

ADAPTING THE CDIO APPROACH IN DEVELOPING LEARNING OUTCOMES FOR ECONOMICS AND BUSINESS DISCIPLINES IN VIETNAM: A CASE-STUDY OF UNIVERSITY OF ECONOMICS AND BUSINESS AT VIETNAM NATIONAL UNIVERSITY, HANOI

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ABSTRACT

This paper shows how we adapt the CDIO approach (at the first step) in developing learning outcomes or syllabus at the 3rd (XXX) level of detail, at the conceptual stage, for economics-for-foreign-affairs discipline at University of Economics and Business – Vietnam National University, Hanoi. Our practice demonstrates that the approach can be reasonably adapted for other disciplines like economics and business although our conceptual framework of the learning outcomes should be validated in the next steps. The paper also compares the CDIO-based and the existing learning outcomes of our training programmes to assess the pre-eminence of the CDIO approach. In the end the paper also discusses the importance of the CDIO approach as one of the models in solving higher education quality issue in Vietnam.

INTRODUCTION

Vietnamese higher education has been facing a serious quality issue. At the 2008 conference for higher education quality organised by the Vietnamese Ministry of Education and Training (MOET), most of the educators strongly insisted on the need for changing from “*the bottom to the top*” of the tertiary education system in order to improve and enhance the quality [1]. The fact is that Vietnam still does not have a single university whose quality is assessed and accredited by international quality assurance associations (or organisations) up to the date. Other researchers point out that “*Vietnamese universities are not producing the educated workforce that Vietnam’s economy and society demand. Surveys conducted by government-linked associations have found that as many as 50 percent of Vietnamese university graduates are unable to find jobs in their area of specialization, evidence that the disconnection between classroom and the needs of the market is large. With up to 25 percent of undergraduate curricula devoted to required coursework laden with political indoctrination, it is little wonder that Vietnamese students are ill-prepared for either professional life or graduate study abroad.*” [2]

The conclusions of the Deputy Prime Minister cum the Minister of MOET of Vietnam also acknowledged the fact that the Vietnamese tertiary education quality has not been accountable to employers whereas the education sector has not involved the employers into their training programs [3]. In order to solve the quality issue a number of solutions have been suggested and taken into action. One of those is to mandate all Vietnamese tertiary educational institutions to develop and publicise learning outcomes of their training programs. However, no specific guideline of HOW to build up learning outcomes is given. Most of the institutions are puzzled with the basic template indicating the 4 general components of learning outcomes that any training programme should declare: (i) knowledge, (ii) skills, (iii) competence/capabilities, and (iv) behaviours/attitude that the

students or learners should achieve. Consequently, many do not know how to develop the detailed contents for the individual components while the others place too much emphasis on the first component following their traditional way and little attention in the rest without systematically and practically knowing why they come up with such contents (just based on their experience). In addition the basic template seems to ignore the competence or capabilities and practical of students to meet the demands of the society when they leave the institutions for work.

CDIO is an innovative education model. Initially, CDIO was developed for engineering education – “*to educate students who are able to Conceive-Design-Implement-Operate complex, value-added engineering products, processes and systems in a modern, team-based environment*” [4] [5]. This is also illustrated in the initiative’s three overall goals of educating students who are able to:

- “*Master a deeper working knowledge of technical fundamentals.*”
- “*Lead in the creation and operation of new products, processes, and systems.*”
- “*Understand the importance and strategic impact of research and technological development on society*” [4].

Essentially, it can be understood that the CDIO is an approach that bases upon the society demands (or outcome-based) to design curriculum. A CDIO-based training programme focuses on building and equipping four “blocks” of competence (or capabilities) – learning outcomes – for students at the universities: (i) technical knowledge and reasoning, (ii) personal and professional skills and attributes, (iii) interpersonal skills (teamwork & communication), and (iv) conceiving, designing, implementing, and operating systems in the enterprise and societal context [4] [5]. Although this approach has been scientifically and logically developed, its technical root has caused a strong debate among faculties and educators if the approach could be cross-applied to other disciplines such as economics and business and this debate has been continued [6]. This has also undermined the application and adaptation of the CDIO approach to other disciplines at the institution like ours.

RESEARCH SCOPE AND AIM

The CDIO approach contains a number of elements such as the goals, the vision, the CDIO syllabus or learning outcomes and student proficiency levels, the CDIO standards etc [4]. In this paper we only concern with the syllabus or learning outcomes without considering student proficiency levels. In our opinion “student proficiency levels” is a broad topic and varies depending on the type of the training programmes and the situation of current practices (e.g. socio-economic condition) in Vietnam. For instance, for the same training programme there might have different types or levels such as advanced, high-quality, standard, international or domestic ones in which each of them would require “student proficiency levels” differently. Therefore, we would leave this part out for another discussion and research.

Within the narrow-down scope this paper aims to adapt the CDIO approach’s learning outcomes template in developing learning outcomes or syllabus at the 3rd (XXX) level of detail, at the conceptual stage, for economics and business disciplines at University of Economics and Business – Vietnam National University, Hanoi.

