World Transactions on Engineering and Technology Education
Vol.5, No.1, 2006

Vocational English tests for license examinations and the corresponding training programmes in the technical and vocational education system

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ABSTRACT: It is important to generate tighter connections between technical and vocational college/university (TVCU) programmes and vocational license examinations in order to bridge the gap that exists between school training and various job competence requirements. Thus, the English abilities tested in vocational license examinations can be adequately arranged in TVCU programmes in non-Native English Speaking Nations (non-NESNs). In this article, the authors propose that vocational licenses should be classified into two categories, namely: global type (GT) and domestic type (DT). Some English abilities tests can be added to GT vocational license examinations. Large engineering organisations could help non-NESNs to build a fundamental engineering English communication database to integrate the common overlap that exists between English for science and technology.

INTRODUCTION

Most educators and employers think that it is essential to make a tighter connection between technical and vocational college/ university (TVCU) programmes and vocational license examinations (VLE) in order to bridge the gap that exists between school training and the necessary abilities for jobs, including English abilities. The minimum competence requirement can be tested in license examinations [1][2]. Thus, those English abilities that are tested in vocational license examinations can be adequately covered in TVCU programmes. Furthermore, globalisation is a worldwide trend. The economies of many countries depend upon imports and exports.

The objectives of English communication for international trade can be achieved by training English expertise in non-Native English Speaking Nations (non-NESNs). However, the world has entered the high-tech and knowledge-based economic eras. English should be the direct means of communication and plays an important role in facilitating convenient Internet global access for everyone. Most large professional engineering organisations use English as their primary language. Thus, most of the engineering publications that students study in the higher education system have been written in English. However, the English abilities required of students is higher than that provided in the technical and vocational education system. Therefore, in this article, the authors present a proposal to improve the English abilities of students enrolled in TVCU programmes.

BACKGROUND

Most technical documents contain lots of equations, tables and figures for the presentation of concepts. The explanations for the equations, tables and figures are usually presented simply, sequentially, logically and predictably. Therefore, in non-NESNs, some students, who are not majoring in English, can read technical documents, although they do not know all the vocabulary and terminology listed in the documents. Based on these facts, the authors propose that frequent apparent vocabulary in respective professional fields can be tested in vocational license examinations and that English courses in TVCU programmes can be added to vocational English training programmes in order to help students obtain their licenses, especially in non-NESNs.

An essential element of globalisation is communication in English. Although Taiwan is a non-NESN, senior management highly appreciate the English language competences of their employees [3]. This phenomenon is shown in a questionnaire where most employees think that the better their English is, the higher salary they can get.

However, the status quo of English teaching in non-native English speaking nations (non-NESNs) is described as follows. People in non-NESNs use their mother tongue in their daily life. Most people have learned English for a long time, but have forgotten much of their English vocabulary because they have not used English after graduation. Most non-NESNs are information and technology receivers. However, hi-tech can make countries more prosperous; these countries have enough money to establish modern universities or develop their higher education systems [4]. The more qualified graduates there are, the more multinational enterprises there are in these countries. Therefore, these countries are eager to elevate their people's English-speaking abilities.

Mandarin and some dialects are widely used in daily life in Taiwan, but people sometimes talk in Mandarin mixed with English terminology in the workplace. This situation shows that communication in English for science and technology (EST) is easier to understand than in Mandarin on some occasions. Some people utilise professional English terminology

to communicate, but most people are too shy to speak English. In fact, according to a previous study, most part-time students who were working for technical companies needed to use English in their jobs, and hoped that they could make significant progress in English over a short time [5]. Therefore, effectively teaching English to students in order to improve their English abilities over a short period of time is what the authors' training programmes aim to achieve.

METHODS

Vocabulary Spectrum

Briefly, effective English teaching directly impacts upon the pace of globalisation. The school-based curricula (SBC) for the technical and vocational education system in Taiwan has been developed by the Ministry of Education in Taiwan in order to cope with rapid change in this era of the knowledge-based economy [6][7]. These curricula have been divided into 17 occupational families (OFs), as listed in Table 1 [8][9].

Table 1: The 17 occupational families (OFs) of the school-based curricula (SBC) in the technical and vocational education system [9][10].

