

## ARTICLES ORIGINAUX ORIGINAL ARTICLES

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### Making Curricula Competence-oriented at Vietnamese Universities

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**Keywords:** Education- Skills- Attitude- Lecturers- Curricula- Vietnam

#### Summary

*Many academic curricula suffer from a teacher-centred focus on knowledge transfer and do not consider the societal needs for competences. This paper reflects on the transformation from theory-centred towards competency-oriented curricula at three Vietnamese Agriculture Universities with support of a Netherlands-funded project. Experts guided the implementation, from analysis of labour market to evaluation of new courses. Based on students' evaluation and lecturers' experiences, both types of respondents reported that after having been exposed to a series of trainings and hands-on experience in and outside classrooms, they gained new sets of knowledge and skills. However, some issues emerged in the process. Among these are the lack of competence among lecturers to design curricula based on outcomes, particularly addressing competence of students' knowledge, skills and attitudes; lack of staff to develop and implement a competence-based curricula; non- aggregation of closely related courses in modules that avoid repetitions and provide time for training of skills and attitudes. There is also a need to train students for competency in performing more complex learning outcomes, such as critical thinking. For this change to happen, lecturers need continuous training in didactics for active teaching, and universities need to provide means for participative learning.*

#### Résumé

#### Orienter des programmes universitaires sur base de la demande des compétences dans les Universités Vietnamiennes

*Beaucoup de programmes universitaires sont orientés vers un enseignement des connaissances cognitives négligeant les besoins réels de la société. Cet article reflète la réforme des programmes académiques dans trois universités d'Agronomie au Vietnam. Ces réformes visaient de baser l'apprentissage des compétences en matière de cognition, aptitude et attitude par rapport à la demande de ces compétences par la société. Un projet appuyé par les Pays Bas a été initié où des experts ont mis en œuvre cette réforme à partir de l'analyse du marché de travail jusqu'à l'évaluation des nouveaux cours. Après le projet, l'évaluation des nouveaux programmes par les étudiants et par les professeurs a confirmé qu'ils avaient acquis de nouvelles compétences. Néanmoins, quelques contraintes ont été signalées. L'étude confirme l'insuffisance de capacités des professeurs à définir des programmes de cours et des modules basés sur les objectifs de formation des compétences. Cela ne permet pas un apprentissage actif des trois compétences. Il a ensuite été révélé que les institutions ne facilitaient pas la définition des programmes organisés en modules thématiques ce qui n'arrange pas l'apprentissage de ces trois compétences, et entraîne des répétitions. De plus, il y a un besoin d'enseigner aux étudiants des compétences plus complexes telle que l'analyse critique. Dans ce but, les professeurs doivent suivre des formations continues en didactique de l'enseignement actif et les universités doivent fournir les moyens nécessaires pour un apprentissage participatif.*

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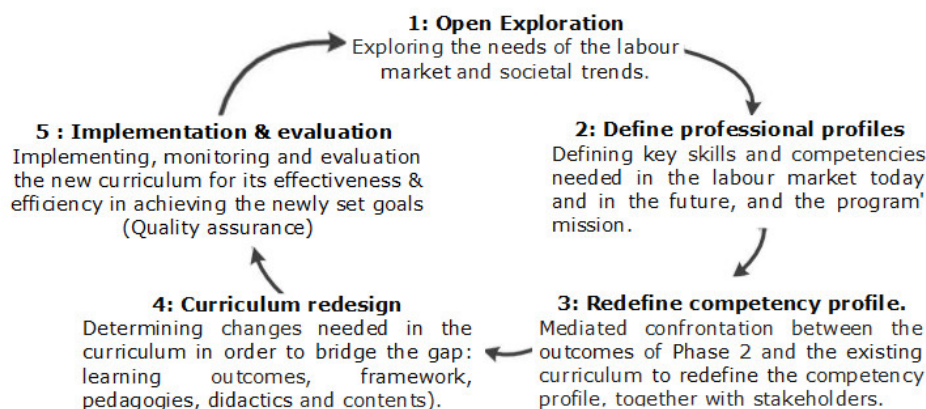
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## Introduction

According to recent reports both from donors and governments, most curricula of Universities in SE Asia suffer from a teacher-centred focus of knowledge transfer and do not consider the needs of the world of work (WoW) for knowledge, skills and attitude. We give some examples: rarely Bachelor or Master include an internship that would familiarise the students with their future employment; most lecturers read mainly their notes and include no skills training in their pedagogy. For example, physiology students merely copy pictures but cannot use a microscope; students do not work on group assignments. Both program and pedagogy are failing with regard to teaching other than cognitive competences. Consequently, (i) the universities deliver graduates who can repeat learned knowledge only, but hardly have other competences relevant for their future employers (6; 2), and (ii) the rate of underemployed young graduates is higher than that of non-graduates (7). The problem of mismatch between higher education outcomes and societal needs for skills and attitude is not restricted to Asia. A recent study on European graduate programs for aquaculture concluded, among others, that the fast changes in IT create new skills demands and recommend to focus on learning both generic and job-specific skills (4). These and other studies related to higher education mention that students need to acquire more generic skills, such as writing and presenting reports in English, working in teams, information processing and higher order thinking. To overcome the mismatch, large private companies hire groups of potential undergraduates, provide on-the-job trainings and employ the outstanding candidates, thus leaving behind the graduate students unemployed. However, smaller companies and public organisations can't do so, and thus are hampered in their development through an increasing gap in competences.

By 'competence', we refer to the integrated use of head (knowledge), heart (attitudes) and hands (psychomotor skills) in professional settings (both in routine and in critical job situations). These three: knowledge, skills and attitude are categories to guide and verify the learning goals, and are used in program qualification frameworks and descriptions of curricula and courses (modules). Instead of these classical competency categories, some qualification frameworks use mixed categories: Knowledge and Skills, Application and Competencies, and Responsibility, which we will discuss later. From 2012 to 2016, the Netherlands Initiative for Capacity development in Higher Education (NICHE) supported several Vietnamese universities to make their curricula more competence-based. NICHE supported projects to align curricula with demands for competences from the labour market for the graduates. The NICHE projects mostly have four components: strengthen institutions, train human resources, reform curricula and invest in equipment. All have a transversal gender component, and some included activities to link research to education and development, and to stimulate business incubation. In this paper we focus on the curriculum redesign framework of two Vietnamese NICHE projects (ACCCU<sup>1</sup> and POHE<sup>2</sup>), the results of ACCCU's first student evaluations and the challenges identified at the closing workshop of ACCCU. ACCCU supported three agricultural universities in North Vietnam, and POHE focused on horticulture in its first phase and broadened scope to training of lecturers at universities throughout Vietnam. Both projects did build on the theoretical framework of curriculum development designed, among others, by Wals *et al.* (8).