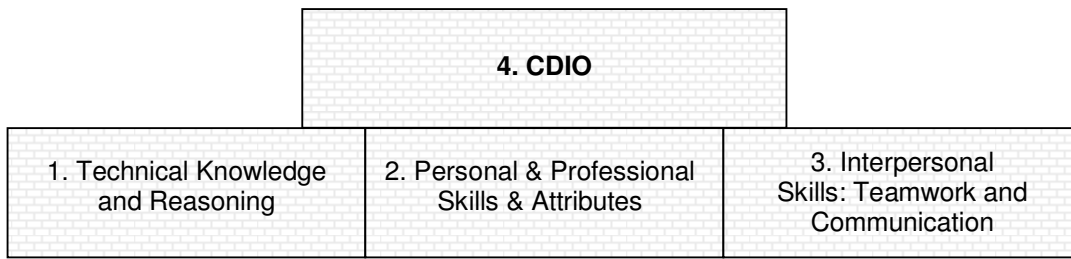
RESEARCH QUESTION

Like the CDIO approach [4] we have started with the following question in order to develop learning outcomes for economics and business disciplines at our university: “*What is the full set of knowledge, skills and attitudes that economics and business students should possess as they leave the university?*” In the other way “*What are the desired learning outcomes for*

REVIEWING THE CDIO APPROACH’S SYLLABUS TEMPLATE

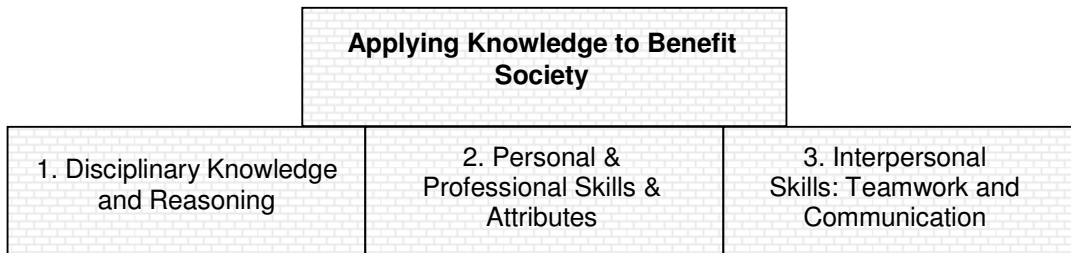
Standard 2 of the CDIO approach sets “*specific, detailed learning outcomes for personal and interpersonal skills, and product, process and system building skills, as well as disciplinary knowledge, consistent with program goals and validated by program stakeholders*” [4, p.49]. “*The CDIO syllabus is a list of knowledge, skills and attitudes rationalized against the norms of contemporary engineering practice, comprehensive of all known skills lists, and reviewed by experts in many fields*” [ibid]. In this light the CDIO-based learning outcomes consist of four expectations of competence required by stakeholders that an engineering undergraduate student should possess or achieve when he/she leaves the university – (1) technical knowledge and reasoning, (2) personal and professional skills and attributes, (3) interpersonal skills, and (4) CDIO in social and enterprise context (Figure 1). Of these, the first three blocks of competence are the foundation to create the C-D-I-O (conceive, design, implement and operate) competence for each engineer upon graduation.

Figure 1: CDIO syllabus (at the 1st level of detail) for engineering discipline [4, p.51]



The CDIO approach also states that “*The principle value of the syllabus is that it can be applied across a variety of programs and can serve as a model for all programs to derive specific learning outcomes*” [ibid]. Therefore, the syllabus was designed to be applicable to any field of engineering in particular and to other non-engineering fields in general by choosing the words (i.e. terms/norms). As the result of this, the CDIO syllabus at the first level of detail (X level) for other disciplines can be modified as below (Figure 2):

Figure 2: High-level organisation of the generalised syllabus [4, p.63]



- Block 1 would generalise from “*technical knowledge and reasoning*” to “*disciplinary knowledge and reasoning*”.
- Block 2 “*personal and professional skills and attributes*” and Block 3 “*Interpersonal skills: teamwork and communication*” will remain largely unchanged.
- Block 4 can be changed from “*CDIO in an enterprise and societal context*” to “*Applying knowledge to benefit society*” although it is difficult to generalise.

The CDIO approach's learning outcomes for engineering education are also specified at the 3rd level of detail as given in [Box 1](#) below.

