DO OUR STUDENTS LEARN
WHAT THEY WILL NEED LATER?
About expected learning outcomes and competences of graduates

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Editors

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PREFACE

SILVA Publications 10, a nice round number of proceedings of the annual SILVA Network conferences. There have been more conferences but not all resulted in proceedings and not all publications were included in this series. Nevertheless a milestone.

This conference was organised by the School of Agricultural and Forestry Engineering of the University of Lleida (ETSEA) in Lleida, Spain. This School, a dedicated member, fulfilled this task in a way worthy for an old SILVA Network member. The excursion to a very special type of agroforestry, hunting with dogs for truffle, showed the great possibilities of this Mediterranean land use. It was characteristic that the role of this land use in Spanish forestry curricula, was discussed too during the meeting. The conference was co-sponsored by two IUFRO groups (IUFRO education group and IUFRO Task Force Education in Forest Sciences), strengthening the professional content of the conference and helping to spread information about the SILVA Network activities.

The participants from Western, Eastern, Northern, Central Europe and Spain presented many papers concerning typical SILVA Network subjects. The following discussions were fruitful and intensive. The editors are happy that twelve of these presentations were translated into printable and readable contributions to these proceedings, quite often only after intensive reading by the editors and reworking by the authors. Without their input, these proceedings would not exist.

The editors would like to thanks here all who contributed to the conference, be it organising, be it writing papers, be it guiding though the field of agroforestry or chairing a session. Thank you all very much.

The editors

Participants of the SILVA Network conference in Lleida in 2012 (photo Miss Colinas Vega).

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SUMMARY

DO OUR STUDENTS LEARN WHAT THEY WILL NEED LATER? ABOUT EXPECTED LEARNING OUTCOMES AND COMPETENCES OF GRADUATES

PIETER SCHMIDT

In his introduction to the SILVA Network members attending this annual conference, Siegfried Lewark, president of the SILVA Network and Chairman of this conference mentioned seven questions: What do our students learn? What should they learn? Do they learn, what they will need later? What would our graduates make successful in their careers, in the labour market? And finally: Do university exams assess what professors intend to teach, what student want to learn, what the labour market needs? These questions are follow-up questions from earlier SILVA Network conferences, especially the 2008 one in Copenhagen and are relevant and typical topics for SILVA Network. In twelve papers answers to these and other questions will be discussed by teachers and students of forest sciences from Europe.

Manoli Pifarré explains that the fast development of information and communication technologies (ICT) has caused a profound shift to a knowledge creation society in which – based on participation and collaboration – knowledge is the key productive factor. This change is promoting changes in all components of the education system and demanding for a new set of skills and competences to be developed in our students. Teachers have to be aware of that and have to act accordingly.
In order to prepare higher education students to succeed in the knowledge creation society, Manoli Pifarré highlights some pedagogical guidelines to promote knowledge creation skills and competences with ICT in higher education classes. These guidelines are based on the next four pedagogical axes: a) using a challenge-based learning approach; b) defining key established knowledge in a concrete discipline; c) unpacking the cognitive processes to solve complex and challenging tasks and their promotion in higher education classes and d) emphasizing team work and collaborative learning strategies.

Three papers concern the adaptation of curricula to the Bologna Declaration and the difficulties faced by these, one Spanish and two German, universities.

According to Cristina Vega-Garcia and Jorge Alcázar, there are 16 universities in Spain, teaching forestry in 16 different programmes, each more or less six years long. Due to the now nation wide adaptation to the Bologna declaration, the curricula have been homogenised and the differences between the graduates

diminished. Moreover the job market for forestry graduates declined too. For the University of Lleida, the Bologna process has resulted in major changes in the university system improving its quality and competitiveness through greater transparency and a student-centred learning approach, which is quantified through the European Credit Transfer and Accumulation System (ECTS). The new curriculum is four plus two years, thus separating Spain from the rest of Europe and diminishing the possibilities for students' mobility. Vega-Garcia and Alcázar are positive about more attention given to practical training and the tutorial system Nestor, providing better counselling of students.