[Adapted from Wals *et al.* (8)].

**Figure 1:** The five-step curriculum development cycle used by POHE and ACCCU.

To redesign curricula, this framework proposes a cycle with five steps:

- (1) Explore societal trends and needs of the labour market;
- (2) Establish key skills and competences needed in the labour market today and in the future;
- (3) Mediate between the outcomes of step 2 and the existing curriculum;
- (4) Determine changes needed in the curriculum in order to bridge the gap (learning outcomes, pedagogy, didactics and contents);
- (5) Implement the new curriculum, and monitor and evaluate its effectiveness & efficiency in achieving the newly set goals. This framework was also implemented by the POHE project (Figure 1).

The latter and the projects supporting education in agriculture and forestry funded by the Swiss cooperation ([www.helvetas.ch/Vietnam](http://www.helvetas.ch/Vietnam)) compiled several guidelines in both Vietnamese and English languages. These guidelines supported the training of lecturers in designing competence-based curricula and modules.

### The process of developing competence-oriented curricula

ACCCU supported the process of developing competence-based curricula through the following project activities:

- 1/ Train faculty members in key principles of competence-based education, participatory curriculum development and its didactical implications, and prepare a market assessment.
- 2/ Meet the WoW to assess the potential labour market, the key-job profiles (required competences), and the changes (key-trends) in science and society that may affect the teaching practice.
- 3/ Conduct workshop(s) to convert the key competences of the job profiles in the mission of the education program and its overall learning outcomes, and in an overall curriculum with specialisations. Thereafter, the curricula with modules can be defined based on the job profiles and general societal competences required by the society.
- 4/ Conduct workshop(s) to describe the learning goals, assessment methods and learning activities of the various modules, and cross-check if all expected competence outcomes will be reached.
- 5/ Provide feedback on e.g. the insertion of gender in the new or redesigned courses;

- 6/ Provide training of trainers for student-centred teaching activities.
  - 7/ Support the evaluation and organise curriculum network meeting among the partners to learn from the evaluations.
- Hereafter we review the integration of these activities in the five-step approach.

### **Step 1: The market demand**

Competence profiles were defined through a labor market review and thereafter aggregated to match an education program with specialisations. The profiles described the roles, tasks and responsibilities of the various professions (jobs) that have employees in the specific market sector aimed for by the education institute, while giving the key knowledge areas, attitudes and skills needed for successful performance in both routine and critical job situations. The routine competences can usually be trained in simulated conditions, while the critical ones are only developed through experience and feedback in real-life situations. For example, a competent stewardess in an airplane is not only capable of routine job, such as giving safety instructions and serving food; but is also capable of handling unexpected or stressful critical situations, such as dealing with an obnoxious passenger or with a medical crisis (8).

ACCCU grounded the competence-oriented curriculum into the needs of society by capturing the different views and interests of a broad range of stakeholders during labour market assessments. These stakeholders were local, regional and national government officials, and future employers, such as schools, vocational education institutions, local development agencies and small-and-medium private enterprises in rural communities within the food and land-use chains. Also former students and staff of the three universities were involved. Individual employers were identified through the graduate's network, employer's associations, professional associations, government bodies, research organizations and public institutions. Given the project's objectives, ACCCU assessed the sectors for three existing curricula: agriculture, aquaculture and horticulture, and two new: environmental management and land management.

The assessments of these sectors aimed at (i) defining the labour market profiles, i.e. what different types of jobs the graduates are likely to pursue and what competences are needed for these different jobs; (ii) describing the changes and their drivers in the sector that influences the graduate's competence needs. At the first workshop, the faculty leaders and staff involved in the process listed the persons to be contacted, the questions to be asked and the way of documenting the review. The workshop included a training on the focused group discussions and on the personal interviews to be used for the market assessment. Thereafter these key stakeholders of the WoW were interviewed to discuss key changes in science and society that affect the teaching practice; describe the potential labour market and key-trends; and list the key-jobs and related key competences of themselves and their staff.

Labour market reviews can be elaborate and costly as implemented by POHE at first, and also concise and embedded. ACCCU chose for the latter because of the complaints from the Vietnamese partners about the first. Well-designed on-line surveys among graduates; interviews with some representative employers; and focused group discussions with employers, government and professional organization provided sufficient information for designing a new curriculum. The outputs of the market assessment were the present and future job profiles of which an example is given in Table 1.

### **Step 2: Targeted professional profiles**

ACCCU reviewed the outcomes of Step 1, i.e. graduate competence profiles in workshops with staff members and key administrators for each of the faculties. First the closely related competence profiles were aggregated to make the basis of the curriculum concise, and then used to formulate learning outcomes and if still required a mission statement for each of the curriculum. In particular, ACCCU considered the needs related to Climate Change Adaptation (Table 2), gender inclusion and sustainable rural development in the learning outcomes because of the present societal context (Table 2).

**Table 1**

An example of the knowledge, skills and attitude required for a BSc Environmental Science according to employers from one of the sector assessments.

Knowledge	<ul style="list-style-type: none"> <li>- Multiple disciplinary aspects of environmental management</li> <li>- ISO, and environmental laws, regulations and policies</li> <li>- Fundamental and practical understanding about waste water treatment technologies, solid waste management and treatment, environmental quality analysis and monitoring, land-use and land management, pollution control, social issues in environmental protection and land management</li> </ul>
Skills	<ul style="list-style-type: none"> <li>- Collecting and analysing environmental data, using modern machines and equipment</li> <li>- Specialized computer skills (GIS, remote sensing, Photoshop, Arcgis, Arcview)</li> <li>- Environmental analysis and management</li> <li>- Environmental consultancy and counselling</li> <li>- Environmental project launching and management</li> <li>- Communication in local and foreign languages while considering the cultural settings of Vietnam, the region and the globe</li> </ul>
Attitude	<ul style="list-style-type: none"> <li>- Enthusiastic and passionate with the job, and having good manners and correct office behaviour</li> <li>- Be creative, have good work ethics, and able to work hard</li> <li>- Have the ability to gather people.</li> </ul>

**Table 2**

Selected courses at VNUA in which Climate Change (CC) issues were integrated.