Box 1: CDIO syllabus at the 3rd level of detail for engineering discipline

1 TECHNICAL KNOWLEDGE AND REASONING	3.2 COMMUNICATIONS
1.1 KNOWLEDGE OF UNDERLYING SCIENCES	3.2.1 <i>Communications Strategy</i>
1.2 CORE ENGINEERING FUNDAMENTAL KNOWLEDGE	3.2.2 <i>Communications Structure</i>
1.3 ADVANCED ENGINEERING FUNDAMENTAL KNOWLEDGE	3.2.3 <i>Written Communication</i>
	3.2.4 <i>Electronic/Multimedia Communication</i>
	3.2.5 <i>Graphical Communication</i>
	3.2.6 <i>Oral Presentation and Inter-Personal Communications</i>
2 PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES	3.3 COMMUNICATION IN FOREIGN LANGUAGES
2.1 ENGINEERING REASONING AND PROBLEM SOLVING	3.3.1 <i>English</i>
2.1.1 <i>Problem Identification and Formulation</i>	3.3.2 <i>Languages of Regional Industrial Nations</i>
2.1.2 <i>Modeling</i>	3.3.3 <i>Other languages</i>
2.1.3 <i>Estimation and Qualitative Analysis</i>	
2.1.4 <i>Analysis With Uncertainty</i>	4 CONCEIVING, DESIGNING, IMPLEMENTING, AND OPERATING SYSTEMS IN THE ENTERPRISE AND SOCIETAL CONTEXT
2.1.5 <i>Solution and Recommendation</i>	4.1 EXTERNAL AND SOCIETAL CONTEXT
2.2 EXPERIMENTATION AND KNOWLEDGE DISCOVERY	4.1.1 <i>Roles and Responsibility of Engineers</i>
2.2.1 <i>Hypothesis Formulation</i>	4.1.2 <i>The Impact of Engineering on Society</i>
2.2.2 <i>Survey of Print and Electronic Literature</i>	4.1.3 <i>Society's Regulation of Engineering</i>
2.2.3 <i>Experimental Inquiry</i>	4.1.4 <i>The Historical and Cultural Context</i>
2.2.4 <i>Hypothesis Test, and Defense</i>	4.1.5 <i>Contemporary Issues and Values</i>
2.3 SYSTEM THINKING	4.1.6 <i>Developing a Global Perspective</i>
2.3.1 <i>Thinking Holistically</i>	4.2 ENTERPRISE AND BUSINESS CONTEXT
2.3.2 <i>Emergence and Interactions in Systems</i>	4.2.1 <i>Appreciating Different Enterprise Cultures</i>
2.3.3 <i>Prioritization and Focus</i>	4.2.2 <i>Enterprise Strategy, Goals, and Planning</i>
2.3.4 <i>Trade-offs, Judgment and Balance in Resolution</i>	4.2.3 <i>Technical Entrepreneurship</i>
2.4 PERSONAL SKILLS AND ATTRIBUTES	4.2.4 <i>Working Successfully in Organizations</i>
2.4.1 <i>Initiative and Willingness to Take Risks</i>	4.3 CONCEIVING AND ENGINEERING SYSTEMS
2.4.2 <i>Perseverance and Flexibility</i>	4.3.1 <i>Setting System Goals and Requirements</i>
2.4.3 <i>Creative Thinking</i>	4.3.2 <i>Defining Function, Concept and Architecture</i>
2.4.4 <i>Critical Thinking</i>	4.3.3 <i>Modeling of System and Insuring Goals Can Be Met</i>
2.4.5 <i>Awareness of One's Personal Knowledge, Skills, and Attitudes</i>	4.3.4 <i>Development Project Management</i>
2.4.6 <i>Curiosity and Lifelong Learning</i>	4.4 DESIGNING
2.4.7 <i>Time and Resource Management</i>	4.4.1 <i>The Design Process</i>
2.5 PROFESSIONAL SKILLS AND ATTITUDES	4.4.2 <i>The Design Process Phasing and Approaches</i>
2.5.1 <i>Professional Ethics, Integrity, Responsibility, and Accountability</i>	4.4.3 <i>Utilization of Knowledge in Design</i>
2.5.2 <i>Professional Behavior</i>	4.4.4 <i>Disciplinary Design</i>
2.5.3 <i>Proactively Planning for One's Career</i>	4.4.5 <i>Multidisciplinary Design</i>
2.5.4 <i>Staying Current on World of Engineering</i>	4.4.6 <i>Multi-Objective Design (DFX)</i>
3 INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION	4.5 IMPLEMENTING
3.1 TEAMWORK	4.5.1 <i>Designing the Implementation Process</i>
3.1.1 <i>Forming Effective Teams</i>	4.5.2 <i>Hardware Manufacturing Process</i>
3.1.2 <i>Team Operation</i>	4.5.3 <i>Software Implementing Process</i>
3.1.3 <i>Team Growth and Evolution</i>	4.5.4 <i>Hardware Software Integration</i>
3.1.4 <i>Leadership</i>	4.5.5 <i>Test, Verification, Validation, and Certification</i>
3.1.5 <i>Technical Teaming</i>	4.5.6 <i>Implementation Management</i>
	4.6 OPERATING
	4.6.1 <i>Designing and Optimizing Operations</i>
	4.6.2 <i>Training and Operations</i>
	4.6.3 <i>Supporting the System Lifecycle</i>
	4.6.4 <i>System Improvement and Evolution</i>
	4.6.5 <i>Disposal and Life-End Issues</i>
	4.6.6 <i>Operations Management</i>

THE CURRENT LEARNING OUTCOMES FOR ECONOMICS AND BUSINESS DISCIPLINES AT UNIVERSITY OF ECONOMICS AND BUSINESS – VIETNAM NATIONAL UNIVERSITY, HANOI

As mentioned earlier the learning outcomes or objectives of any domestic economics and business undergraduate training programme of Vietnamese tertiary education are guided and bound by a basic template that contains 4 general components: (i) knowledge, (ii) skills, (iii) competence/capabilities, and (iv) behaviours/attitudes that the students or learners

should achieve. **Box 2** provides an example for the programme's objectives of the honourable "(international) economics for foreign affairs" bachelor programme at University of Economics and Business at Vietnam National University, Hanoi. This can be considered as the statement of the learning outcomes of the programme. It is important to note that other economics and business programmes following the same template and the same level of description of the contents/details.