Under the title 'Good bye Diploma, welcome Bachelor and Master' Norbert Weber and Stephan Bonn present the main points of the new forest sciences study programme in Bologna format at the Technische Universität Dresden. An Advisory Board (Programmbeirat), consisting of representatives from different groups of employers, accompanied the reform, which was a challenging task for students, lecturers and administrative staff. The seven major changes are indicated. Although some traditions and familiar things like the German Diploma degree and – at least partly – the lecturers' individual freedom of teaching were lost, some advantages and achievements became obvious. More cooperation between teachers and a heavy workload for students and teachers proved to be inherent to the new programme. Alarming is the reduced interest of students in social commitment at the university as well as in public life. The authors are positive that bachelor students at the end demonstrated their employability and that regular evaluation of the teachers by the students seems to work. At the end they discuss coming challenges for the university with regards to these BSc and MSc curricula

In a more philosophical approach, Achim Dohrenbusch evaluates the change over to and the new study programme Forest Sciences at Göttingen University, more than ten years after the Bologna reform was initiated. The main goals of the Bologna Declaration, a faster study, a better structured programme and a better focus on learning outcomes instead of achieving subject specific knowledge, did not bring the expected success. In addition to the general Bologna problems for all disciplines there is a specific situation for the forest education, because the forest administrations have clear demands concerning the education contents that do not in all areas correspond with the Bologna goals. BSc graduates are not very welcome on the labour market. But on the other hand these graduates prefer to enrol in MSc programmes.

Melanie Schulte interviewed her colleagues, 2nd year forestry students at Technische Universität München, about their wishes to go abroad for a while at a university and about their perception on 'Do we learn what we will need later?' Regarding the first question about 80% would like to go abroad, about two thirds of them inside Europe, the others further away. A majority of the students (86%) thinks that current research topics are integrated in the lectures relatively well due to workshops and field trips. However, most students were not positive about the

preparation for future working life. Three points were mentioned: students were just learning basics, did not gain practical experiences and the lecture notes were identical to the lecturer's words.

Based on their experiences at the Technische Universität München, Germany, and the Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften (Bern University of Applied Sciences), Switzerland, Gerhard Müller-Starck and Martin Ziesak drew the conclusion that first the possibilities for student mobility have increased due to the Bologna Process and due to the European Credit Transfer and Accumulation System (ECTS) and that second the majority of European higher education institutions neglected cooperation with respect to the acknowledgement of course achievements abroad. As a consequence, students risk an involuntary prolongation of their studies due to a study sojourn abroad. Both universities experienced such cases. Authors suggest improvements for this procedure including cooperative agreements between universities, so-called 'wild cards' facilitating approval, obligatory counselling before departure, and the integration of a longer period abroad in the BSc programme.

A consortium of six European universities with a forestry education joined forces to develop and offer new Master programmes in an integrated manner using the European Credit and Accumulation Transfer System and the Diploma Supplement. The overall framework is given by the programme 'Erasmus Multilateral Projects'. Maria Paz Arraiza and seven co-authors described the role of each partner university, chosen for its own specialism and strength, in the process. A Virtual Learning Platform (VLE), containing learning materials in a digital format, was made in the framework of the projects in order to be available to all participating European institutions. Since 2010 four programmes were developed in subject areas like forest fire fighting, environmental security, climate change, and green technologies. The proposed MSc programmes will provide a continuing education and will overcome the shortage of skills and educational resources regarding several environmental issues at European level.

Agroforestry is a form of land use combining agricultural and forest practice, which delivers a degree of sustainability in soil use in various areas throughout the world. According to Rosario Fanlo and Marc Taull agroforestry is a promising practice in the Mediterranean area to obtain forest land yields. However, combining different techniques and strategies requires specialised expertise which should be present in the curricula of Forestry Engineering. Fanlo and Taull made an inventory of agroforestry courses in forestry curricula in 12 Spanish universities. They found 11 compulsory courses and 4 optional ones, with a course load varying between three and six ECTS credits. They considered this not enough for a good education in this difficult land use technique.

Maria Paz Arraiza and two colleagues describe the course Industrial Uses of Medicinal and Aromatic Plants, which is part of the Technical University of

Madrid´s (UPM) free choice E – Learning programme. It is offered broadly in every Technical School of the UPM, and also in the Universitat Autònoma de Barcelona, as a participant of the Campus Global initiative. The purpose of this course is that students learn about the biodiversity of this plant group, its economic and social importance, industrial uses, cultivation and production processes of raw material, chemical analysis techniques and quality control procedures. It is delivered through UPM's E-Learning Office (GATE) Moodle platform, both in English and Spanish, and it has been published in the UPM's Open Course Ware. Between 2008 and 2102 four times 80 students participated in this course, of which around 90% in the Spanish course passed the examination, in the English course around 75%. The evaluation form for students is demonstrated.

