

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

<sup>1,2</sup>Ming-Li Tung <sup>3</sup>Bing-Yuh Lu <sup>3</sup>Hao-Li Liu,  
<sup>1</sup>Mau-Yuan Wang <sup>4</sup>Jer-Junn Luh <sup>5</sup>Kuen-Cheng Ju  
<sup>1</sup>Department of Electrical Engineering  
<sup>2</sup>Department of Applied Foreign Languages  
<sup>3</sup>Department of Electronic Engineering  
Tung-Nan Institute of Technology  
<sup>4</sup>School and Graduate Institute of Physical Therapy  
<sup>5</sup>Institute of Electrical Engineering,  
National Taiwan University, Taipei, Taiwan

# About Myself

- Born in Taiwan (Non-NESN)
- BS, MS, and Ph. D. degrees in electrical engineering in Taiwan
- Major Research: Biomedical Engineering
- Visiting USA several times
- Chief, Curriculum Section, Department of Academic Affairs, Tung-Nan Institute of Technology, Taipei, Taiwan (2000-2002)
- Why am I here to talk about this topic?

# Ultrasound Heating Therapy

Target



Single  
Scanned  
Ultrasound  
Transducer



Ultrasound  
Transducer Array  
(multiple elements)



Target

Optimization:

Focus the energy in the target

Less damage in normal tissue

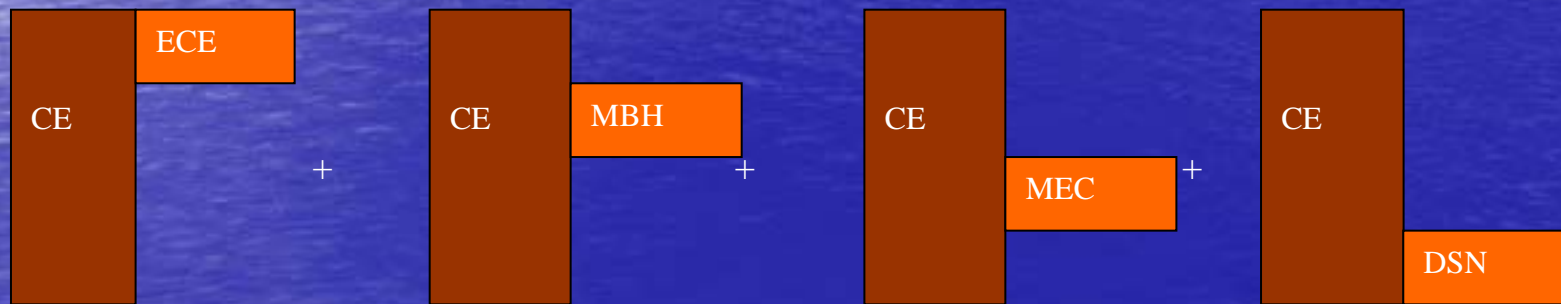
# Target: Non-NESN Now!

- Mother tongue in daily life
- English communication is almost for international trade and technology.
- English translators are the main communicators between the people of NESN and non-NESN
- Knowledge of English is a passport to a better job
- Many students study English very hard, but most of the students forget a lot of vocabulary because they use their mother tongue in daily life.

# Concept of the systematic design for English courses

CE	ECE
	MBH
	MEC
	DSN

(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).

# Key Points

- We suggest to make the spectrum analysis of the English vocabulary for vocational use in the TVCU programs to systematically design the English courses.
- Many students study English very hard, but most of the students forget a lot of these vocabulary because they use their mother tongue in daily life.
- The English courses are designed by the **objective-oriented** principle to arouse students' interest.
- Due to the analysis and the curriculum design, the globalizing pace in Taiwan will be speeded up.

# Introduction

- The correlations among the school systems in the TVCU programs of Taiwan:

Technological and Vocational Education Systems		Age
Graduate Schools of TVCU Programs		Over 23
4-Year Technological and Vocational College/University	2-Year Technological and Vocational College/University	22
		21
	2-Year Junior College of Technology	20
		19
Vocational High School		18
		17
		16

# Method

## Spectrum Analysis of English Vocabulary

- 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
  - MED: Medicine
  - CHE: Chemistry
  - ECE: Electrical and Computer Engineering
  - MEC: Mechanics
  - DSN: Design
  - MBH: Management, Business, and Hotel
  - CE: Common English.

