

Ha Xuan Hung (Namdinh University of Technology Education), **I Wayan Ratnata** (Indonesia University of Education), **Boualinh Soysouvanh** (National University of Laos) & **Wang Jiping** (Tongji University, IBB)

Cooperative, regional development and implementation of new Curricula in Vocational Teacher Education – experiences and reflections

Abstract

As part of the Regional Cooperation Platform for Vocational Teacher Education in Asia (RCP), four vocational teacher training institutions from Vietnam (Namdinh University of Technology Education – NUTE), Laos (Faculty of Engineering/ National University of Laos – FE/ NuoL), Indonesia (Faculty of Technology and Vocational Education/ Indonesia University of Education – FPTK/ UPI) and China (Institute of Vocational Teacher Education – IBB/ Tongji University) have been developing core curricula for Vocational Teacher Education (VTE) in Mechanical Engineering (ME) and Electrical Engineering (EE) at Bachelor Degree.

The authors compared and analysed the available curricula of the institutions for the purpose of discovering commonalities and differences. In seeking out differences, the authors applied the following principle: regarding various academic issues, it is deemed necessary to analyse and compare to reach an agreement with the proviso that different cultural issues had to be respected. Going from that point the authors proposed this common structure for both curricula comprising: (1) Title of the curriculum; (2) Objectives; (3) Duration; (4) Enrollee; (5) Graduation condition; (6) Evaluation; (7) Contents; (8) Brief description of subjects and (9) How to use the core curriculum.

The core curriculum for VTE in ME consists of 134 credits including 28 credits in general knowledge, 52 credits in professional knowledge, 21 credits in pedagogical knowledge, 22 credits for internship – practice and 8 credits for the graduation paper.

The VTE core curriculum in EE consists of 133 credits made up of 30 credits in general knowledge, 55 credits in professional knowledge, 21 credits in pedagogical knowledge, 22 credits for internship – practice and 8 credits for the graduation paper.

The core curricula for vocational teacher education in Mechanical Engineering and Electrical Engineering is to be implemented in the institutions taking part in the research. As they all share these core curricula, the institutions can exchange lecturers and students and in the near future have the qualification awarded by these institutions mutually recognized.

1 Introduction

The Association of Southeast Asian Nations (ASEAN) is a political, economic, cultural and social association of the countries in Southeast Asia. ASEAN concentrates its emphasis on regional cooperation resting on the "three pillars" of security, sociocultural and economic integration towards the goal to create an ASEAN Economic Community (AEC) by 2015. Establishing the AEC ushers in many advantages for the countries in the region. AEC cultivates political trust and promotes friendly relations, making for an environment of peace and political stability. AEC creates a common market economically connected through the basis of consistent production, free trade for investment, capital transfer, labour all based on common standards and criteria to facilitate the the ASEAN member countries'. By 2015, ASEAN will have become a community. In place of ten heterogeneous labour markets there will be a large labour market in which nations recognize one another's qualifications.

The Regional Cooperation Platform for Vocational Teacher Education and Training in Asia (RCP) was established with the support of GIZ (Germany). The platform was erected for vocational institutes in China and some ASEAN nations to discuss, share experiences and cooperate for the purpose of developing curricula and improve teaching and research skills.

Under these auspices Namdinh University of Technology Education in collaboration with National University of Laos, Indonesia University of Education and Vocational Training Institute-Tongji University, Shanghai conduct research for developing core curricula for vocational teacher education in Mechanical Engineering and Electrical Engineering at bachelor level.

2 The training programmes of VTE in ME and EE at NUTE and partners

At NUTE, the curricula for VTE in ME and EE have three kinds of knowledge: general knowledge awarded 51 credits, pedagogical knowledge 21 credits and professional knowledge 78 credits. In ME, professional knowledge is classified into basic knowledge (26 credits), specialized knowledge (24 credits), internship (18 credits) and graduation paper (10 credits). In EE, professional knowledge is categorized into basic knowledge (30 credits), specialized knowledge (20 credits) and internship (18 credits). In general knowledge, aside from subjects such as Mathematics, Physics or English, other subjects are included based on the curriculum of the Ministry of Education and Training (MoET) such as basic principles of Marxism-Leninism, Ho Chi Minh ideology or General laws. Professional knowledge provides students with the knowledge that need to apply in their major subject. Pedagogical knowledge focuses on subjects such as teaching skills and research methodology.