Module	Some typical CC integrated content
1. Basic Ecology	<ul style="list-style-type: none"> <li>The distribution of ecosystem in conditions of CC and biodiversity</li> <li>The impact of climate CC on the material circulation</li> </ul>
2. Modeling for environmental management	Modeling climate change, greenhouse effect and global warming
3. Principle of meteorology	<ul style="list-style-type: none"> <li>The phenomenon of CC: causes, manifestations and effects</li> <li>The impact of CC on water cycles</li> <li>The impact of CC on the thermal regime of the soil and air</li> <li>Meteorological disasters in Vietnam</li> </ul>
4. Aquatic Ecology	<ul style="list-style-type: none"> <li>The impact of CC on ecological factors of aquatic ecosystems</li> <li>The impact of CC on species group in aquatic ecosystems</li> <li>The impact of CC on the sustainability of aquatic ecosystems</li> <li>The impact of CC on farming activities aquaculture</li> </ul>
5. Aquatic Pathology	Fish Diseases occur when CC affects salinity or parasitology
6. Water quality management in Aquaculture	<ul style="list-style-type: none"> <li>Water quality when climate changes</li> <li>Changing Aquaculture season in flooding</li> </ul>
7. Specialized vegetable crops	The impact of CC on vegetables production and management
8. Flower and ornamentals production	<ul style="list-style-type: none"> <li>The impact of CC on production and adaptation of flowers</li> <li>Characterization of resistant varieties of flowers and plants</li> </ul>
9. Landscape plants production and maintenance	Negative impacts of ecological factors on landscape plants and solutions



The proposed curriculum learning outcomes were reviewed by experts from the ACCCU project. Thus, the professional competence profiles made up the core of competence-oriented curricula which were used to define the learning outcomes of the graduates needed by the labour market.

### Step 3: Curriculum design

Then, a curriculum with courses was designed or redesigned, considering also specific learning outcomes related to knowledge, skills and attitude. These specific learning goals were attributed to specific courses. The coverage of all expected competences was cross-checked in a spreadsheet. Then the lay-out of the curricula was reviewed during a workshop with experts from Wageningen UR.

The ACCCU partners chose not to modify all courses for the existing curricula, but to insert the learning of skills and attitude, and aspects on gender and climate change in some courses only. In particular, non-disciplinary courses, such as English were not modified. In some cases, stakeholders' workshops were held to reflect on the proposed curricula and their learning goals.

### Step 4: Module design

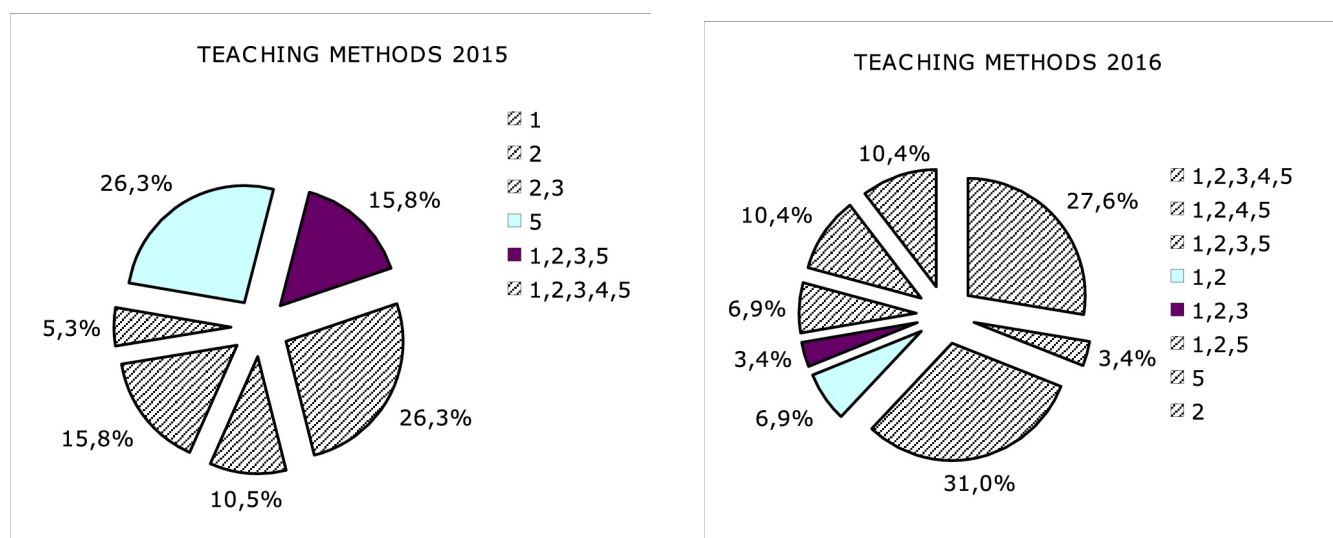
After the curriculum was set, the lecturers started to (re)design the courses/modules. Developing the courses included decisions on which didactical principles were needed to be used to reach these competences (Wals *et al.* 2004). Features, such as interdisciplinary integration were also addressed. Individually and in workshops, the lecturers developed the courses/modules in seven steps. They:

- (i) defined the contribution of the course to the curriculum learning goals and the preconditions, (what students need to know before starting this course) and making these fit into the curriculum;
- (ii) formulated clear learning outcomes referring to one of the six cognitive levels, to a skill or to an attitude;
- (iii) formulated the strategy (procedure & criteria) to assess students' performance on the learning outcomes;

- (iv) identified learning and teaching strategies (i.e. students' activities) and aligning these with outcomes and assessment;
- (v) defined the equipment needed and other practical points such as the course coordinator;
- (vi) established the course content (syllabus) that enables students to attain the learning outcomes;
- (vii) wrote the exhaustive course description for approval by authorities. In Vietnam, the student guide includes profile, learning outcomes, learning and teaching methods, assessment strategy, content outline and time schedule. The results of steps i to v were reviewed and discussed in workshops, together with disciplinary experts from Wageningen UR. For the curricula on aquaculture and horticulture, discussions concerning two universities were done collectively.