Education is a constant, life-long process, which makes it important to support graduates with tools, enabling them to upgrade their knowledge and skills during their professional career and thus keeping them valuable for their employers. According to Szymon Bijak and his colleagues from IUFRO Task Force Education in Forest Sciences, aimed at developing tools for this life-long learning, summer schools can play a useful role here. They present experiences from the first summer school (1st IUFRO Learning Initiative), held in August 2012 in Warszawa (Poland) including the preparation (deliberations on date and duration, choice of topic, quality of the location, quality of speakers, excursion but also relaxation), the running of a summer school and the participants' assessment of the educational (knowledge before and after, trainings equipment, excursion), and organisational aspects (mixture of teaching and relaxation, location, duration). Most of the 32 participants were positive at the end of the summer school.

Vadim Kostyukevich and Alexander Pitukhin discussed the Finnish-Russian Cross-Border University (CBU) as a good example of cooperation between universities to overcome difficulties in this cooperation due to differences in educative systems, language etc. and to stimulate mobility on all levels. At this stage, the Finnish-Russian Cross-Border University (CBU) offers a 2-year Master's Degree programme taught in English, and is expected to be of significant help. Traditionally, studies in Russian and European universities have some differences in the design of study programmes. Therefore, the implementation of the project is supposed to reveal both positive aspects and subsequent difficulties. This article analyses the strengths (internationalisation, modular structure and flexible individual study programme) and weaknesses (no federal or regional funding, no official status of the diploma, no administrative support and poor use of English by Russian participants) and opportunities (development of a Doctoral programme, better employability, better mobility between Russian universities) and threats (lack of funding, not enough Finnish students) of the CBU project performance at the Forest Engineering Faculty of the Petrozavodsk State University, based on seven years of experience in implementing the Master's Degree programme.

The orientation of the higher education in Europe, rapidly changing due to the Bologna declaration, should, due to the European Education Ministers, shift towards an 'outcome' approach. Katharina Schneijderberg and Siegfried Lewark stated that the implementation of this movement taking into account the plethora of suggestions from different individuals and groups, fields and organisations, is a challenge for the universities. They expect that education committees and the labour market will come closer together in preparing and implementing this change. Important questions regarding the ideas of all stakeholders will have to be answered including the question: what will be the outcome?

In their study the current status and role of competences in higher forestry education institutions are reconstructed based on group discussions held at international forestry conferences. There is no focus on a specific forestry study programme since participants of the discussions were students and professors from various programmes from Europe and the USA. They compare and contrast European and American expectations of higher education and descriptions of its current structure and practice. Competences play a central role in the transformation of European higher education structures as they are open to be defined by professors, students and employers in contrast to the remainder of the mostly rigid Bologna reforms. In which way the spectrum of definitions is used in Europe and the USA based on the results of our group discussions, is illustrated.

Under the title 'How to make the Bologna tree grow?' Katharina Schneijderberg summarized two group discussions of the participants. Important outcomes are

- A better equilibrium between teaching and research in universities and in the careers of university teachers should be found;
- The developments of skills (competences) should be improved;
- The employability of graduates at both BSc and MSc level can be improved by more freedom to choose individual pathways to graduation;
- Individuality of the students is under pressure in the nearly complete fixed actual BSc curricula;
- Students' mobility should be guaranteed by special openings in curricula.

So coming back to the initial question: do the students learn what they will need later? This can only be answered in retrospective, looking back to study experiences and outcomes, which can be answered by alumni some time after graduation, or by employers. This information, even if known to a certain degree by the universities, can help them only to a limited degree in shaping the study programmes and the learning and teaching process. We come back to the observations that future employment of the students is not known, careers are becoming more diverse, and the labour market is developing faster and faster; competences needed later therefore cannot be known specifically. But one thing is for sure: generic competences will be needed, transferable skills, problem solving competence, team

skills and the like – together with broad and deep subject specific knowledge, on exemplary level, because such knowledge and its value has to be experienced by the student: how to get it, how to use it, how to add specific competences, to fill gaps or supplement in the course of lifelong learning, how limited such knowledge is and how much situation and time dependent they are.