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

In a previous study, it was found that the English vocabulary used at technical and vocational college/university (TVCU) programmes could be based on these 17 occupational families, and divided into seven occupational groups (OGs) [5][10][11]. The vectors of the spectrum analysis are shown in Table 2. All the vocabulary taught in TVCU programmes through the vocabulary spectrum analysis should be organised according to common English and the seven occupational groups.

One of the obvious goals of TVCU programmes is to make students obtain better jobs more easily and also to gain higher appreciation by their employers. Furthermore, vocational license examinations (VLE) are a guarantee to students, schools and employers. In most non-NESNs, vocational license examinations meet the needs of various fields, but vocational license examinations do not presently include English abilities. Therefore, vocational English should be tested in vocational license examinations so that students can fulfil the needs of their future jobs. The objective of this study is to help students to handle such situations in the working environment, for example, a foreigner asks a computer maintenance worker to fix a personal computer. They can use simple English sentences with PC terminology to communicate and fix it properly [12]. This programme targets training students in non-NESNs not to be nervous or shy when conversing in English.

Table 2: Analysis of English courses for TVCU programmes.

General	Occupational Groups	Occupational Families
Common English	Management, Business, and Hotel (MBH)	Foreign languages
		Management and business
		Home economics
		Hotel management
	Design (DSN)	Industrial and commercial designs
		Arts
	Mechanics (MEC)	Mechanical engineering
		Power mechanical engineering
		Civil and architecture engineering
	Electrical and Computer Engineering (ECE)	Electrical and computer engineering
	Chemistry (CHE)	Chemical engineering
		Food
	Medicine (MED)	Nursing
		Medicine and pharmacy
	Agriculture and Fishery (AGF)	Agriculture
		Marine and fisheries
		Water fowl

Strategies

The items of vocational license examinations in Taiwan can be classified into two categories, namely:

- The global type (GT);
- The domestic type (DT).

An example of pre-classification is shown in Table 3; people in Taiwan communicate with foreigners in two ways: one is face-to-face (mainly in the service industries) and the other is through fax, e-mail, phone or other media (mainly in industry and commerce). In the service industry, workers, such as waiters, Western cooks and bartenders, need to face foreigners directly, but carpenters, shoemakers and bricklayers do not need to be in direct contact with foreigners.

Table 3: An example for the classification of vocations as global type (GT) or domestic type (DT).

Vocations	Global Type (GT)	Domestic Type (DT)
Service Industries	Waiters, Western cooks, bartenders	Carpenters, shoe makers, bricklayers
Industry and Commerce	Salespersons, telephone operators, computer programmers	House wiring trades-persons, domestic insurance personnel, air conditioner maintenance workers

However, workers in industry and commerce, such as computer programmers, telephone operators and salespeople, have to be able to read English manuals, communicate with foreigners via phone, e-mails, faxes and other media in English. On the other hand, air conditioner maintenance workers, domestic insurance personnel and house wiring tradespersons do not need to

engage foreigners directly. Therefore, it is suggested that for some GT licenses, vocational license examinations must be given English tests, especially common and widely used vocabulary in their jobs. In Taiwan, there are three levels (A, B and C) in each item of vocational license examinations. In this study, vocational vocabulary and technical document reading were suggested to be tested at level B, with listening comprehension, speaking, reading and writing skills suggested to be tested at level A.

The TVCU programmes and the vocational license examinations should be more tightly connected. The English abilities tested in the vocational license examinations can be adequately arranged in the TVCU programmes. This study was proposed that the technical and vocational English depending on the occupational group belongs to should be added. The contents of these English courses can be matched by the English abilities tested in the vocational license examinations. These English courses can help students effectively learn English and improve their English abilities to satisfy the needs of the jobs and get the licenses at the same time.

RESULTS

Vocational English Drill Programmes

Vocational license examinations in Taiwan comprise two parts. One covers a test for professional knowledge comprehension, while the other assesses skills practice. Both tests are presented in Mandarin. Some categories in the vocational license examination for the electrical and computer engineering occupational group and the service industry have been classified [13]. These are presented in Tables 4a and 4b. Items in vocational license examinations can be classified as either GT or DT to determine if the person should be given vocational English tests. The relationship between educational levels and vocational license examination levels is shown in Table 5. Level C is the basic technical level where there is no need to give students English tests. Vocational vocabulary and technical document readings should be tested for level B vocational license examinations. Moreover, those items related to tourism should include simple speaking and listening in the tests. Level A is the most difficult and should only apply to TVCU graduates with work experience or graduate students in TVCU programmes. English listening, speaking, reading and writing abilities should be tested, especially spoken English in the vocational environment. Students are certainly encouraged to challenge the advanced level if they get the matching license.