Box 2: Current objectives of the honourable (international) economics-for-foreign-affairs bachelor programme – University of Economics and Business at Vietnam National University, Hanoi

The honourable (international) economics-for-foreign-affairs bachelor programme is designed to find out and train undergraduate students who are capable of this field. The programme is given priority in terms of investing good teaching and learning facilities and qualified and talented lecturers who can apply modern teaching methods which meet the standards set by the advanced and high-ranked regional universities. Specifically, the programme is designed towards the following objectives:

- *Knowledge*: the programme aims to equip students systematic and basic knowledge of economics and international economics, as well as specialised knowledge in the field that approach the modern knowledge of the region and the world. These ensure that students can develop scientific methods to adapt with the swift change of the environment. Upon graduation, (international) economics-for-foreign-affairs bachelors would be able to meet the requirements of possessing good knowledge in the field while being able to promote their creative capacity.
- *Skills*: Students should be able to analyse, synthesise and evaluate the issues of world's modern economy and international economics relations and to solve the practical matters of Vietnam's economics for foreign affairs. Students are also equipped with professional skills, practical and effective skills such as project planning, analysis and management skills; international financial analysis skills, professional trading techniques etc. Upon graduation (International) economics-for-foreign-affairs bachelors would be able to use English proficiently to work and to communicate with foreign colleagues. They are also able to utilise informatic tools to serve for their professionals.
- *Competence/Capabilities*: (International) economics-for-foreign-affairs bachelors can work at governmental organisations (e.g. ministries, sectors, departments), domestic or foreign educational and research institutions, international organisations, industrial zones, export processing zones, economic zone, domestic enterprises which have economic relations with foreign partners, joint ventures, foreign representative offices, and foreign companies in Vietnam. They would also be able to establish their own businesses or to continue their higher education.
- *Attitude*: (International) economics-for-foreign-affairs bachelors should possess political virtue and good awareness of career ethics.

According to our internal quality assurance for the (international) economics-for-foreign-affairs training programme which has been conducted in March 2009 [7], the objectives of the programme have been built on the basis of referring to comments and contributions of home and foreign experts and professors. The objectives have also addressed the requirements of knowledge, skills, and attitude in approaching to standards of regional and international universities which students should achieve. Furthermore, the objectives have been set in reflecting a partial requirement of employers for whom students work after their graduation.

However, the objectives or learning outcomes for the economics-for-foreign-affairs bachelor programme at our University in particular and for other economics and business programmes

in Vietnam in general have been stated very unspecific when compared with the learning outcomes introduced by the CDIO approach (especially at the third level of detail). Our internal quality assurance report also points out that the objectives or learning outcomes regarding “skills” mentioned above have been insufficient. More specifically, the training programme has not equipped students a full set of skills and practical experience in a real working environment in their field of study, so that they could be more confident to work at home or abroad. The report also suggests us to assess the programme’s curriculum more often and to organise regular seminars with the participation of employers and students in order to understand better and to capture new demands of the labour markets and from there to add, adjust or revise periodically the objectives of the programme to make it more relevant and suitable.

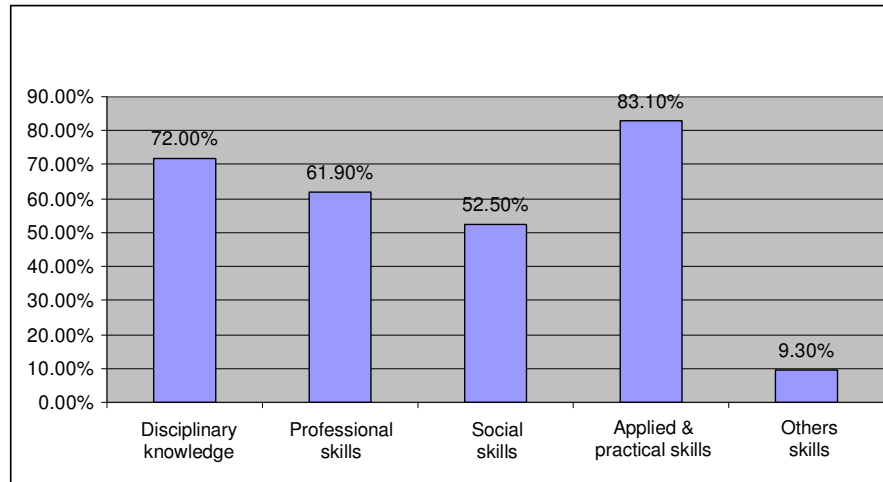


Figure 1: Survey results regarding the learning outcomes of the (international) economics-for-foreign-affairs bachelor programme at University of Economics and Business – Vietnam National University, Hanoi