INTRODUCTION

DO OUR STUDENTS LEARN WHAT THEY WILL NEED LATER? ABOUT EXPECTED LEARNING OUTCOMES AND COMPETENCES OF GRADUATES

SIEGFRIED LEWARK

What our graduates will need later depends to a larger or smaller extent on their future careers. Where they want to work, what their chances are on the labour market, what their first and successive jobs are, that is information which the universities obtain to some degree from graduate analyses. Results from graduate analyses were the topic of the SILVA Network annual conference 2008, where the conclusions referred to the relationship between competences and study programmes (Lewark, 2010):

> *"Certainly choices and specialisations for students during their studies, ... working for key competences and transferable skills, ... as a preparation for problem solving in the working life are of growing importance. ... students know less than ever about the stations waiting for them in working life.*
> *The ... considerations lead to the questions whether or to which degree universities can design and offer curricula based on graduate enquiries. Certainly curriculum design cannot be deducted from graduate enquiries in a detailed manner, i.e. introducing specific courses directly upon views of employees (or employers)."*

The issues to be discussed at the annual conference 2012, as stated in the conference announcement, were a follow-up: What do our students learn? What should they learn? Do they learn what they will need later? What would our graduates make successful in their careers, in the labour market? Finally: Do university exams assess what professors intend to teach, what student want to learn, what the labour market needs?

We may assume that success of a university graduate on the labour market will depend on his or her competences relevant for a certain task or occupation. These competences are at least partly a result of the learning process during his or her studies. It is helpful to think backwards, from the competences as intended outcomes of study programmes and from there to designing of the study programmes and to the courses in the programmes. And as a second step to consider the responsibility of university teachers for designing of study programmes and organising the learning process of the students.

Formulated and expected learning outcomes (ELO) are benchmarks for judging the quality of a study programme in the accreditation. The performance is based on the match of contents and learning and teaching methods of the courses as well as assessments of the learning results on one hand with the competences needed by the graduates on the other.

In our conference we explored the role of ELO in Spain and elsewhere in the European faculties of forestry, which is reflected again in the texts based on the experiences shared in the presentations and discussions of the conference.

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MIND EXPANDING: TEACHING, THINKING AND CREATIVITY WITH ICT

MANOLI PIFARRÉ

Abstract

Information and Communication technologies (ICT) have launched important economic and social changes around the world. A profound shift to a knowledge creation society has occurred in which - based on participation and collaboration - knowledge is the key productive factor. All these social and economic changes are promoting changes on all components of the education system and demanding for a new face of skills and competencies to be developed in our students.

In order to prepare higher education students to succeed in the knowledge creation society, in this paper I highlighted some pedagogical guidelines to promote knowledge creation skills and competences with ICT in higher education classes. These guidelines are based on the next four pedagogical axes:

- Using a challenge-based learning approach;
- Defining key established knowledge in a concrete discipline;
- Unpacking the cognitive processes to solve complex and challenging tasks and their promotion in higher education classes;
- Emphasizing team work and collaborative learning strategies.

Keywords: Collaborative learning; creativity; thinking skills; learning and instruction with technology; information and communication technologies; Higher education.

Introduction

Countries around the world are making large changes in their educational systems in order to prepare students for a knowledge- creation society. In this paper I will reflect about the next three issues:

- What characteristics the knowledge creation society has;
- What does this new society imply for the transformation of higher education programmes;
- In what ways can the use of information and communication technology (ITC) in higher education be a contribution for preparing our students to live as competent citizens in the knowledge creation society.

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The paper begins by describing major structural changes that are occurring in the economies of many countries in the world shifting the principal source of production from the manufacture of material goods to the provision of information products and services. It details the changes in organizational structures of businesses and in ways of working requiring new competences and skills. The paper

continues by reflecting about which competences should be developed in our students in order to respond to the knowledge creation society demands. The paper finishes by providing pedagogical guidelines to promote knowledge creation skills and competences with ICT in higher education classes.