In NUoL, the Bachelor Degree Programme of Vocational Teacher Training is organised under the human resource development system and has an important role in the teaching-learning process at the vocational institute in meeting and corresponding to the needs of the social-economy of the country and society. The curricula of Mechanical Engineering and Electrical Engineering are comprised of general knowledge (20 credits), pedagogical knowledge (32

credits), professional knowledge and graduation paper (04 credits). Professional knowledge of Mechanical Engineering features 93 credits, whereas the credit number of professional knowledge in Electrical Engineering is 94 credits. In Mechanical Engineering, professional knowledge includes basic knowledge (42 credits) and specialized knowledge (51 credits). The specialized knowledge consists of optional energy (21 credits), optional applied mechanics (20 credits) and optional material and production (18 credits). In Electrical Engineering, professional knowledge includes basic knowledge (30 credits), specialized knowledge (59 credits) and elective subjects (5 credits).

The general objective of Electrical Engineering Education and Mechanical Engineering in UPI is to produce undergraduates with the skills to master technology within the field of electrical engineering/ mechanical engineering and capable of being professional teachers in these two fields. The S1 or bachelor programme in Electrical Engineering Education (PTE: Pendidikan Teknik Elektro) can be accomplished within eight semesters and comprises a total of 150 credits, including General Subjects (14 credits), Expertise Subjects (93 credits), Profession Basic Subjects (12 credits), Profession expertise Subjects (14 credits), Elective subjects (13 credits), and Profession Training Subjects (04 credits). The curriculum for VTE in ME includes the following subjects: General Subjects (14 credits), Skills (expertise) Subjects (92 credits), Elective subjects (16 credits), Profession Basic subjects (12 credits), Professions Skill Subjects (12 credits) and Profession Training Subjects (04 credits).

The training objective of IBB is to meet the modernization needs of the twenty-first century and develop all-round physical and moral energy, providing the basic knowledge and skills of mechanical engineering, vocational education teaching theory and practice, producing rounded, senior personnel. The curriculum for VTE in EE at IBB consists of general knowledge (91.5 credits), pedagogical knowledge (16 credits), professional knowledge (56 credits) of which basic knowledge accounts for 26 credits, specialized knowledge 30 credits, internship 21 credits and the graduation paper 17 credits. The curriculum for VTE in ME includes general knowledge (84.5 credits), pedagogical knowledge (18.5 credits) and professional knowledge (54 credits), among which basic knowledge accounts for 34 credits, specialized knowledge (20 credits), internship (24 credits) and graduation paper (17 credits).

Table 1: **The amount of knowledge for VTE in ME and EE in some institutions**

Contents	Number of credits							
	IBB		NUoL		UPI		NUTE	
	ME	EE	ME	EE	ME	EE	ME	EE
General knowledge	91.5	84.5	20	20			51	51
General subjects					14	14		
Expertise subjects					92	93		
Pedagogical knowledge	16	18.5	32	32			17	17
Professional knowledge	56	54	93	94			50	50
<i>Basic knowledge/ subjects</i>	26	34	42	30	12	12	26	30
<i>Specialized knowledge/ subjects</i>	30	20	51	59	12	14	24	20
<i>Elective subjects</i>				05	16	13		
Internship	21	24			04	04	18	18

Contents	Number of credits							
	IBB		NUoL		UPI		NUTE	
	ME	EE	ME	EE	ME	EE	ME	EE
Graduation paper	17	17	04	04			10	10
Total	201.5	198	149	150	150	150	146	146

3 Research methodology

In this research study, constructing a completely new core curriculum was not intended, but rather to develop a core curriculum basing on the partners' available curricula. The major research methodology used in this study is the analysis and comparison of partners' curricula to reveal commonalities and differences. The analysis and comparison follows the principle that commonalities enable partners to easily agree on the core curriculum. Regarding differences, if the difference is related to academic issues, partners analyse and compare for the purpose of reaching an agreement. Should the difference be culture related, it will remain unchanged. The core curriculum will be the combination of partners' curricula but nonetheless follow the nature and the principles of curriculum development of each country.