Figure 1 shows the design of a vocational English drill (VED) programme for TVCU programmes. The curriculum format of the VED is presented in Table 6. The syllabi of these programmes are listed in Table 7. There are two parts in the VED programmes. One is required courses (RCs), while the other is occupational courses (OCs), covering English training courses, dependent upon the vocational group that they belong to (OCs), including MBH, DSN, MEC, ECE, CEH, MED and AGF. Required courses include: *Daily Spoken English*, *Tourism English* and *Basic English Writings*. Required courses are targeted at training students' daily English, especially spoken English. Occupational courses focus on training students' vocational English. Occupational courses are as follows: *Spoken English in the Vocational Environment*, *Guidelines for Reading Vocational and Professional Documents* and *Vocational English Writings*.

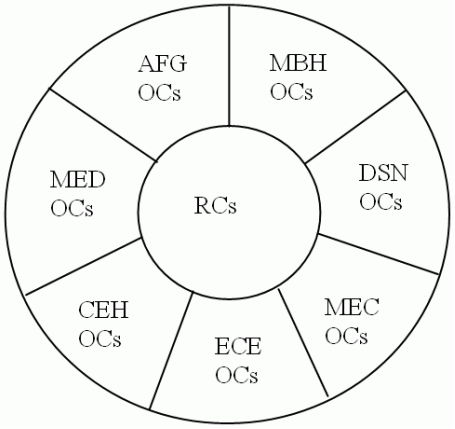

Figure 1: There are two parts in the VED programmes, one covers required courses, while the other is occupational courses (English training courses depending on which vocational group the student belongs to), including MBH, DSN, MEC, ECE, CEH, MED and AGF.

According to the curriculum format of VED listed in Table 5, there are VED programmes from the vocabulary classification given in Table 2, for example, the VED programmes in MBH, marked as VED (MBH). The respective occupational courses in the VED (ECE), VED (AGF), VED (MED), VED (CHE) and VED (MEC) can also be designed.

Students enrolled in VED programmes can elevate their common English skills and *Tourism English* will encourage students to go abroad or communicate with foreigners. Occupational courses will encourage students to read technical and vocational English documents, such as manuals, data sheets, professional journals and magazines, to write some technical and vocational reports, and to virtually simulate and practice speaking English in the vocational environment. These simulations of the occupational environment are very important in service industries, especially those that are related to mass transportation, restaurants, hotels, etc. Therefore, GT license examinations should incorporate some virtual simulation tests in English from the vocational environment in order to encourage globalised human resources.

Students enrolled in the programme have to pass two basic professional required courses that are taught in English or using English textbooks. The two required courses depend upon the occupational group they chose. For example, a student majoring in electronic engineering wants to join the VED (MBH) programme, then he/she should pass the required and occupational courses in VED (MBH), and take at least two basic professional required courses that are also taught in English or using English textbooks in the MBH field related to the department. However, if he/she joins the VED (ECE), then he/she should gain credits in these courses in his/her department.

Procedures

In non-NESNs, it is hardly approvable that English abilities are tested in vocational license examinations at the beginning. Thus, vocational license examinations should be given English tests gradually. It is proposed that the hospitality industry should firstly be given English tests, with other GT licenses incorporated gradually. In some special industries (especially tourism), other languages can be tested in vocational license examinations, such as Japanese, German and French. VED programmes can also be used to train employees from

companies related to the hospitality industry. Attendants from service industries, such as traffic companies and domestic airlines, should be trained in some vocational English to help foreign visitors to Taiwan.

Table 4a: Items from the electrical and computer engineering (ECE) occupational group for vocational license examinations and the pre-classification of items as GT or DT (this test level is currently open for students and technicians to take in vocational license examinations).