In our recent survey over 120 employers and other programme’s stakeholders about their requirements for a bachelor of economics for foreign affairs [8], most of them have emphasised on the necessity and importance of which students should possess professional skills, social skills, and applied and practical skills apart from their understanding of disciplinary knowledge (Figure 1). This also demonstrates the insufficiency of our current programme’s objectives or learning outcomes. This is also a common situation for other economics and business undergraduate programmes in Vietnamese tertiary education.

ADAPTING THE CDIO APPROACH IN DEVELOPING LEARNING OUTCOMES FOR ECONOMICS-FOR-FOREIGN AFFAIRS DISCIPLINE AT UNIVERSITY OF ECONOMICS AND BUSINESS – VIETNAM NATIONAL UNIVERSITY, HANOI

In developing the learning outcomes or syllabus we form a focus group including the following programme’s stakeholders:

- Directorboard of the University (Rector and Vice Rectors).
- Dean and Vice Dean of Faculty of International Economics and Business.
- Lecturers and staffs of Faculty of International Economics and Business to which the (international) economics-for-foreign-affairs bachelor programme belongs.
- Representatives from Training Department of the University.
- Professors in the same discipline from other leading home universities and research institutes.
- Representatives from employers (companies and organisations mentioned in Box 2).

- Representatives from alumni and current students.
- Management team of the (international) economics-for-foreign-affairs programme.
- A representative of Vietnamese education quality expert.

The focus group bases largely on the CDIO approach's syllabus to develop the learning outcomes for the (international) economics-for-foreign-affairs discipline [4]. Apart from that the group also refers to a number of below sources for the employment requirements both inside and outside the country:

- Viewpoint about the quality of tertiary education products [9].
- Model for quality requirements for undergraduate students [10].
- Top 10 soft skills for effective living, learning and working [11].
- Employability skills - an employer perspective getting what employers want out of the too hard basket [12].
- Employability skills for the future [13].
- Generic skills of undergraduate students required by Singaporean government [14].
- Employee appraisal form of PVN (Vietnam Petroleum Corporation) [15].
- Employee appraisal form of Emerson Network Power (American firm in Vietnam) [16].
- Employee appraisal form of Eximbank Vietnam (Export-Import Bank of Vietnam) [17].
- Employee appraisal form of Canon Vietnam (Japanese firm in Vietnam) [18].

The central question that the group concentrates on is *“What is the full set of knowledge, skills and attitude that economics-for-foreign-affairs students should possess as they leave the university?”*

The first level of detail (X-level):

At the first level of detail the focus group gets consensus by agreeing the terms used in [Figure 2](#) to apply for the learning outcomes of the (international) economics-for-foreign-affairs bachelor programme.

This highest level of the learning outcomes differs with the existing learning outcomes of the (international) economics-for-foreign-affairs bachelor programme at the following points:

- Not only focusing on the professional skills and attributes but also clarifying the role of personal skills and attributes.
- Clarifying and emphasising on interpersonal skills.
- Emphasising on practice through training and demanding undergraduate students to be able to apply knowledge to benefit the society.

The second level of detail (XX-level):

For “disciplinary knowledge and reasoning” block (**block 1**): our internal quality assurance report [7] points out the balance and relevance of the 5-knowledge-block structure – (1) *General knowledge*, (2) *Math and natural sciences*, (3) *Basic knowledge*, (4) *Disciplinary fundamental knowledge*, and (5) *Disciplinary specialised knowledge*. Therefore, the focus group agrees to use this result to develop/build the learning outcomes at the second level of detail for “disciplinary knowledge and reasoning” block.

For “personal and professional skills and attributes” block (**block 2**): since several terms are used for engineering education, the focus group modifies them when applying for the (international) economics-for-foreign-affairs undergraduate programme:

- *Section 2.1*: “engineering reasoning and problem solving” is changed to “economics or business reasoning and problem solving”.
- *Section 2.2*: For engineering discipline, knowledge discovery is largely based on experimentation. However, it is mainly based on (scientific) research for economics and business disciplines. Therefore, the focus group agrees to change from “experimentation and knowledge discovery” to “research and knowledge discovery”.
- *Section 2.3*: both economics or business and engineering students would need systematic thinking. The focus group agrees to remain this term.
- *Section 2.4* and *Section 2.5*: these can be also applied to economics and business disciplines. Therefore, the focus group agrees to remain these terms.

For “interpersonal skills” block (**block 3**): all three main contents of this block – *teamwork*, *communication*, and *communication in foreign languages* – can be applied to the economics or business disciplines without any change. In fact, our programme also pays a great attention in developing English proficiency for students.