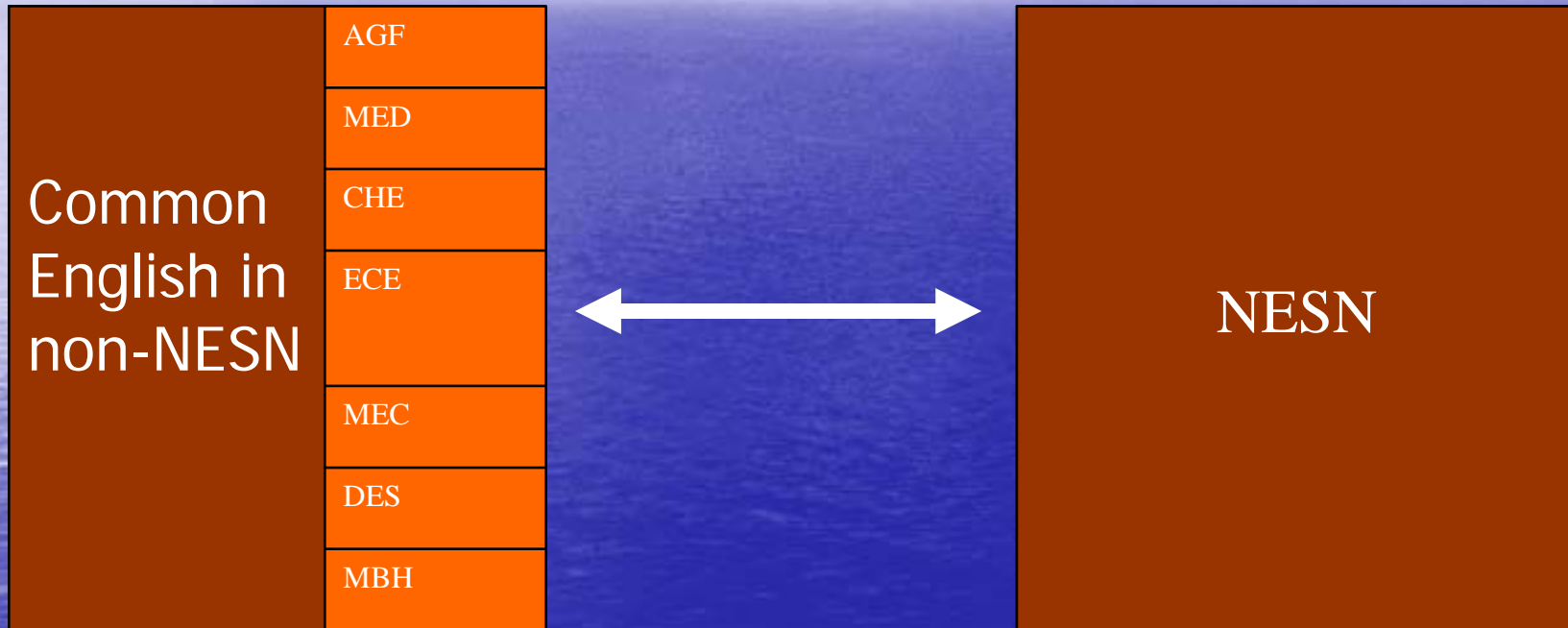
AG	MF	WF	MP	NS	FD	CHE	EE	ME	PME	CAE	ICD	ART	MB	HE	HI	FL
AGF		MED		CHE		ECE	MEC			DSN		MBH				
CE																

- The English curriculum overview is developed from the spectrum for technology and vocational education systems

Course	Abbreviation	Meanings	Required/Elective
■	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	Electives
■	TVC(OF)	Technological and vocational courses using English textbooks, handouts and multimedia. (two or more courses per semester)	Required or Electives

System	Year	Courses																
TVCU	1-4	A G	M F	W F	MP	NS	FD	CHE	EE	M E	PM E	CA E	IC D	ART	M B	H E	H I	F L
	2	TVE(AGF)			TVE(MED)		TVE(CHE)		TVE(ECE)		TVE(MEC)		TVE(DSN)		TVE(MBH)			
	1	CE (partially included ADF, MED, CHE, ECE, MEC, DSN, MBH)																
HS/VHS	3	CE																
	2																	
	1																	