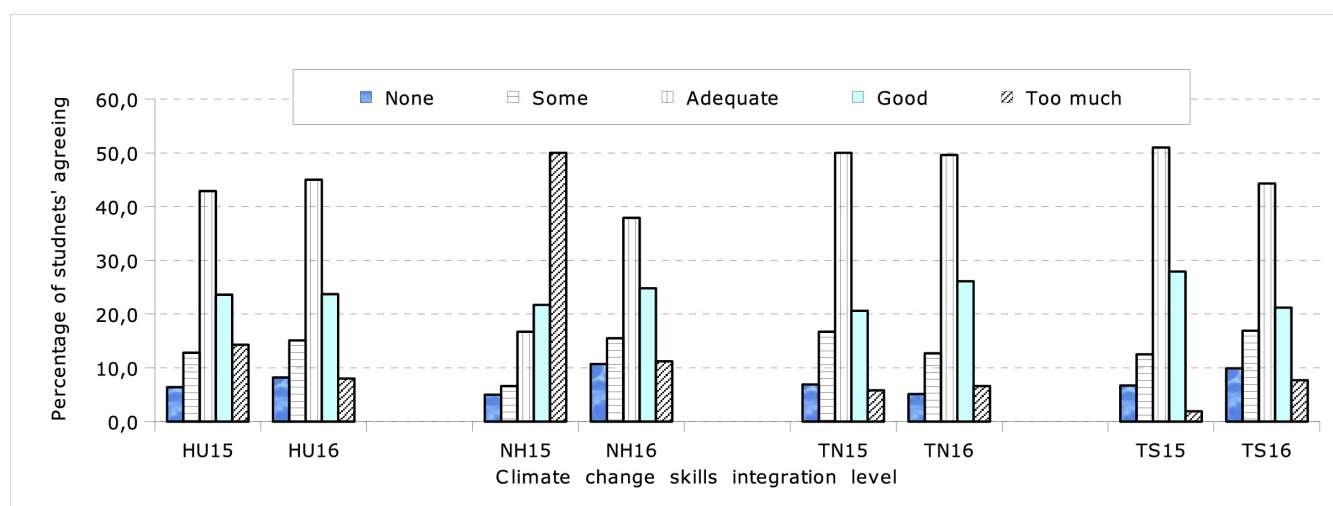
The duration of these workshops depended on the complexity of the courses, the teachers' knowledge and experience in designing competence-based courses and the agreement on the descriptions and the distribution of tasks. The workshops were guided by an experienced lecturer. In particular, the design of the course aiming at learning skills and attitude next to knowledge required new skills for most lecturers of the modules. ACCCU assumed that the training of such skills was covered by POHE, but the students' evaluations (see next section) demonstrated that complementary training was required for the design of active teaching/learning activities.

The learning outcomes of the various courses were cross-checked with the list of all expected competence outcomes in order to make sure that all would be reached. The issues on gender and CC were integrated in selected courses. All courses were reviewed to determine the necessity of including gender aspects; after the lecturers had reformed the course content, this was reviewed by a gender expert provided by the project. CC issues were integrated in three modules for each of the three curricula at VNUA for example (Table 2).



(1= power-point presentation; 2= seminar/group discussion; 3= practical; 4= field trip; 5= self-learning); the combinations of numbers represent methods used in one course).

**Figure 2:** Methods used in instructions of the climate change-integrated courses according to HUAF's lecturers involved in 2015 and 2016.



**Figure 3:** The level of integration of training on Climate Change-related skills according to the students of three curricula in two subsequent years (2015 and 2016): aggregated for the three (HU15 and HU16) and separated for the faculties of Agronomy (NH15 and NH16), Land Resources and Agricultural Environment (TN15 and TN16) and Aquaculture (TS15 and TS16).

### Step 5: Evaluation

To evaluate the quality of the new courses, ACCCU collected feedback from the students and lecturers through surveys in 2015 and 2016. At Hue University of Agriculture and Forestry (HUAF) 266 and 1072, at Hong Duc University (HDU) 38 and 40, and at Vietnam National University of Agriculture (VNUA) 261 and 270 students replied; respectively, in 2015 and 2016. At HUAF 19 and 29, at HDU 36 and 25, and at VNUA 27 and 30 lecturers replied to the questionnaire; respectively, in 2015 and 2016.

#### Evaluation at HUAF

Lecturers at HUAF said that they used more types of teaching methods in 2016 than in 2015 (Figure 2). However, the students judged the integration of skills training in the courses as remaining about the same for Aquaculture and Land resources and agricultural environment; they said it was even lower in 2016 for the one of Agronomy than in 2015 (Figure 3). This may be subjective as the appreciation of opportunities for skills training in the agriculture curricula was evaluated as being too much in 2015 (Figure 3). The results of the surveys among students indicate that “repetition” of course content had occurred (see Discussion).

The changed appreciation on skills training may mean that either the didactical method used was not yet well developed in 2015, but improved in 2016, or that the students were better prepared for this new type of activity in 2016 compared to 2015. Indications for the first are the replacement by the lecturers of self-study opportunities with other active learning activities as shown in Figure 2. Indications for the latter are the shift in judgement from too much towards adequate for both the integration of CC-related skills of the Agronomy students (Figure 3) and the availability of self-study time in general (Figure 4).

#### Evaluation at VNUA

At VNUA, climate change issues (CC) had been implemented in nine courses since 2013. In 2015, issues on CC were included in 45% of the exams of the nine courses of the three curricula (Table 3). Both lecturers and students agreed that integrating CC into training programs was necessary to meet the requirements of their future jobs.

However, the number of courses in the three curricula that became more skills-oriented is small (3 on 60 for the total BSc), and will have little impact on the learning attitude of students who are used to passive learning (2). The survey showed that the ACCCU-trained lecturers scored better on the use of learning methods recommended for the competence-oriented, credit-based system (Figure 5). The students’ habit will not change after only one semester of being taught by one or two lecturers trained by ACCCU, especially in the context of the existing lecturers who are not trained by ACCU or POHE, but are still actively using the traditional teacher-centred approach.

The results of the survey among students indicate “repetition” as a problem. Moreover, according to the students, the number of credits attributed to the courses is too small for the total content to be studied. Together, the findings plead for the aggregation of several courses in modules in which skills training can be combined with a reduction of the content.

#### Evaluation at HDU

The reform at HDU was evaluated for three courses in 2013-2014. The survey of 2014-2015 reached fewer lecturers (38 vs 25) as the students followed two instead of three adjusted courses; however the number of students increased. In the first year, HDU’s evaluation included many yes/no questions, which were replaced by scaling questions in the second year.

The three courses of 2013-2014 integrated climate change issues, and the syllabi gave the learning goals. The modules included “practicals”, “field-trips”, “self-study” and “group discussions”; but no “individual assignments” or “group assignments”. The latter assignments are the ones that most likely allow to train skills and attitude. Nevertheless, HDU students and lecturers scored “high” the achievement of skills training. These high scores might be related to their classification of the learning outcomes; e.g. “Describe main pests and their symptoms on several major crops” is classified as skills, while this is typically the lowest level of the cognitive learning outcome, “remember” in Bloom’s taxonomy (Table 5).