The knowledge creation society

Perez (2002) provides a useful summary and contrast between the technological, economic, and social variables associated with the mass production paradigm and the knowledge and information technology paradigm. According to Perez, the primary distinction between these two paradigms is the shift from the production of objects to the production of knowledge (see Table 1). The hallmark of the mass production model is standardization. Standardization of production processes and outputs is necessary to maintain the quality of produced goods, as well as achieve the economies on a scale that leads to productivity gains and profit. The standardization of processes and outputs rests on an organizational structure in which a relatively small number of decision-makers and managers direct the efforts of a large number of skilled, semi-skilled, and unskilled workers. In contrast, the hallmark of the information technology paradigm is personalization. Rather than providing a large number of high quality but identical products to a mass market, the information technology paradigm provides customized services that meet individual needs and preferences. Consequently, the organization structure shifts to place decision making closer to the customer and more responsive to customer diversity and demands. Productivity gains are achieved by increasing the skill of the workforce and distributing operations to lower overhead costs.

Kozma (2010) highlights, that the role of ICT is also quite different in organisations following these two paradigms. Under the mass production paradigm, the information and communications technologies of an earlier time—print, radio, and television—are used to support the dissemination of information from centralized authorities and to foster the consumption of mass produced goods. Under the knowledge and information technology paradigm, ICT serves primarily a productive function, as more people have access to the multimedia, to information processing capabilities of computers, and are able to use them to create new knowledge. These capabilities allow for a market based more on the personalisation and customization of products and services than on standardisation and mass production. Networks are used to access and share information and they both enable and reinforce the collaborative relationships that are characteristic of the new paradigm.

Table 1: Characteristics of mass production and information technology paradigms
(Kozma, 2010).

Mass production paradigm	Information technology paradigm
Economies of scale and mass markets Horizontal integration Standardisation Functional specialization/hierarchical pyramids Centralisation Synthetic materials, energy intensity (oil based)	Segmentation of markets/proliferation of niches Decentralized integration/network structures Heterogeneity, diversity, adaptability Inward and outward cooperation/clusters Globalisation, interaction between local and global Knowledge as capital/intangible value added

Competences demanded by the knowledge creation society

According to Kozma (2010), the shift to a paradigm based on the collaborative, customized creation, sharing and use of new knowledge by a large, diverse, and distributed population, is creating tremendous pressure for change on all components of the education system. It has profound implications for what is taught, how it is learned, how teachers teach, how students are tested, and how schools are structured. And it has significant implications for how schools, teachers, students, parents and citizens, generally, use ICT for education.

The dynamic forces of the knowledge economy call for a new face of skills and competencies to be developed in higher education students. A shift is claimed from a more narrowly defined vocational training dominated by technical skills to a broadly viewed technical and vocational education and training where generic or transferable skills thrive alongside the technical. The increasing focus on the so-called generic, transferable, core, or key skills lies in the fact that they can be applied across varied organizational and employment contexts (Wegerif and Mansour, 2010).

Determined from a variety of sources, Grubb (2006) argues that the skills to be included as knowledge creation society and to be developed across different domains are the next six skills: problem-framing and –solving skills, communications skills, teamwork skills, information analysis, critical thinking and reasoning "skills".

In addition to the generic versus specific characterization of skills, there is an increasing focus on hard and soft skills. Employers desire workers possessing soft or life skills in addition to hard skills. Hard skills refer to the technical and analytical competencies and know-how allowing the worker to perform the mechanical aspects of a job (Batlle, 2006). In contrast, soft or life skills are those "abilities" for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life. In particular, life skills are a group of psychosocial competencies and interpersonal skills helping people make informed decisions, solve problems, think critically and creatively, communicate effectively, build healthy relationships, empathize with others, and

cope with and manage their lives in a healthy and productive manner (Joy Nam, 2009).

Pedagogical guidelines to promote knowledge creation skills and competences with ICT

In order to prepare higher education students to succeed in the knowledge creation society, I claim that higher education may introduce the next four pedagogical axes:

- Introduce challenge-based learning;
- In the discipline, define the key established knowledge;
- Unpack the cognitive processes to solve complex and challenging tasks and their promotion in higher education classes;
- Emphasis on team work, collaborative learning strategies.

Next I will develop the characteristics of the four pedagogical axes proposed.

Challenge-based learning

Challenge-based learning – henceforth ChBL– is a learning method that has its roots in problem-based learning and in experiential learning theories. This method focuses on increasing student engagement, by a collaborative learning experience, teacher and students work together to learn about different kinds of issues, propose solutions to real problems, and take action. Students are engaged to reflect on their learning and the impact of their actions, as well as to publish their solutions to a worldwide audience.