Before comparing and analysing the major contents of the curricula, the authors compared and analysed to discover the common structure of the core curriculum. The authors began by comparing the partners' curricula objectives. Analysis and comparison, revealed the partners' curricula to be objective-oriented meaning the curricula content matched the objectives. The partners' curricula objectives dealt with issues such as: health, professional ethics, the ability to satisfy the demand of industrialization and modernization, professional knowledge and teaching ability. The authors discussed and agreed that the core curriculum objectives should be confined to issues of professional and technical field i.e. upon graduation students must have professional knowledge, practical skills and teach ability at vocational institutions.

In terms of training duration, the authors compared the training duration of the partners' curricula. In most of the curricula, featured a 4 year course, but Laos also included a year internship at vocational institution and in Vietnam the course a further six months was required for the acquisition of pedagogical knowledge. After the discussion, the partners agreed the training duration to be 4.5 years including professional knowledge, practical skills and pedagogical knowledge.

The enrollees in the partners' curricula are graduates from high schools and the equivalent, which made it is easy for the partners to agree on this issue.

AS each country has different conditions and different assessment methods in terms of graduation conditions and assessment, ,the authors discussed and agreed: in order to graduate, students must accumulate all the required credits, the minimum GPA being 2 and must not have an "F".

More importantly, the authors analysed and compared to reach agreement on the structure of the core curriculum. Via analysis and comparison, it became clear that the structure of

Vietnam and China is quite similar regarding basic knowledge, professional knowledge, and pedagogical knowledge. In Laos and Indonesia, however, the structure of curricula is quite different. In Laos, general subjects, basic core subjects and core subjects feature in the curriculum. In Indonesia, the curriculum includes general subjects, skill subjects, elective subjects, professional skill subjects, professional basic subjects and professional training subjects. Although the subjects differ in nomenclature, the curricula are similar to one another. After the discussion, the authors agreed the structure of the core curriculum should feature general knowledge (including basic knowledge and core knowledge), professional knowledge (including basic knowledge and specialized knowledge), pedagogical knowledge, internship and graduation paper.

After the structure of the core curriculum was agreed, the authors went on to discuss the subjects and credit number of each subject in the core curriculum. The authors only focused on core knowledge, professional knowledge and pedagogical knowledge. The basic knowledge including the subjects related to social science and culture is to be decided upon and added to the core curriculum by each partner, to make the curricula appropriate to the situation in each country. The authors' comparison resulted in the following: similar subjects of the partners' curricula are to be added to the core curriculum, differing subjects are discussed more thoroughly to discover why such differences exist. If the subject content is the the same and only differing by name the authors discussed these to arrive at an agreement on how to name the subject and have it suitable to all partners. If the subject content were different, the authors tried to arrive at a single common subject for the partners. For example, Laos' curriculum, features some mathematical subjects: Mathematics 1 (3 credits), Mathematics 2 (3 credits), Engineering Mathematics 1 (3 credits), Engineering Mathematics 2 (3 credits), Advanced statistics (3 credits) (the total number of credits is 11); the curriculum of Indonesia features Basic Mathematics (2 credits), Engineering Mathematics 1 (3 credits), Engineering Mathematics 2 (3 credits) and Probability and Statistics (3 credits) (the total number of credits is 11). In the NUTE curriculum, the mathematics subjects are Advanced Mathematics 1 (2 credits), Advanced Mathematics 2 (2 credits), Advanced Mathematics 3 (2 credits), Special subject mathematics 1 (2 credits), Special subject mathematics 2 (2 credits), Special subject mathematics 3 (2 credits) (Special subject mathematics 2 and Special subject mathematics 3 are elective subjects) (the total number of credits is 10). The curriculum of IBB includes Advanced Mathematics (10 credits), Linear Algebra (3 credits) and Probability and Statistics (3 credits). It was immediately clear that there are some differences in the mathematical subjects of the partners' curricula. After the analysis and comparison, the authors agreed on the following subjects: Mathematics 1 (2 credits), Mathematics 2 (2 credits), Mathematics 3 (2 credits), Engineering Mathematics (3TC) and Probability and Statistics (2 credits) (the total number of credits is 11). The above subjects and credit numbers, can ensure the core curriculum provides the required knowledge and is suitable to the available curricula of the partners.