Occupational Group (OG) in TVCU Programmes		Vocational License Examinations in the Council of Labor Affairs	GT/DT	Levels		
				A	B	C
ECE	Electrical Engineering	Distribution power lines wiring and repair	GT	X	X	X
		Transmission overhead power lines wiring and repair	GT			X
		Transmission underground power lines wiring and repair	GT		X	X
		Distribution power cables wiring and repair	GT		X	X
		Air conditioner maintenance	DT	X	X	X
		Electric equipment testing	GT			X
		Industrial piping	DT	X	X	X
		Elevator maintenance	DT		X	X
		House wiring	DT	X		X
		Power transform action equipment setting and repair	GT			X
	Electronic Engineering	Power electronics	GT	X	X	X
		Industrial electronics	GT			X
		Instrumentation electronics	GT	X	X	X
		Audio and video electronics	GT	X	X	X
		Digital electronics	GT	X	X	X
	Computer Engineering/ Computer Science	Server set-up	GT			X
		Computer programming (C++)	GT		X	X
		Computer programming (Basic)	GT			X
		Computer programming (Java)	GT		X	X
		Homepage design	GT			X
		Computer application software	GT		X	X
		Computer hardware maintenance	GT		X	X

Table 4b: Items from the management, business and hotel (MBH) and design (DSN) occupational groups for vocational license examinations and the pre-classification of items as GT or DT (this test level is currently open for students and technicians to take in vocational license examinations).

Occupational Group (OG) in TVCU Programmes	Vocational License Examinations in the Council of Labor Affairs	GT/DT	Levels		
			A	B	C
MBH	Commercial calculation	GT		X	X
	Accounting	GT		X	X
	Hotel affairs	GT			X
	Bartender	GT			X
	Western cooking	GT		X	X
	Chinese cooking	GT		X	X
DSN	Hairdresser	GT		X	X
	Beautician	GT			X
	Carpenter	DT	X	X	X
	Shoemaker	DT		X	X
	Bricklayer	DT			X
	Advertisement design	DT		X	X
	Tailor	DT	X	X	X

Table 5: The relationship between educational levels and vocational license examination levels.

VLE Levels	English Tests	Technical and Vocational Education Systems	
A	Vocational listening, speaking, reading and writing	TVCU graduates with work experience or graduate students in TVCU programmes	
B	Vocational vocabulary and technical document reading (simple speaking and listening added for tourism items)	4-year technical and vocational college/university	2-year technical and vocational college/university
			2-year junior college of technology
C	None	Vocational high school	

Table 6: The curricula format of VED programmes.

Abilities	Required Courses (RCs)		English Training Courses Depending on the Vocational Group that the Student Belongs to (OCs)	
Listening	First-year English and English listening	Daily spoken English and tourist English	Spoken English in the vocational environment	At least two basic professionally-required courses that are taught in English or use English textbooks
Speaking				
Reading		Basic written English	Guidelines for reading vocational and professional documents	
Writing			Vocational written English	

Table 7: The syllabi of VED programmes.

VED	Course	Syllabi
Required courses (RCs)	Daily spoken English	This course provides daily spoken English simulation environments. Students can learn about speaking strategies and common expressions used in different situations by watching video films and online oral practice.
	Tourism English	This course provides tourist English simulation environments. Students can learn about speaking strategies and common expressions used in different situations by watching video films and online oral practice.
	Basic written English	This course trains students to learn basic written forms, including résumé, autobiography and letters of application, etc.
Occupational courses (OCs)	Spoken English in the vocational environment	This course provides spoken English in vocational simulation environments. Students can learn about speaking strategies and common expressions used in different situations by watching video films and online oral practice in some vocational environments.
	Guidelines for reading vocational and professional documents	Students can learn a framework for technical articles and how to read technical textbooks, papers, manuals and magazines. Some simple vocational vocabulary will be emphasised to help students' reading skills.
	Vocational written English	Students can learn how to present tables and figures in vocational and technical papers. They will practice writing some reports and papers in the typical English technical format belonging to their occupational group.

Some publication companies in Taiwan often buy the translation rights to some English technical textbooks; because some students' English levels are not good enough, they prefer the translated version. VED programmes may encourage students to read English technical textbooks. Previous studies presented a lot of vocabulary that was repeatedly used in technical textbooks and data sheets [10][11]. In fact, most technical and vocational documents have the aforementioned characteristics, ie simple and clear. Therefore, understanding vocabulary is the key to technical documents.

