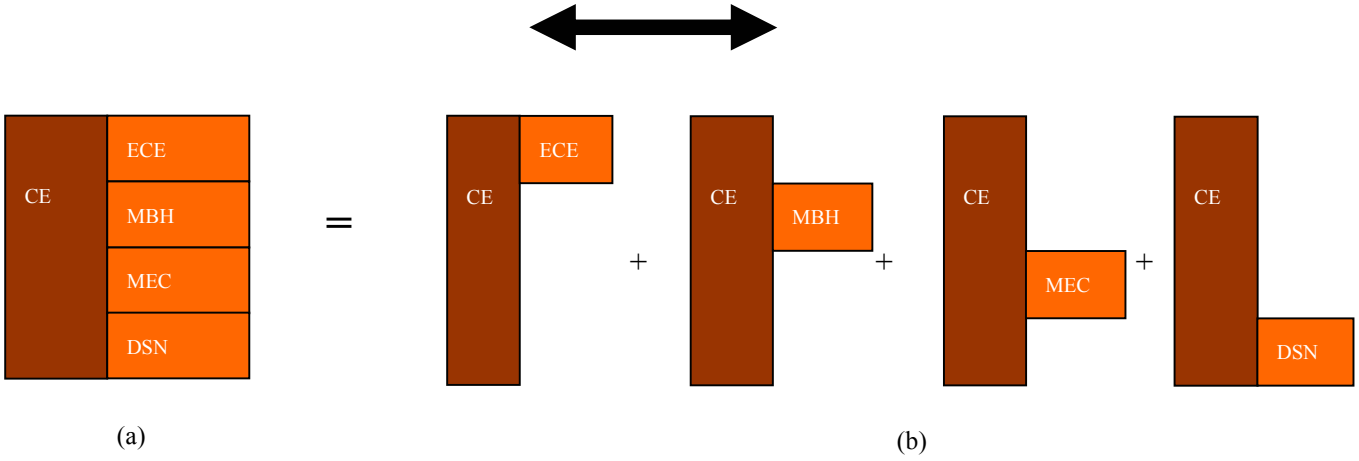
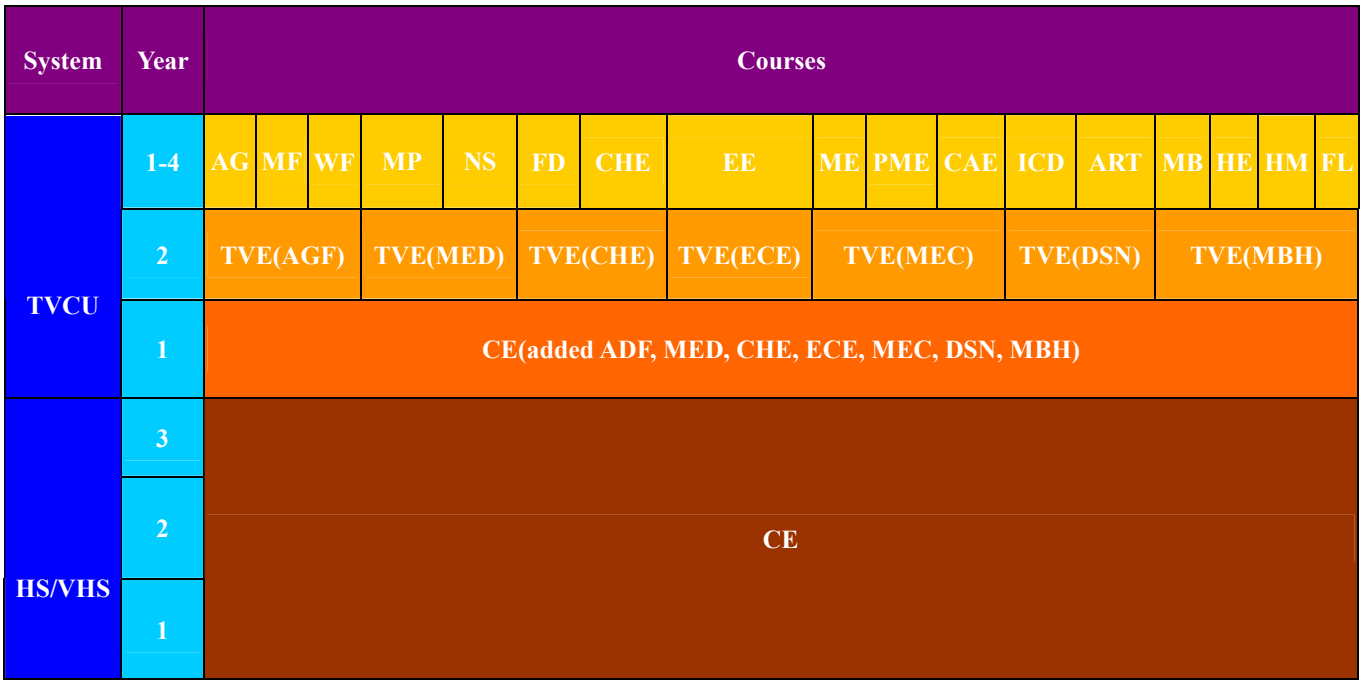


Fig. 2 An illustration of the systematic design for English courses. (a) The abilities of the electronic product engineer in the NESN (b) We can systematically design the English courses in non-NESN to combine the English abilities from the students of the four occupational families to communicate with the electronic product engineer in (a).

Fig. 3 The design for English courses will speed up the globalizing pace.



CE	Common English courses	Required
CE(OGs)	Common English with adequate technological and vocational materials related to several OGs	Required
TVE(OG)	Technological and vocational English depending on individual OGs	Elective
TVC(OF)	Technological and vocational courses using English textbooks, handouts and multimedia. (two courses or more per semester)	Required or Elective
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Fig 4. The English curriculum overview is developed from the spectrum for technology and vocational education systems (HS/VHS: High school / Vocational high school, TVCU: Technological and vocational college / university). The technological and vocational vocabulary and terminologies are added to the curricula in TVCU programs little by little.

Table I. An example for the vocabulary classification according to the spectrum.

OGs	Common Vocabulary	Common Professional Vocabulary
AGF	growth, vegetable, culture	“soil amelioration”, fertility
MED	medicine, clinics, doctor	“action potentials”, transcription
CHE	atom, silicon, pollution	“fused ring”, “chemical affinity”
ECE	system, signal, communication	algorithm, synchronous
MEC	force, architecture, design	strain, “ball screw”, rigidity
DES	view, picture, drawing	mold, “depth of the field”, landscape
MBH	statistics, management, secretary	“diffusion index”, “earnings yield”