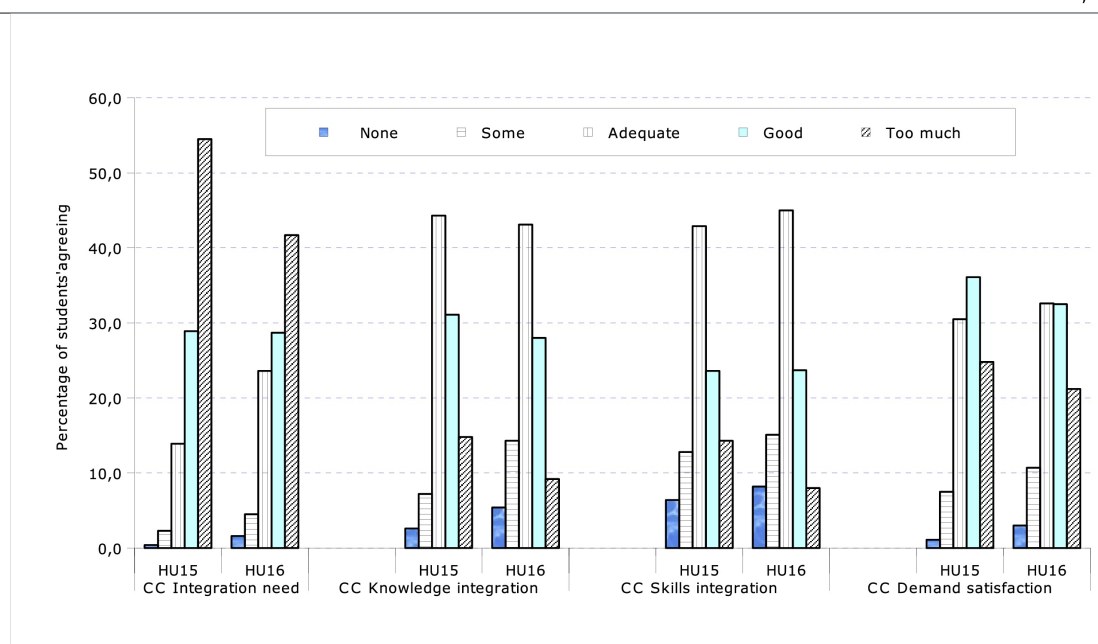


Figure 4a: Curriculum quality categories

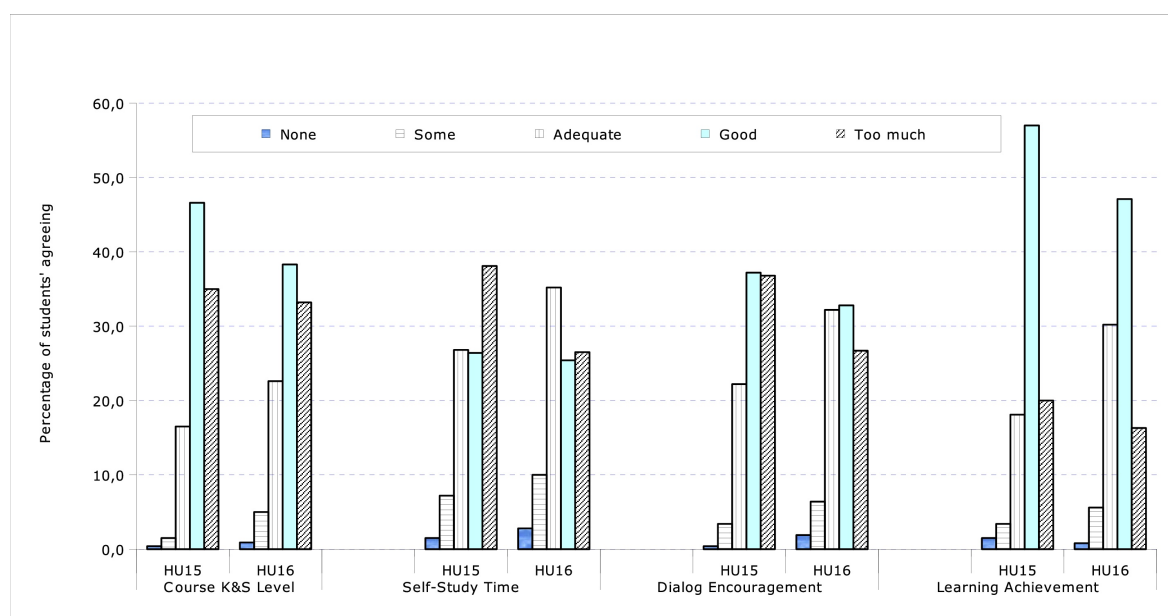


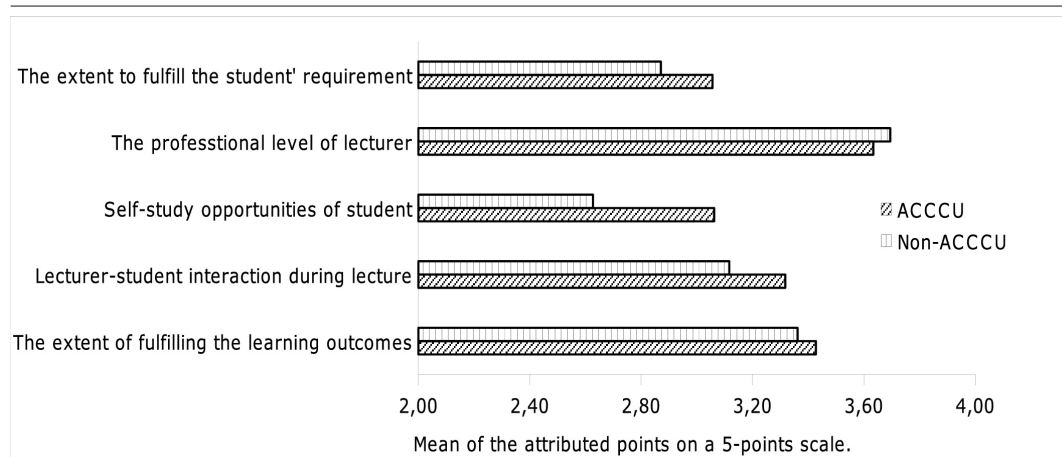
Figure 4b: Teaching staff quality categories

**Figures 4a and 4b:** The opinion of students on the quality of the syllabus (4a) and on the quality of instructors (4b) at HUAF for 2015 and 2016 (HU15 and HU16, respectively).

**Table 3**

The evaluation of VNUA students on four topics regarding the quality of the lecturers.

Evaluated indicator	Results	Notes
Lecturers use audio-visual techniques	100%	
Suitability of class size with course's contents	3,7 on a 5-point scale	Over-crowded
Suitability of class size with the infrastructure	3,8 on a 5-point scale	Over-crowded
Question on Climate Change in examination	45%	



**Figure 5:** The effect of VNUA lecturers' participation in an ACCCU activity (ACCCU), compared with those who did not (non-ACCCU), on the appreciation by the students of five indicators for active learning and reaching learning outcomes, on a scale of 1 to 5 (5 being highest).