For “applying knowledge to benefit society” block (**block 4**): as the specific objectives of engineering and economics or business differ (products that an engineer creates are usually tangible such as a computer while it is a business or economics plan or project for economics/business students), the terms should be specified when applying for the economics-for-foreign-affairs programme. For instance, for a tangible product like computer, the term “CDIO” is relevant along its life cycle. However, for an economics or a business plan or project, the “O” in “Operate” should be changed to “Evaluate”. There is a common aspect between engineering and economics or business disciplines that “applying knowledge to benefit society” need to be placed in external, societal, enterprise and business context.

Box 3 synthesises the contents of the learning outcomes for the (international) economics-for-foreign-affairs at the second level of detail (XX-level).

Box 3: Learning outcomes at the 2nd level of detail for the honourable (international) economics for foreign affairs undergraduate programme

<p>1- DISCIPLINARY KNOWLEDGE AND REASONING</p> <p>1.1 GENERAL KNOWLEDGE 1.2 MATH AND NATURAL SCIENCES 1.3 BASIC KNOWLEDGE 1.4 DISCIPLINARY FUNDAMENTAL KNOWLEDGE 1.5 DISCIPLINARY SPECIALISED KNOWLEDGE</p> <p>2- PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES</p> <p>2.1 ECONOMICS OR BUSINESS REASONING AND PROBLEM SOLVING 2.2 RESEARCH AND KNOWLEDGE DISCOVERY 2.3 SYSTEMATIC THINKING 2.4 PERSONAL SKILLS AND ATTRIBUTES 2.5 PROFESSIONAL SKILLS AND ATTRIBUTES</p>	<p>3- INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION</p> <p>3.1 TEAMWORK 3.2 COMMUNICATION 3.3 COMMUNICATION IN FOREIGN LANGUAGES</p> <p>4- APPLYING KNOWLEDGE TO BENEFIT SOCIETY</p> <p>4.1 EXTERNAL AND SOCIETAL CONTEXT 4.2 ENTERPRISE AND BUSINESS CONTEXT 4.3 CONCEIVING ECONOMICS / BUSINESS IDEAS 4.4 DESIGNING ECONOMICS / BUSINESS PLAN / PROJECT 4.5 IMPLEMENT ECONOMICS / BUSINESS PLAN / PROJECT 4.6 EVALUATE ECONOMICS / BUSINESS PLAN / PROJECT</p>
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The third level of detail (XXX-level):

At this level of detail block 1 “disciplinary knowledge and reasoning” are not specified further and, therefore, remain unchanged as the second level of detail. Otherwise, it would become the curriculum of the (international) economics-for-foreign-affairs programme (with specific subjects).

At the block 2, 3 and 4 the focus group checks item-by-item and agrees the following:

Box 4: Learning outcomes at the 3rd level of detail for the honourable (international) economics for foreign affairs undergraduate programme