ChBL includes the following attributes:

- Multiple points of entry and varied and multiple possible solutions;
- Authentic connection with multiple disciplines;
- Focus on the development of 21st century skills;
- Twenty for hours and seven days access to up to date technology tools and resources, allowing students to do the work;
- Use of Web 2.01 tools for organizing, collaborating, and sharing;
- Focus on universal challenges with local solutions;
- Requirement that students do something rather than just learn about something
- Documentation of the experience from challenge to solution (Johnson *et al.*, 2009).

The framework of this method is presented in Figure 1. More information about ChBL can be found at: www.challengebasedlearning.org

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1 Examples of web 2.0 tools are blogs or wikis.
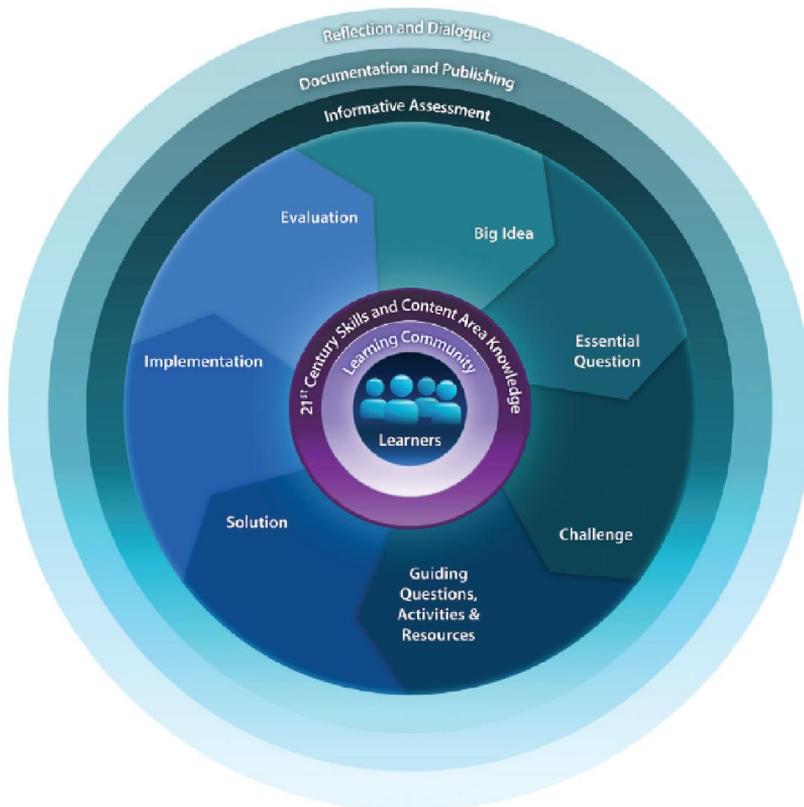
Figure 1. ChBL – Framework (Johnson and Adams, 2011)

Define key established knowledge
The main goal of the knowledge creation approach is to make class learning more relevant to the workplace and to social life. The intent is to increase the ability of the future graduates to add value to economic output and to increase the ability of the citizenry to improve their standard of living and the condition of society by using their knowledge of subjects to understand and solve complex problems encountered in real-world situations of work and life. Rather than the superficial coverage of a large number of topics that are characteristic of the mass production model, the curriculum in this approach must focus on the deep understanding of a smaller number of key concepts, principles, and procedures and on how these ideas are organized and interconnected within and across subject areas to form complex knowledge systems (Bransford *et al.*, 2001). Teachers pose challenging questions drawing on core concepts and principles in the disciplines, as well as on student interests and motivations.

Unpacking the processes to help students to solve complex and challenging tasks
One of the main goals of the knowledge creation approach is to develop citizenry which are continually engaged in and benefit from knowledge creation, innovation, and learning. If students are called to participate in an economy and society in

which the creation, sharing, and use of new knowledge and cultural artefacts are the basis for sustained development, their educational preparation must go beyond the learning of established knowledge. The curriculum is extended to explicitly include general and specific skills and processes. Knowledge creation skills include the ability to use a range of technological tools and digital resources, to search for, organize, and analyze information, and to communicate effectively in a variety of forms.