When the names of subjects and their credit numbers were agreed on, the authors compared and analysed to reach agreement on the contents of subjects in the core curriculum. Should the subject content in partners' curricula have been similar, it was easy to agree on the subject

content of the core curriculum. Should the subject content have been different, the authors talked this through and worked out whether to add, reduce or modify the content to make the core curriculum content suitable to the partners' available curricula . For example, each partner had different ways of describing the content of the mathematical subjects; however, the authors talked these through to arrive at the common content for all partners. The authors agreed on the content of the mathematical subjects as follows: Mathematics 1 (2 credits) includes the knowledge related to function; Mathematics 2 (2 credits) provides students with knowledge on matrix, linear equations and the concept of complex number; Mathematics 3 (2 credits) mentions multi-variable function, differential equation level 1 and level 2...; Engineering Mathematics (3 credits) includes knowledge on higher order differential equation, Laplace transformation and the introduction to partial differential equation; Probability and Statistics (2 credits) deals with random variables, probability distribution, mathematics expectation, hypothesis testing and statistical depiction. The same method was applied for the other such and talked out to reach an agreement on the subject content of the core curriculum.

The outcomes of the comparison and analysis are shown in the following table:

Table 2: The comparison and analysis outcomes

No	Parameters	NUoL	UPI	NUTE	IBB
1	Objectives	<ul style="list-style-type: none"> - Have knowledge in vocational teacher in didactic methodology and mechanics - Have capacity for setting problems and seeking information via research science - Have ethical responsibilities to society - Know how to preserve national cultures and customs 	Produce undergraduates able to master technology within the field of ME and be a professional teacher in the field of ME	Train TVET teachers to serve the process of industrialization and modernization Graduates possess teaching and research capability, professional knowledge and skill and good ethics and health	Meet the modernization needs of the twenty-first century, the all-round development of physical and moral energy, setting the basic knowledge and skills of mechanical engineering, vocational education teaching theory and practice in a compound of senior personnel
2	Training duration	2 phases: 4 years: NUoL 1 year: Industry Practice/ Vocational School Practice	4 years longest possible duration: 5 years	4.5 years - 4 years for engineering - 0.5 year for pedagogy	4 years
3	Enrollee	Upper secondary school Technical Vocational School	- high school (majoring in natural science) - vocational school	Ss graduating from upper secondary school or equivalent	High school graduates
4	Graduation condition	min GPA = 2.0	min GPA = 2.0	- accumulate enough credits (146 cre.) - GPA \geq 2.0 - have national defence certificate and physical education certificate	Completing all courses required for graduation thesis defence
5	Assessment	A = 4.0 B+ = 3.5 B = 3.0 C+ = 2.5 C = 2.0 D+ = 1.5	A = 4.00 - 3.50 B = 3.49 - 3.00 C = 2.99 - 2.50 D = 2.49 - 2.00 F < 2.00	Distinction 8.5 - 10 A Credit 7.0 - 8.4 B Strong pass 5.5 - 6.9 C Pass 4.0 - 5.5 D Fail < 4.0 F	Based on course grades and performance in school during evaluation
6	Structure of the curriculum	1. General subjects: 20 credits 2. Basic core subject: 42 credits 3. Core subjects: 80 credits + Professional mechanic: 44	- General subjects: 14 cre. - Skill subject:	1. General knowledge: 51 credits 2. Pedagogical knowledge: 17 credits	- General knowledge: 91.5 credits - Pedagogical knowledge: 16 credits