<p>1- DISCIPLINARY KNOWLEDGE AND REASONING</p> <p>1.1 GENERAL KNOWLEDGE 1.2 MATH AND NATURAL SCIENCES 1.3 BASIC KNOWLEDGE 1.4 DISCIPLINARY FUNDAMENTAL KNOWLEDGE 1.5 DISCIPLINARY SPECIALISED KNOWLEDGE</p> <p>2- PERSONAL & PROFESSIONAL SKILLS & ATTRIBUTES</p> <p>2.1 ECONOMICS OR BUSINESS REASONING & PROBLEM SOLVING</p> <p>2.1.1 <i>Problem Identification and Formulation</i> 2.1.2 <i>Modeling</i> 2.1.3 <i>Estimation and Qualitative Analysis</i> 2.1.4 <i>Analysis With Uncertainty</i> 2.1.5 <i>Problem analysis using math knowledge (quantitative)</i> 2.1.6 <i>Problem solving</i> 2.1.7 <i>Solution and Recommendation</i></p> <p>2.2 RESEARCH AND KNOWLEDGE DISCOVERY</p> <p>2.2.1 <i>Hypothesis Formulation</i> 2.2.2 <i>Survey of Print and Electronic Literature</i> 2.2.3 <i>Experimental Inquiry</i> 2.2.4 <i>Hypothesis Test, and Defense</i> 2.2.5 <i>Application of research in practice</i> 2.2.6 <i>Information collection, analysis and handling skills</i></p> <p>2.3 SYSTEMATIC THINKING</p> <p>2.3.1 <i>Thinking Holistically</i> 2.3.2 <i>Emergence and Interactions in Systems</i> 2.3.3 <i>Prioritization and Focus</i> 2.3.4 <i>Trade-offs, Judgment and Balance in Resolution</i> 2.3.5 <i>Multi-perspective analysis / reasoning</i></p> <p>2.4 PERSONAL SKILLS AND ATTRIBUTES</p> <p>2.4.1 <i>Initiative and Willingness to Take Risks</i> 2.4.2 <i>Perserverant / Patient</i> 2.4.3 <i>Flexible</i> 2.4.4 <i>Self-confident</i> 2.4.5 <i>Diligent / hard working</i> 2.4.6 <i>Enthusiasm and passion for career</i> 2.4.7 <i>Creative Thinking</i> 2.4.8 <i>Critical Thinking</i> 2.4.9 <i>Awareness of One's Personal Knowledge, Skills, and Attitudes</i> 2.4.10 <i>Curiosity and Lifelong Learning</i> 2.4.11 <i>Time and Resource Management</i> 2.4.12 <i>Adaptability to complicated real situations</i> 2.4.13 <i>Cross-cultural savvy</i> 2.4.14 <i>Self-esteem</i> 2.4.15 <i>Learning and self-learning skills</i> 2.4.16 <i>Self-management skills</i> 2.4.17 <i>Computer skills</i></p> <p>2.5 PROFESSIONAL SKILLS AND ATTRIBUTES</p> <p>2.5.1 <i>Professional Ethics, Integrity, Responsibility, and Accountability</i> 2.5.2 <i>Professional Behavior</i> 2.5.3 <i>Proactively Planning for One's Career</i> 2.5.4 <i>Task organisation and arrangement skills</i> 2.5.5 <i>Awareness & catch up with modern world's economy</i> 2.5.6 <i>Ability to work independently</i> 2.5.7 <i>Self-confidence in international working environment</i> 2.5.8 <i>Ability to set objectives</i> 2.5.9 <i>Ability to self-motivate at work</i> 2.5.10 <i>Ability to develop and promote personal & career</i> 2.5.11 <i>Customer and partner care skills</i></p>	<p>3- INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION</p> <p>3.1 TEAMWORK</p> <p>3.1.1 <i>Forming Effective Teams</i> 3.1.2 <i>Team Operation</i> 3.1.3 <i>Team Growth and Evolution</i> 3.1.4 <i>Leadership</i> 3.1.5 <i>Ability to work with different teams</i></p> <p>3.2 COMMUNICATION</p> <p>3.2.1 <i>Communications Strategy</i> 3.2.2 <i>Communications Structure (argument, idea arrangement...)</i> 3.2.3 <i>Written Communication</i> 3.2.4 <i>Electronic/Multimedia Communications</i> 3.2.5 <i>Presentation</i> 3.2.6 <i>Oral Inter-Personal Communications</i></p> <p>3.3 COMMUNICATION IN FOREIGN LANGUAGES</p> <p>3.3.1 <i>English – listening and speaking</i> 3.3.2 <i>English – reading and writing</i> 3.3.3 <i>Other languages</i></p> <p>4- APPLYING KNOWLEDGE TO BENEFIT SOCIETY</p> <p>4.1 EXTERNAL AND SOCIETAL CONTEXT</p> <p>4.1.1 <i>Roles and responsibility of bachelors</i> 4.1.2 <i>The Impact of economics/business on Society</i> 4.1.3 <i>Society's Regulation of economics/business</i> 4.1.4 <i>The Historical and Cultural Context</i> 4.1.5 <i>Contemporary Issues and Values</i> 4.1.6 <i>Developing a Global Perspective</i></p> <p>4.2 ENTERPRISE AND BUSINESS CONTEXT</p> <p>4.2.1 <i>Appreciating Different Enterprise Cultures</i> 4.2.2 <i>Enterprise Strategy, Goals, and Planning</i> 4.2.3 <i>Entrepreneurship and relationship between enterprises and economics for foreign affairs issues</i> 4.2.4 <i>Working Successfully in Organizations</i></p> <p>4.3 CONCEIVING ECONOMICS / BUSINESS IDEAS</p> <p>4.3.1 <i>Set up economics/business objectives (based on the market need and societal context)</i> 4.3.2 <i>Basic definitions, concepts, theories as foundation</i> 4.3.3 <i>Modeling of ideas and insuring goals can be met</i> 4.3.4 <i>Development Project Management (risks, feasibility, costs, resources...)</i></p> <p>4.4 DESIGNING ECONOMICS / BUSINESS PLAN / PROJECT</p> <p>4.4.1 <i>Plan/project designing process (implementing conditions...)</i> 4.4.2 <i>Plan's or project's approach (approach methods, steps...)</i> 4.4.3 <i>Utilisation of knowledge in designing plan/project</i> 4.4.4 <i>Disciplinary plan/project design (tools, methods and relevant process...)</i> 4.4.5 <i>Multi-disciplinary plan/project design (relationships among tools, methods and processes...)</i> 4.4.6 <i>Multi-objective plan/project design (designing implementation plan, testing, environmental factors, reliability ...)</i></p> <p>4.5 IMPLEMENTING ECONOMICS / BUSINESS PLAN / PROJECT</p> <p>4.5.1 <i>Training/coaching to implementing plan/project</i> 4.5.2 <i>Selecting resources for implementing plan/project</i> 4.5.3 <i>Organising the implementation of plan/project</i></p> <p>4.6 EVALUATE ECONOMICS / BUSINESS PLAN / PROJECT</p> <p>4.6.1 <i>Designing standards/criteria to evaluate performance / outcomes</i> 4.6.2 <i>Evaluating performance/outcomes (economic - social – environmental...)</i> 4.6.3 <i>Adjusting/upgrading plan/project</i> 4.6.4 <i>Creating new plans/projects</i></p>
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- Remaining sub-sections 2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.4.6, 2.4.7, 2.5.1, 2.5.2, 2.5.3, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.6, 3.3.1, 3.3.3, 4.1.4, 4.1.5, 4.1.6, 4.2.1, 4.2.2, 4.2.4, 4.3.4, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6 of the engineering syllabus in [Box 1](#) and applying to the (international) economics-for-foreign-affairs programme ([Box 4](#)).
- Changing the terms of the sub-sections 2.5.4, 4.1.1, 4.1.2, 4.1.3, 4.2.3, 4.3.1, 4.3.2, and 4.3.3 in [Box 1](#) when applying to the (international) economics-for-foreign-affairs programme ([Box 4](#)).
- Removing sub-sections 3.1.5, 3.2.5, 3.3.2, 4.5.1, 4.5.2, 4.5.3, 4.5.4, 4.5.5, 4.5.6, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.5, and 4.6.6 in [Box 1](#) because they are only suitable for engineering education but not for the (international) economics-for-foreign-affairs programme.
- Adding in the contents that are relevant for the economics and business disciplines which are synthesised from the other sources mentioned earlier. These new sub-sections are 2.1.5, 2.1.6, 2.2.5, 2.2.6, 2.3.5, 2.4.3, 2.4.4, 2.4.5, 2.4.6, 2.4.12, 2.4.13, 2.4.14, 2.4.15, 2.4.16, 2.4.17, 2.5.6, 2.5.7, 2.5.8, 2.5.9, 2.5.10, 2.5.11, 3.1.5, 3.2.5, 3.3.2, 4.5.1, 4.5.2, 4.5.3, 4.6.1, 4.6.2, 4.6.3 và 4.6.4 given in [Box 4](#).