In order to organize the teaching of these types of skills and processes, teachers must, first, identify, categorize and organize them. Various schemes exist for helping the teachers to organize the teaching of key processes and skills to solve complex and challenging tasks. One leading method of characterizing knowledge and skills is that of Bloom's taxonomy. As shown in Table 2, Bloom's taxonomy is broadly divided into cognitive, affective, and psychomotor skills. Cognitive skills refer to mental skills or knowledge, affective skills refer to attitude and the emotional aspects of learning, and psychomotor skills refer to manual or physical skills.

Table 2: Bloom's Taxonomy (adapted from Anderson and Krathwohl, 2000)

Cognitive skills	Affective skills	Psychomotor skills
Synthesis	Internalizing values	Adaptation
Analysis	Organizing	Complex overt response
Application	Prioritizing	Mechanism
Comprehension	Valuing	Guided response
Recall	Active participation	Set response
	Awareness and attention	Perception

We will show an example of unpacking processes to solve complex task using technology: The Metafora project founded by EC (to know more about the project: www.metafora-project.org). The Metafora system is a software platform that encompasses a suite of tools used to support and encourage the development of "Learning to learn together" skills, through domain-specific activities in science and math.

One of the main tools of the platform is the planning/reflection tool which offers a visual language enabling students to create and map representations of their work for planning, enacting and reflecting on Metafora learning activities (see Figure 2).

The main feature of this tool is to help students to think about the appropriate processes and skills they should develop in order to solve the complex challenge. To do so, the platform provides a set of the main processes related to inquiry learning (e.g. experimentation, building models, making hypotheses), and to problem-solving (e.g. define the problem, analysis). In Figure 3, we present some examples of the visual language representing key processes to solve a complex task that students choose, discuss and plan.
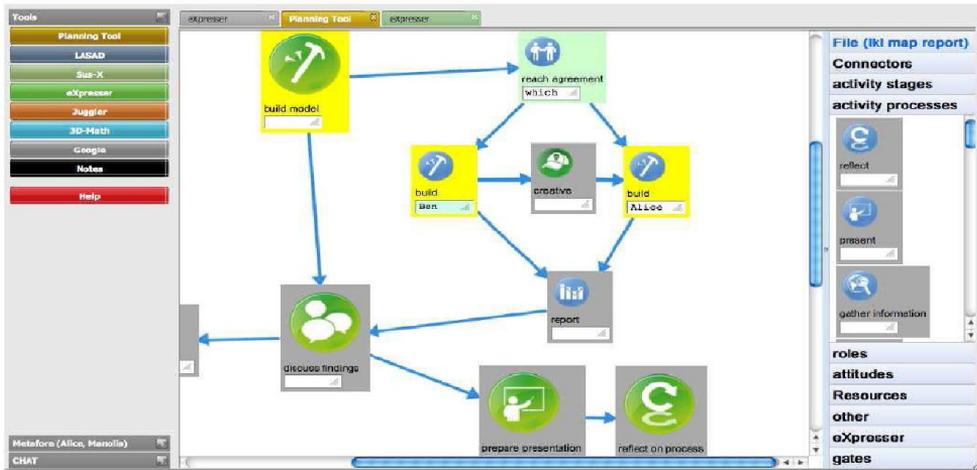
Figure 2. Snapshot of the Metafora planning and reflecting tool.

Emphasis on team work, collaborative learning strategies.
Learning how to learn together with others (henceforth, L2L2) is the reality of the knowledge creation era. Learning how to solve a task with others combines the dimension of task management (i.e. how to organize complex inquiries with multiple stages and strands) with the dimension of social relationships (i.e. working with attitudes, expectations and identities in order to participate constructively in learning as a collective accomplishment).

Figure 3: Examples of the visual language that refers to problem-solving processes in Metafora project

I claim that one of the focuses of higher education is to unpack the key aspects of learning collaboratively with others and design complex activities that could allow teaching them explicitly.

In an attempt to unpack the complexity of the L2L2 competence, Yang *et al.* (2013) highlights the next four key aspects that should be focused when students are working in groups:

- Encouraging distributed leadership moves: Leadership is not just the job of the leader but also requires the cooperative efforts of others. To view leadership as a reciprocal social process instead of the property of an individual, leadership responsibilities are shared within the group, and there may be no sharp boundary between leaders and followers From this perspective, it is positive to raise awareness in the group about the fact that different stages of the group solving process may reveal a need for different kinds of leadership distribution pattern. This awareness of distributed leadership around particular topics could break down dominating coalitions, hierarchical relationships, social exclusion and isolation.