# Concept



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

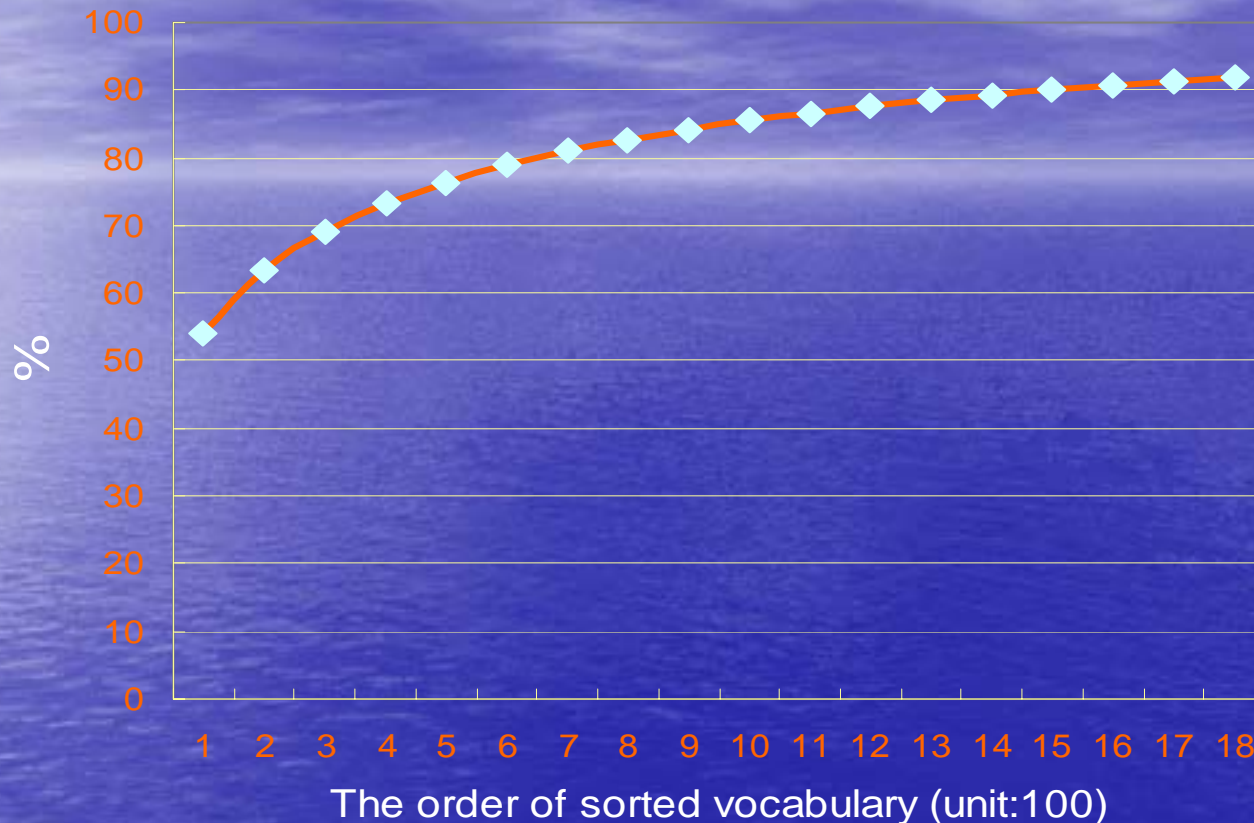
# Surprise !

(Vocab: Vocabulary, Num: Presented times)

Vocab.	Num.	Vocab.	Num.	Vocab.	Num.	Vocab.	Num.
the	8827	Be	1100	On	623	from	423
Of	3935	this	964	can	595	system	421
a	3369	memory	958	it	552	cache	412
Is	2916	As	898	register	496	I/O	411
To	2821	instruction	862	one	489	each	409
and	2425	An	800	By	487	registers	387
In	2249	data	746	processor	481	if	381
that	1200	0	740	address	470	figure	367
are	1132	with	734	used	434	which	363
for	1120	Or	716	instructions	428	number	356

Lu *et. al.s'* study, a popular textbook for the course, Computer Organization and Architecture, in the departments of ECE has about 800 pages, 112508 words, but the number of the vocabulary in this book is only 6695.