[Box 4](#) (above) synthesises the contents of the learning outcomes for the (international) economics-for-foreign-affairs at the third level of detail (XXX-level).

FUTURE WORKS

The syllabus with the codified learning outcomes for the (international) economics-for-foreign-affairs bachelor programme is developed at the conceptual level. In order to validate this conceptual framework we plan the following future works following the CDIO approach:

- Conducting a wide survey over the stakeholders of the programme: employers, lecturers from University of Economics and Business – Vietnam National University, Hanoi and from other universities, the University's management team and staff, current students, alumni, and experts in the field of economics for foreign affairs. Feedbacks from the stakeholders will be taken into careful consideration and used to revise the conceptual framework of the syllabus with the approval by the University's and the programme's lecturers.
- Organising seminars on the revised conceptual framework with the participation of the representatives of each group of the programme's stakeholders. The seminars' outcomes will help us to make further revisions (if any) to the syllabus and, thereafter, complete the final syllabus with codified learning outcomes of the programme.

DISCUSSIONS AND CONCLUSIONS

In extending the result of this paper two important aspects are further discussed: (1) possible adoption of the (international) economics-for-foreign-affairs programme's CDIO-based syllabus for other economics and business disciplines and (2) the importance of the CDIO approach for enhancing the quality of Vietnamese tertiary education.

In our opinion the developed conceptual framework/syllabus can be reasonably used for other economics and business disciplines. When developing the syllabus we has taken into consideration the fact that students who graduate from our programme have a wide range of choices for their future career as they can work for both business and economics environments (as mentioned in [Box 2](#)). The learning outcomes for both economics and business are, therefore, generalised and integrated into the syllabus. However, there might be an argument about the differences of the learning outcomes among those economics and

business disciplines or among sub- or minor-disciplines within economics and business domains.

In fact the differences mainly exist in the block 1 (disciplinary knowledge and reasoning) and block 4 (applying knowledge to benefit society) while block 2 (personal and professional skills and attributes) and block 3 (interpersonal skills) are largely transferable among various disciplines. For instance, the knowledge required for economics-for-foreign-affairs and business disciplines are different. In addition, although both economics and business students adopt the same approach or method in applying knowledge to benefit society (i.e. the cycle of conceiving-designing-implementing-evaluating business plan/project), the context and objectives are also quite different. When adopting or adapting the framework, business or economics programmes should take these into account.

In regard to the quality issue of Vietnamese tertiary education system it should not be a single solution but a number of solutions. One of those, as mentioned before, is to mandate all Vietnamese tertiary educational institutions to develop and publicise learning outcomes of their training programs. In order to facilitate this solution the CDIO approach provides a general template of syllabus with codified expected learning outcomes in a very specific and systematic way which each training programme might refer to and follow to develop its own syllabus and integrated learning outcomes. Our practice (i.e. the development of the (international) economics-for-foreign-affairs programme's CDIO-based syllabus) illustrates the usefulness and adaptability of the CDIO approach in this matter, as well as provides either a useful case or a general template of the outcome-based syllabus for other economics and business disciplines.

KEYWORDS

CDIO Approach, Learning Outcomes, Education Quality, University of Economics and Business (UEB), Vietnam National University – Hanoi (VNU), Higher/Tertiary Education.

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