No	Parameters	NUoL	UPI	NUTE	IBB
		credits + Core Vocational Pedagogy: 32 cre. + Final paper: 4 cre. 4. Elective subjects: 4 cre. 1 year practice: + 4 months in Industry + 4 months in vocational school Total: 149	92 cre. - Elective subjects: 16 cre. - Professional skill subjects: 12 cre. - Professional basic subjects: 12 cre. - Professional training subjects: 4 cre. Total: 150 cre.	3. Professional knowledge: 78 credits + Basic knowledge: 26 credits + Specialized: 24 cre. + Internship: 18 cre. + Graduation paper: 10 cre. Total: 146 cre.	- Professional knowledge: 94 credits + Basic knowledge: 26 credits + Specialized knowledge: 30 credits + Internship: 21 credits + Graduation paper: 17 credits Total: 201.5 credits

4 The core curricula for VTE in ME and EE

Basing on the comparison and analysis, the authors constructed the core curricula for VTE in ME and EE. The structure of each core curriculum consists of nine parts: (1) the title of the core curriculum, (2) objectives of study, (3) duration of study, (4) enrollee, (5) graduation condition, (6) assessment, (7) the structure of knowledge, (8) description of each subject and (9) the guide how to use the curriculum. The specific content of each part is as follows:

- **Title of the core curriculum:** Core curriculum for vocational teacher education in mechanical engineering/ electrical engineering
- **Objectives of study:** To train students with knowledge, skills and ability to teach in Mechanical Engineering/ Electrical Engineering in vocational institutes and industry.
- **Duration of study:** 4.5 years
- **Enrollee:** Graduates from upper secondary schools or equivalent institutes
- **Graduation condition:**
 - Take all required subjects
 - GPA \geq 2.00
 - No "F"
- **Assessment:** Basing on the national assessment system of each country.
- **Structure of the knowledge:** The structure of knowledge includes general knowledge, professional knowledge, pedagogical knowledge, internship – practice and graduation paper. The specific amount of each kind of knowledge is shown in the Table 3.

Table 3: The knowledge during the training course

Contents	Number of credits	
	Mechanical Engineering	Electrical Engineering
General knowledge	28 credits	30 credits
Professional knowledge	55 credits	52 credits
<i>Basic knowledge</i>	<i>29 credits</i>	<i>34 credits</i>
<i>Specialized knowledge</i>	<i>26 credits</i>	<i>18 credits</i>
Pedagogical knowledge	21 credits	21 credits
Internship – Practice	22 credits	22 credits
Graduation paper	8 credits	08 credits
Total	134 credits	133 credits

In general knowledge, the authors only mention some core subjects such as English, Mathematics, Physics, Informatics or Psychology. Other basic subjects related to ideology, laws, culture and social studies will be open to each partner as these subjects are specific to the education system and cultural traditions in each country.

The professional knowledge provides the knowledge in the field of Mechanical Engineering and Electrical Engineering. These are the students' main focus throughout their career. This kind of knowledge is divided into basic knowledge and specialized knowledge. The basic knowledge of Mechanical Engineering comprises 29 credits in such subjects as Graphic and Technical Drawings, Heat Transfer, Mechanics, Engineering material, Metal processing,

Tolerance and Measurement Technique... The specialized knowledge of Mechanical Engineering consists of 26 credits with some subjects such as Metal Cutting Principle, General Metal Cutting Machines, Manufacturing Processing and Fixture, Manufacturing Processing Project, CNC Technology, Unconventional Processing Methods, CNC Machine and Industrial Robotics... In the Electrical Engineering major, the basic knowledge of professional knowledge comprises 34 credits. It features such subjects as Electrical Circuit, Electronic, Electrical Measurement and Instrumentation, Digital Technique, Power Electronic, Electric Machine, Electric drives, Electronic-Electrical Materials, Automatic Controlling Systems... There are 18 credits of specialized knowledge including Electrical Installation Technique, Power System Analysis, Power System Protection, Power Station & Substation, Power Transmission, SCADA, Programming Control...