**Table 4**

Constraints to the introduction of Competence-based Curricula (CBC) at the level of the human resources and strategies to overcome these constraints.

Constraints / Challenges	Strategies to overcome the constraints
Knowledge, skills and awareness of part of the lecturers do not meet the requirements for CBC, because:	
<ul style="list-style-type: none"> <li>- the number of enrolled students is too high for the number of lecturers</li> <li>- No effective system yet for monitoring and evaluating the KS&amp;A of lecturers</li> <li>- A proportion of lecturers do not try to build their KS&amp;A</li> <li>- Income of lecturers, especially the juniors are too low for them to love their jobs</li> <li>- the direct investment for training and education (practical, field trip) is only moderate.</li> </ul>	<ul style="list-style-type: none"> <li>- Set up, implement, monitor and evaluate the programs on building the KS&amp;A capacity of the lecturers, especially the young ones</li> <li>- Set up evaluation system for courses and lecturers</li> <li>- Set up an incentive system</li> <li>- Strengthen the cooperation with WoW to increase practical knowledge, skills of lecturers and feedback</li> <li>- Increase the training facilities to improve the lecturer's skills</li> </ul>
Lack of experience in developing curricula and courses oriented towards skills training	<ul style="list-style-type: none"> <li>- Provide regular training arrangement on pedagogy;</li> <li>- Use experienced shadow lecturers of high standard;</li> <li>- Exposure to the WoW through internships in the private sectors</li> <li>- Develop central facilities/institutions serving several faculties or universities</li> </ul>
Staff's resistance to change	<ul style="list-style-type: none"> <li>- Teacher assessment</li> <li>- Peer level team teaching</li> <li>- Appoint teacher on a contract basis</li> <li>- Link career opportunities and rewards based on objective assessments.</li> </ul>

**Table 5**

Six levels of learning outcomes based on Bloom's taxonomy, as modified by Anderson and Krathwohl (1) to match with active learning, and some related methods for learning and assessment.

Taxonomy of Bloom	Learning method *	Assessment method
Remember (Recognizing or recalling knowledge, facts or concepts)	Note-taking pairs	Multiple choice
Understand (Constructing meaning)	Think-Pair-share	Test with open questions
Apply (Using ideas and concepts to solve problems)	Buzz Groups; Role play	Case studies, Essays, Project performance assessment
Analyze (Breaking something down into components, seeing relationships and structure)	Critical verbal and oral debates	Case studies, Essays, Project performance assessment
Evaluate (Making judgments based on criteria and standards)	Paper seminar	Case studies, Essays, Project performance assessment
Create (Reorganize diverse elements to form a new pattern or structure)	Project assignments	Case studies, Essays, Project performance assessment

\*See: Barkley E.F., Cross K.P., & Major C.H., 2005, Collaborative learning techniques: A handbook for college faculty. San Francisco: Jossey-Bass. Paperback (320 pp). ISBN: 978-0-7879-5518-2.

In 2014-2015, the small number of lecturers was more critical about the performance, in particular those involved in the Integrated Pest Management course. In general the lecturers for this course scored the achievement of the goals about half a point lower; while those involved in 'Food crops' already scored lower than that in the previous year. For example, on a scale of 1 to 5, the question, "Whether the contents of the course inspired self-learning or not," students scored the lecturers 4.1 in year one, but in year two, they scored these lecturers 3.5. Likewise, the score for the rate of integration of CC issues went down from 3.9 to 2.9. We assume that the level of awareness and knowledge of the fewer lecturers on the pedagogical methods for actively teaching skills was better, and they were more critical. More training events using participatory techniques and focusing on climate change and gender are needed for lecturers to be capacitated when confronted with these possibilities.

### **General evaluation issues and stakeholders' inputs**

The HUAF team noticed that for the second survey, the students became less afraid to be critical. They gave lower scores to the lecturers; a higher number of the students requested more "practicals".

Stakeholders review and input closes the cycle (Figure 1). To receive the input of stakeholders, instead of professional advisory committees (PAC) composed of stakeholders, the three universities organised feedback sessions during the employers' market days. Most Vietnamese universities organise such days to increase the employment opportunities for their graduates. At these sessions feedback from employers on the recently hired graduates and the need for skills were collected with the goal in mind: to educate graduates qualified for the labour market.

### **Challenges of competence-oriented curricula**

The introduction of competence-oriented curricula in Vietnam is confronted with challenges in three levels: the design, the institutions (management and infrastructure), and the lecturers (human resources). Below we present details of the challenges and some of the strategies to overcome the detailed constraints suggested at the project workshop.

### **Curricular design**

Four constraints were listed for the curricular design:

- (i) the unfamiliarity with curricula building on learning outcomes;
- (ii) the lack of staff with experience in designing such curricula;

- (iii) the insufficient combination of knowledge, skill and attitude in the courses;
- (iv) the incomprehension about the module structure compared to a course program. All these require training of the lecturers.

The first constraint relates to the unfamiliarity with constructing a curriculum that builds on learning outcomes according to the taxonomy of Bloom (Table 4). This is due also to the custom of talking about disciplinary knowledge (topics / courses) and not about learning outcomes relating to the three competences (see Discussion). The second constraint is related to the first. The lack of staff with the special competences and experience in designing such curricula, can find temporary relief by hiring experts.

The third and fourth constraints both relate to the structure of the learning activities in either courses or modules; lack of structure leads to lack of understanding the connections among subjects, repetition among the subjects, unclear credit distribution among the subjects, and skewed relation between fundamental and major knowledge credits. The description of courses or modules aims to provide this structure, i.e. how various teaching activities allow the students to learn all three competences (knowledge, skills and attitude) related to the content of the course. A 'course' tends to be related to lecturing one subject in a series of lectures given by one person only. Modules tend to be larger units in which students participate during 3 to 6 weeks (half or whole day) and learn through carefully chosen activities guided by a team of lecturers, with a coordinator. In principle, in modules it is easier to avoid repetition, and more importantly, include a variety of student-centred activities allowing to reach the learning outcomes relating to all three competences and levels of Bloom's taxonomy. The design of the latter may require guidance by experienced persons for a period of time.

### **Institutional challenges**

There are three categories of constraints at the institutional level:

- (i) involvement of the ministry and coordination between universities;
- (ii) infrastructures;
- (iii) workload and quality of lecturers,

The inappropriate workload and quality of the lecturers will be discussed below (Human resources).