Thus, the concept of the vocabulary spectrum is proposed in these studies. VED programmes are based on this concept to design the content of courses. Generally speaking, students in the technical and vocational education system prefer technical and vocational courses to English courses. This policy will also help them effectively learn English to catch up with the trend of globalisation. If programmes are applied on a worldwide basis, then frequently appearing vocabulary for technical communication among professionals from the same occupational group will be widely used in many countries.

DISCUSSION

Evidence of Feasibility

Some previous studies have presented research into teaching English for science and technology (EST). The study by Orr et al presented Japanese students' progress in English for science and technology in the field of computing, and shows the special learning needs for non-native fundamental engineering English [14-17]. In the study by Lu et al, part-time students, who were working in professional companies in Taipei, Taiwan, were shown that it was helpful to explain the meanings of frequently appearing vocabulary in class in order to read English technical textbooks and slides [5][10][11]. The study by Duerden et al emphasised the positive experiences concerning the integration of composition and engineering in first-year English [18]. Therefore, students' elevations concerning their reading and writing abilities were proven in these studies.

The practice of engineering English speaking and listening can be arranged through the VED programme in the case of simulations, such as role card practice [12]. Technology covering speech recognition, signal processing and information technology can be applied to improve convenience when learning English speaking and listening skills, such as multimedia English teaching Web sites, which can support the function of voice and image transmission [19-23]. These studies provide Web-based or mobile-based tools to implement interactive multimedia contents that can help students learn English. Moreover, many educators and scholars in Asia have been inviting native speakers to increase the opportunities of English communications in the schools. As such, students enrolled in TVCU programmes can acquire many resources to practice English and pass their vocational license examinations and vocational English tests. In addition, large engineering organisations could help non-NESNs to build a fundamental engineering English communication database to integrate the common overlap of English for science and technology.

The goal of English teaching should make students' English as elegant, smooth and semantically correct as possible. Well-educated persons always speak English with gentle, humorous and cultivated vocabulary and sentences. However, this is a very high level requirement for most people in non-NESNs. In fact, it is hard to read or speak English when first learning it. Students use vocational English on the job or in professional

courses, and memorise some frequently occurring vocational vocabulary and terminology naturally. Therefore, it is easier for them to pass the vocational English test of vocational license examinations.

Students can also be encouraged to develop interest to facilitate learning English. Positive feedback can stimulate students in non-NESNs to enjoy using English for communication. Psychologically speaking, the encouragement mechanism is widely employed in the processes of teaching and learning [24][25].

The purpose of this study was to elevate the English proficiency levels of students enrolled in TVCU programmes, and to build a fundamental English communication environment in non-NESNs. Based on this environment, it is reasonable to expect that more students can obtain advanced information in English.

Information Technology Applications

Applications developed from rapidly developing information technology and the Internet provide the dominant knowledge sources in developed and developing countries, that is, the English level of a country will decide its development in this era of the knowledge based economy, which helps develop economic booms [26-29].

VED programmes are focused on elevating people's English abilities in some non-NESNs following trends on the knowledge-based economic era and applications utilising information technology. Some developing non-NESNs have experienced a trend in an increasing number of schools. Because the number of schools and universities is a kind of scale of modernisation, these countries are expected to build new schools and universities to elevate their level of technology. English teaching is a key for technology transfer for countries. Thus, VED programmes and vocational license examinations, especially when designed with a distance education system, can help make for the smoother development of globalisation in these countries.

CONCLUSION

It is helpful to systematically design license examinations that are related to internationalisation in order to keep up with modern trends in globalisation. TVCU programmes and vocational license examinations can be more tightly connected. Students enrolled in VED programmes can learn English in an objective-oriented manner and improve their English abilities effectively so as to satisfy their future employment needs and to obtain their licenses.

The integration of technology and fundamental engineering English helps people, technology and management. Therefore, VED programmes have been developed to lead students engaged in TVCU programmes to pave the way for preparing their abilities in this age of globalisation. In addition, great engineering organisations can help non-NESNs build a fundamental engineering English communication database to integrate the common overlap of English for science and technology.

ACKNOWLEDGEMENTS

The authors are thankful for the support obtained from *Curriculum simulation projects at Tung-Nan Institute of Technology for the school system links of the technical and vocational education in 200*2, Ministry of Education, and project number: NSC 92-2218-E-236-001, National Science Council, Taipei, Taiwan.

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