The pedagogical knowledge of the two core curricula provide students with the knowledge and skills relevant to their future teaching career. This kind of knowledge includes General Vocational Education, Psychology of Learning and Teaching, Research Methodology, Vocational Curriculum Development, Teaching Skill, Teaching Media, Practice in Vocational School, Teaching Measurement and Evaluation. Aside from the above compulsory subjects, students can choose to study one of these two subjects: Teaching Methodology or Professional Didactic. The credit number of pedagogical knowledge is 21 credits.

The internship – practice consists of 22 credits divided into 3 parts: technical internship in workshop/lab, technical internship in factories and a teaching internship in a vocational institution.

The credit number of the graduation paper is 8 credits.

All the subjects of professional knowledge, pedagogical knowledge, internship and graduation paper are built basing on the analysis, discussion, comparison, and agreement of the four partners. Table 3 illustrates the list of subjects for each kind of knowledge.

Table 4: List of subjects for the core curricula for VTE in ME and EE

No	Mechanical Engineering		Electrical Engineering	
	Subjects	Credit	Subjects	Credit
I	General knowledge	28	General knowledge	30
1	Introduction to Informatics	2	Introduction to Informatics	2
2	General English I	2	General English I	2
3	General English II	2	General English II	2
4	Technical English	2	Technical English	2
5	Physics I	2	Physics I	2
6	Physics II	3	Physics II	3
7	Mathematics I	2	Mathematics I	2
8	Mathematics II	2	Mathematics II	2
9	Mathematics III	2	Mathematics III	2
10	Engineering Mathematics	3	Engineering Mathematics	3
11	Probability And Statistics	2	Probability And Statistics	2
12	Psychology	2	Psychology	2
13	Introduction to Economics	2	Introduction to Economics	2

No	Mechanical Engineering		Electrical Engineering	
	Subjects	Credit	Subjects	Credit
14			Engineering Drawing	2
II	Professional knowledge	55	Professional knowledge	52
II.1	Basic knowledge	29	Basic knowledge	34
	<i>Compulsory subjects</i>			
1	Graphic and Technical Drawings	3	Electrical circuit 1	3
2	Heat Transfer	2	Electrical circuit 2	3
3	Mechanics I – Statics	3	Electronic 1	2
4	Mechanics II – Dynamics	2	Electronic 2	3
5	Engineering material 1	2	Electrical Measurement and Instrumentation	2
6	Engineering material 2	2	Digital Technique	3
7	Metal technology	2	Power Electronic	2
8	Tolerance and Measurement Technique	2	Electric Machine 1	3
9	Machine Principle and Part	2	Electric Machine 2	3
10	Part Course Project	1	Electric drives	2
11	Electric-electronic technique	2	Electronic-Electrical Materials	2
12	Fluid Mechanics	2	Automatic Controlling Systems	3
13	Strength of Material	2	Microprocessor	2
14			Project 1	1
	<i>Elective subjects</i>			
15	Computer Aided Designing and Drawing	2		
16	Industrial Economics and Quality Management	2		
II.2	Specialized knowledge	26	Specialized knowledge	18
	<i>Compulsory subjects</i>			
1	Metal Cutting Principle	3	Electrical installation technique	3
2	General Metal Cutting Machines	2	Power system analysis	3
3	Mechanical Manufacturing Technology and Fixture	4	Power system protection	3
4	Mechanical Manufacturing Technology course project	1	Power station & Substation	2
5	CNC Technology	2	Power transmission	2
6	Unconventional processing methods	3	SCADA	2
7	CNC machine and industrial robot	3	Programming control	2
8	Industry Safety and Maintenance	2	Project 2	1
9	Mold Manufacturing Technology	2		
10	Automatic Controlling	2		
	<i>Elective subjects</i>			
11	Experimental method and Data Processing	2		
12	CAD/CAM-CNC Technology	2		
III	Pedagogical knowledge	21	Pedagogical knowledge	
	<i>Compulsory subjects</i>		<i>Compulsory subjects</i>	
1	General Vocational Education	2	General Vocational Education	2
2	Psychology of Learning and Teaching	2	Psychology of Learning and Teaching	2
3	Research Methodology	2	Research Methodology	2