Four key solutions to these three constraints include:

- (i) having clear objectives,
- (ii) providing more decision power to the universities,
- (iii) respecting the rights of lecturers and
- (iv) providing flexible mechanisms and coordination within the institute.

For the first constraint at the institutional level, participants agreed that the educational programs proposed by MOET are too closed and leave little room for adaption. Solutions could be to distinguish between hard or compulsory courses/topics on the one hand, and on the other hand, elective or soft topics that could be filled in by the faculties or departments. Stimulating more active discussion between universities (see Discussion) to allow more flexibility both in the teaching schedules and cross enrolment of students between universities of their choice would be helpful. With an open mind, universities can be in a better position to design more flexible regulations that cater more to the demands of students.

For the second and third constraints, lack of qualified staff and lack of infrastructure/facilities, respectively, suggested solutions were to:

- (1) present evidence to convince government to increase the funding,
- (2) engage private sectors both for finance and knowledge with the assistance of alumni,
- (3) improve inter-university collaboration in cities with more universities,
- (4) support the transport of unused or second-hand laboratory equipment from other locations. Although increasing facilities may contribute to solving the issue on large classes, reducing class size requires also more lecturers and more student assistants.

However, reducing the contact hours by introducing more independent learning activities for students to be more active might relieve the pressure. The present solution to provide the same subject several times by different lecturers leads to other problems, such as the divergence on the quality of lecturers and the difficulty on the development of the subject due to a lack of coordination between and among the different lecturers. Other solutions would be to limit the number of students, or design modules with a variety of activities, or provide a limited number of lectures by leading professors in a large auditorium, with very well-prepared individual and/or group activities guided by assistants. Evaluations by the students of courses and lecturers should include all activities and assistants and not just consider a sample.

### **Human resources**

There are many solutions and strategies to overcome the constraints at the level of the human resources (Table 4). Many of these refer to training and improving contacts with the WoW. One crucial aspect might be the creation of an independent and objective monitoring system of the lecturers that could guide the individual training plans. The participants noted the resistance to change at the level of the lecturers; the solutions proposed were all administrative, while motivation, and thus understanding the reasons for the change might be important too.

Not included in Table 4 is a question on the time to start implementing the changes in a curriculum. First of all the change requires training that would also motivate the lecturers. An entirely new curriculum should start in the first year, but considering the lack of trained lecturers, a gradual transition by adapting some courses or transforming one semester in modules for training skills & attitude, is an option. Offering these courses or modules to the students in the higher years aligns with the increasing level of learning in Bloom's taxonomy that is aimed for in the curricula. The universities could offer these courses or modules as refreshment trainings to their alumni.

## **Discussion**

We discuss here some issues on ACCCU's implementation, epistemology and ministerial leadership.

### **Didactical skills**

In general, the evaluation indicated that the modified courses gave more attention to skills training but that its didactics still needs to be improved, either by training and informing the students, or by training the lecturers. Although the faculty members' participatory didactics was assessed at the start, with some related trainings provided in between, the evaluation shows that there is still room to improve the "Activities for Participatory Learning". However, such assistance will develop or enhance the skills of the lecturers only if (i) universities make such training compulsory for their lecturers and for the full professors, and if (ii) these are embedded in a continuous training program for all staff. The latter requires a separate section inside a university or a link with a specialised pedagogical institute. In fact, to achieve an active learning attitude, the entire curriculum approach needs to be changed. At present, updating a syllabus, or changing an exam question requires compliance of Faculty or university leader; lecturers are not fully in control. Leaders may not be aware about the importance of integrating skills training; they may not also be updated with current issues, such as gender and climate change in the courses, or about the need to train their lecturers. In the Netherlands, continuous training in pedagogics is customary for teachers at primary and secondary schools, but was introduced recently for lecturers at Universities.

### **Competence and qualification frameworks**

Instead of the classical three competence categories, Knowledge, Skills and Attitude, some qualification frameworks use mixed categories: Knowledge and Skills, Application and Competences, and Responsibility. The latter, in principle, includes attitude, and is perhaps more straight forward to explain, understand and translate to other languages. The use of the word "competence" in one of the two combinations is a fundamental epistemological issue that may lead to confusion as



most literature uses the word to indicate a set of competences (knowledge, skills and attitude) that graduates need to be able to apply, while application is one of the six cognitive domains as defined by Bloom *et al.* (3). The latter described the application as "Student selects, transfers, and uses data and principles to complete a problem or task with a minimum of direction", and suggested the verbs: use, compute, solve, demonstrate, apply and construct. In our opinion, using the two combined categories underestimates the holistic didactical approach that is required to teach/learn competences; making subsets of words cannot solve this complexity and risks even to deny this complexity; e.g., without a good attitude (sense for responsibility), a graduate scoring excellent on cognitive application and computer competences (skills) will waste his bosses' time by playing games.

### **Assessment of learning**

Regarding exams, students of two universities noted that skills training issues were not well reflected in the assessments. This can be solved by averaging marks from several assignments; e.g., for application of learning goals: a mixture of marks for case-study, essay and performance (Table 5). Within ACCCU this problem may be related to the fact that the basis of the module design was not the assessment method for the defined learning goal, but the learning methods were based upon the learning goals. To prevent this problem, an alternative design approach would be to choose the learning methods based upon the required assessment method; the latter will then be selected first depending upon the expected learning outcome.

### **Repetition of course content**

In the evaluation, the students mentioned frequently that repetition of content across courses had occurred, and also during the cited workshop this was listed among the constraints. Repetition in the course content may occur due to at least two reasons: (i) the different courses have closely related topics with different lecturers who do not consult each other in developing the content and (ii) the learning outcomes of the modules differ – more on learning knowledge in the first semesters, and

more on acquiring skills in the later semesters; but the skills part are not developed. Aggregating various closely related courses in modules (Table 6) and focusing on the training of skills in the later semester of a curriculum would reduce the problem of course repetition.

A curriculum may consist of common modules and specialisation modules (Table 6). We purposefully use the word module to indicate that the curriculum needs to step away from credit courses given by individual lecturers. In a two-year curriculum that is built from, e.g., 36 courses given by individual lecturers, the risk of overlap is too high, and each lecturer will have insufficient time to include didactical activities for learning skills and attitudes. The results of the evaluations demonstrate that the higher level learning outcomes were not yet well included (Table 2). Thus, learning activities for the modules in the later years of the curricula need to be improved. Although the highest levels of learning do not need to be reached in a BSc, the intention to train skills in research sets a high goal to the BSc. Either the latter expectation should be downgraded or more skills and attitude activities should be included in the didactics.