# Verification of the Concept of Vocabulary Spectrum



- The accumulation of the presented percentage of the top sorted 1800 vocabulary in a popular textbook in Taiwan---W. Stallings, (MIT) *Computer Organization & Architecture: Designing for Performance*, 6th Ver., New Jersey: Prentice Hall, USA, 2003.

# 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, action	"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"

We propose to compute the frequency of vocabulary for vocational use and classify the words into the 7 OGs, respectively.

# Discussion

- register (sorted:24/ presented times: 496), cache (33/412)
- Generally speaking, the contents of the “entrance exams” lead the teaching of schools in the Asian countries, such as Japan, Korea, Mainland China, and Taiwan.
- Technological and vocational vocabulary and terminologies can be included to the curricula in TVCU programs with the objective-oriented principle gradually.
- This way will make the students learn technological and vocational English effectively to arouse their interests in English study.
- This spectrum helps the part-time students study in SBC of TVCU programs to elevate their English level on their jobs by self-study. (English is a passport to a better job.)
- The concept of the vocabulary spectrum can also be applied to other languages to accelerate the globalizing pace.

# Conclusion

- We suggest an institute can help the non-NESNs build the database of the English vocabulary spectrum to accelerate the globalizing pace.

# References

- S. C. Hu, "A wholesome ECE education", *IEEE Trans. Educ.*, vol. 46, no. 4, pp. 444-447, 2003.
- B. Y. Lu, S. T. Hwang, T. C. Chiang, M. Y. Wang, Y. P. Wang, K. N. Chen, and S. K. Wei, *Report of the Curriculum Simulation Projects for the School System Links of the Technological and Vocational Education at Tung-Nan Institute of Technology*, Taipei: Ministry of Education, Taiwan, R.O.C., 2002.
- C. F. Tai, R. J. Chen, and J. L. Lai, "How technological and vocational education can prosper in the 21st century?" *IEEE Circuit and Devices Magazine*, March, pp. 15-16, 2003.
- L. S. Lee, "The curriculum design for the technological and vocational education in Taiwan," *Technical and Vocational Education*, vol. 54, pp. 14-19, 1999.
- Ministry of Education, *Guides of the Curriculum Simulation Projects for the School System Links of Technological and Vocational Education*, Taipei: Ministry of Education, Taiwan, R.O.C., 2002.
- <http://www.tnif.edu.tw/chancellor/chancellor.htm>
- P. Medgyes, *The Non-Native Teacher*, in S. Holden Ed., *MEP Monographs*, Macmillan Publisher, Hampshire, ch. 1, pp. 1-8, 1994.
- B.Y. Lu, "Statistics of the Vocabulary in the Textbook for the Course of Computer Organization and Architecture in the Department of Electronic Engineering, Tung-Nan Institute of Technology" *Journal of Electronic Engineering of Tung-Nan Institute of Technology*, vol. 5, pp.17-26, 2004.
- W. Stallings, *Computer Organization & Architecture: Designing for Performance*, 6th Ver., New Jersey: Prentice Hall, USA, 2003.
- <http://tw.news.yahoo.com/2003/12/11/leisure/cna/4418116.html>
- R. M. Kanter, *World Class: Thriving Locally in the Global Economy*, ch. 2, New York: Touchston, 1997.
- <http://www.cepd.gov.tw/english/file/200402TES.pdf> (Taiwan Economic Statistics)
- C. H. Du, and C. C. Wang, *An Introduction to the Global Economics: Guide for Business and Culture of the 195 Countries*, Taipei: Laureate Books, Taiwan, 2004.
- S, Y, Cho, *The Art of Study*, 2 nd ver., Seoul: JoongAng M&B Publishing Co., Korea, 2004.
- P. G. Altbach, T. M. Davis, "Global challenge and national response: notes for an international dialogue on higher education", in P. G. Altbach, and P. M. Peterson Eds., *Higher Education in the 21st Century: Global Challenge and National Response*, ch. 1, no. 29, IIE Research Report, 1999.
- D. J. Moore, and D. R. Voltmer, "Curriculum for Engineering Renaissance", *IEEE Trans. Educ.*, vol. 46, no. 4, pp. 452-455, 2003.



Tung-Nan Institute of Technology

Thank you!

Welcome you to visit Taiwan!