No	Mechanical Engineering		Electrical Engineering	
	Subjects	Credit	Subjects	Credit
4	Development Vocational Curriculum	2	Development Vocational Curriculum	2
5	Teaching Skill	3	Teaching Skill	3
6	Teaching Media	2	Teaching Media	2
7	Practice in Vocational School	4	Practice in Vocational School	4
8	Measurement And evaluation Teaching	2	Measurement And evaluation Teaching	2
	<i>Elective subjects</i>		<i>Elective subjects</i>	
9	Teaching Methodology	2	Teaching Methodology	2
10	Professional Didactic	2	Professional Didactic	2
IV	Internship – Practice	22	Internship – Practice	22
1	Technical Internship in workshop/Lab	16	Technical Internship in workshop/Lab	16
2	Technical Internship in Factories	2	Technical Internship in Factories	2
3	Teaching internship in Vocational Institutions	4	Teaching internship in Vocational Institutions	4
V	Graduation paper	8	Graduation paper	8
	Total	134		133

5 Conclusion and recommendations

Through comparing and analysing the training programmes for VTE in ME and EE in four institutions, the authors have constructed the core curricula for these two majors. It is expected that these core curricula will be adapted successfully in all partner universities for the purpose of developing their own new training programmes. The two core curricula are also referenced to other universities in ASEAN regions if they should wish to develop their training programmes. The authors hope that these curricula can form a recommendation to policy makers responsible for issuing policies relating to frame curricula.

Basing on these core curricula, institutions construct their own new training programmes according to the following recommendations:

- In terms of “objective of study”, institutions should add specific objectives which are suitable to the education and the cultural tradition of each country.
- In terms of “assessment” institutions specify the assessment according to the assessment system of each country.
- Institutions add elective subjects to the list of “General knowledge”, “Basic knowledge”, “Specialized knowledge”, “Pedagogical knowledge” and “Internship – Practice” and increase the number of required credits to be suitable to national education system of each country.
- Each institution can decide to replace the “Graduation paper” with some other subject to make the credit number of these subjects same as that of “Graduation paper”. In this situation, it is necessary for the institutions to list the subjects to replace the graduation paper.

Due to the scope of the study, the authors have only focused on the core curricula for VTE in ME and EE. There are still many other VTE majors that require the construction of core curricula among institutions in RCP for these institutions to have the opportunity to exchange training programmes, teachers and students.

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TVET@asia The Online Journal for Technical and Vocational Education and Training in Asia

CITATION:

Ha Xuan Hung, Ratnata, I W., Soysouvanh, B., & Wang, J. (2013). Cooperative, regional development and implementation of new Curricula in Vocational Teacher Education – experiences and reflections. In: TVET@Asia, issue 2, 1-14. Online: http://www.tvet-online.asia/issue2/ha-xuan-hung_et al_tv et2.pdf (retrieved 30.12.2013).

The Authors



Dr. HA XUAN HUNG

Namdingh University of Technology Education
Vietnam

E-mail: jailani@uthm.edu.my

WWW: www.nute.edu.vn/Home/



Drs., ST., M.Pd. I WAYAN RATNATA

Indonesia University of Education

E-mail: i_wayan_ratnata@yahoo.com

WWW: <http://www.upi.edu/en/>



Prof. Dr. BOUALINH SOYSOUVANH

Faculty of Engineering,
National University of Laos

E-mail: boualins@fe-nuol.edu.la

WWW: www.fe-nuol.edu.la



Associate Prof. Dr. JIPING WANG

Tongji University, Shanghai

E-mail: wangjp@tongji.edu.cn

WWW: www.tongji.edu.cn

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