### **Directives from Ministries**

Ministries responsible for the sector's education institutes may either just approve the strategic plan of universities and leave the quality control to an independent institution, or provide exhaustive lists of topics that a graduate should have learned, and take the lead in control. Though in principle the Vietnamese universities have freedom in designing "curriculum", the responsible Vietnamese ministry provided a list with topics the students are required to learn (Table 6, left hand column). Such lists constitute an easy way out for curriculum design but hamper the development of a competence-oriented curriculum, unless the HEIs are creative. One goal of the centrally steered curricula might be to obtain perfectly aligned course schedules and calendars that allow students to shift between universities, for example, to follow a specialization not available at the universities where this student is registered. However, the real situation shows that the actual study calendars among universities hardly align with each other (2).

**Table 6**

Moving away from knowledge courses towards modules with outcomes aiming at competences.

Ministry's list of specific course topics for the MSc Crop science		Overall learning outcomes of Modules covering the topics and allowing students to develop knowledge, skills and attitude.
		Graduates of an MSc crop science are able to:
1.	Advanced Plant Physiology	- Develop advanced plant nutrition schedules considering 'soil' and 'plant' biochemistry and physiology.
2.	Advanced Biochemistry	
3.	Advanced Plant Genetics	- Design plant breeding programs and apply seedling selection, cell technology and biochemistry.
4.	Advanced Seeding Selection	
5.	Plant Cell Technology	
6.	Plant Nutrition	- Develop advanced plant nutrition schedules considering 'soil' and 'plant' biochemistry and physiology (see above).
7.	Soil and Plant	
8.	Advanced Food Crops	- Design climate-smart production plans for food and industrial crops, vegetables, fruit and ornamentals.
9.	Advanced Industrial Crops	
10.	Advanced Ornamental plants	
11.	Advanced Vegetables and Fruit crops	- Conceive crop and integrated pest management plans, using advanced cultivation technologies and considering climatic hazards.
12.	Advanced Technology in crop production	
13.	Advanced Cultivation Techniques	
14.	Integrated Pest Management	- Create and monitor business plans for crop farms, and processing and marketing units.
15.	Management of Agriculture Climatic Resources	
16.	Rural Development Project Planning & Management	- Create programs for extension services and apply extension training programs for farmers.

Nevertheless, the centrally provided lists with topics can be integrated in a curriculum with modules in a creative way (Table 6, right hand column). Considering a 2-year MSc of 64 credits including an internship (12 credits) and a thesis (24 credits), just 28 credits are left for courses. In the proposed learning goals of modules, the word "advanced" is replaced by a verb from the higher levels of Bloom's taxonomy (1). The reformulated program with modules has space for essentials in rural development, such as skills in entrepreneurship and extension.

Closely related topics are aggregated in one module to (i) prevent overlap between the lecturers and (ii) create time for student-centred activities that aim at learning skills and attitudes. We recommend ministries to set an overall mission and overall learning outcomes for the various agricultural faculties, and to provide universities with sufficient means to implement competence-oriented curricula. Higher Education Institutes (HEI) need to continuously determine what society expects from their graduates. A barrier to this may be that staff of HEIs have a different language discourse from that of the employers (4).

We add that also ministries can have a discourse different from that of the HEI, and that although Vietnamese ministries are aware of the urgency for skills development, they seem not to use the appropriate discourse to make the change happen. The ministries continued to give a "list of topics" instead of "learning outcomes"; the change should have been more about "skills-oriented active teaching/learning" rather than "credit-based" (2). If the ministries really want the students to learn skills, they should define the overall Learning Outcomes and the overall program structure (dates for semesters and periods, and the number of credits), and give a free hand to the Universities to design curricula with skills-oriented modules. An overall program structure would impose a parallel programming of the semesters and periods in modules which will enable students to exchange program and to shift between universities without losing time.

### Critical factors

In agreement with a recent study in the EU (4), we note that giving less lectures and more active teaching/learning activities are critical for competence-oriented curricula. Such activities require more time for preparation, and the latter may not be well reflected in the time either given or paid to lecturers. To allow for the effective implementation of credit-based, competence-oriented curricula, university leaders may need to either revisit the payment system or revise the task quantification systems.

The analysis of Pita *et al.* (4) and Mulkey (5) shows also that the curricula need to be responsive, for example, being flexible along with new knowledge, trends and changes, and being decisive along with the obsolete and no-longer applicable knowledge from the past. This requires an 'antenna' not from lecturers only, but also from the entire institutional system because the former could just modify their module. The ACCCU partners used their alumni network and the annual job fairs to collect information on the market needs.

However, "curriculum responsiveness" requires also a continuous (professional) development of the universities and their lecturers.

The requirements for changes may be quite local, and therefore the universities should be able to act

independently, while their curricula still need to be submitted for approval or for certification.

Pita *et al.* (4) also mention that the students' drive or motivation to learn skills needs to be stimulated. The results of the above-mentioned evaluation indicate that students might experience some challenges with the shift from knowledge-based courses only to modules with activities aiming to learn skills and attitude. Other universities address this issue by stressing the learning goals for each module before or at the start of this module, and by relating these to the professional environment. Evaluating courses and the lecturers is not yet the common practice, although this is a crucial step in achieving high quality teaching and learning. Such evaluations can very well be coupled with the proposed continuous training of the lecturers. Another improvement would be to involve students in (re)designing the curricula.

### Conclusion

ACCCU has contributed to transforming the theory-into competence-oriented agriculture curricula of the Vietnamese Universities. At the same time, ACCCU has also made possible the integration of issues on gender and climate change. This transformation was done by training those lecturers and leaders of faculties who were involved with ACCCU. These activities improved the skills and raised the awareness of the involved persons. However, lecturers and leaders who were not involved in ACCCU and related NICHE activities either did not develop new skills or still resisted change. The main challenges, therefore, are the inclusion and assessment of real skills training, and the aggregation of closely related courses in modules. A fragmented curriculum with many courses increases the risk of repetitions and leaves too little time for didactical activities on training skills and attitude.

Many of the constraints for developing competence-based education were caused by insufficient knowledge on curricula, modules and competences, insufficient know-how on the design of curricula and modules, and lack of teaching skills.

For change to happen, all lecturers need to be trained in didactics for active learning, and the universities need to provide sufficient means to implement competence-oriented curricula. Well-trained lecturers will be able to develop by themselves appropriate content and activities; the

ministries can then just set the overall mission and overall learning outcomes for the various agricultural faculties. They do not need to provide detailed course topics. Overall outcome then would be the curricula becoming responsive to the needs of society, i.e. the market for the graduates, or the World of Work.

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