  Li *et al.* (2007) characterized the following types of leadership moves by analyzing group discussion:
  - Turn Management includes directing turns to those who had not contributed ideas and soliciting opinions from them, asking those who started to interrupt others to wait their turns, yielding a turn to someone who failed to gain the floor, or gaining the floor for someone who could not do so by himself or herself.
  - Argument Development refers to soliciting reasons, evidence, and clarification from others, as well as ratifying others' arguments through restating them or making comments about them.
  - Planning and Organizing includes statements that provide structure to the situation or that monitor the group's progress, such as making suggestions about the actions to be taken and summarizing the opinions of the group.
  - Topic Control includes statements that influence the topic of discussion, by such means as asking discussion mates to look at another topic (or the other side of the issue) or go back to the original topic.
  - Acknowledgment is an attempt to inspire others through language or gesture.

- Mutually engaged through/around shared objects: Shared objects/artefacts provide a rich repertoire of referential anchors for mutual engagement and understanding. Thus, it is important that the planning and the organization of the collaborative resolution should be represented and recorded in some way. The shared model of the group learning may play a crucial role in supporting mutual engagement and creating a shared framework for collaboration.

- Peer assessment for group awareness: The ability to take different general attitudes is a prerequisite for successful group learning, for example taking a creative attitude to attempt a speculative approach.
- (4) Group reflection on the social dimension of learning: To make this process of knowing explicit to the group, these researchers identified three distinctive temporal opportunities for group reflection around an online discussion map: Beginning: Reflecting on individual preferences, collective responsibility and intended level of participation. Middle: Reflecting on emerging roles, norms and gaps between individual and collective outcomes. End: Reflecting on original group learning interpersonal structure and emergent structure, intended individual learning outcomes and achieved outcomes.

Conclusions

Economic and social changes have occurred around the world, many of them launched by new information technologies. A profound shift to a knowledge creation society has occurred in which - based on participation and collaboration - knowledge is the key productive factor.

All these social and economic changes are creating tremendous pressure for change on all components of the education system and demanding for a new face of skills and competencies to be developed in our students.

I highlighted some pedagogical guidelines to promote knowledge creation skills and competences with ICT in higher education classes. These guidelines are based on:
- Using a challenge-based learning approach;
- Defining key established knowledge;
- Unpacking the cognitive processes to solve complex and challenging tasks and their promotion in higher education classes;
- Emphasizing team work and collaborative learning strategies.

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UNIVERSITY OF LLEIDA'S EXPERIENCE IN THE ADAPTATION OF FORESTRY STUDIES TO THE BOLOGNA PROCESS

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Abstract

The University of Lleida (UdL), as well as the other universities of Spain, is currently immersed in the implementation of the Bologna objectives for development of the European Higher Education Area (EHEA). The new educational paradigm has resulted in major changes in the university system improving its quality and competitiveness through greater transparency and a student-centred learning approach, which is quantified through the European Credit Transfer and Accumulation System (ECTS).

We review the recent process of transition to the new programmes from the former forestry studies at the School of Agrifood and Forestry Science and Engineering of Lleida (ETSEA-UdL). We focus on the implementation of specific aspects in the new study plans, such as student's personal attention, practical training and evaluation based on continuous assessment.

Keywords: curriculum adaptation, forestry studies, Spain, Bologna process

Introduction

Forestry studies were introduced in Spain (Villaviciosa de Odón, Madrid) in 1848 by the hand and experiences of Agustín Pascual, trained at the Forestry School in Tharandt (Germany). At that time, four years were required to complete the programme.

In 2014, the first cohort of the new 4-year Forestry bachelor at the University of Lleida will graduate, closing a cycle of one hundred and sixty eight years, and again for European convergence reasons. In between, there was a myriad of study plans oscillating in duration from 3 to 6 years, varying widely in structure among the 17 Forestry Schools which developed after the 1990's in Spain (Fanlo and Aunós, 2006; García Robredo, 2013).

The Bologna Process is a convergence process initiated after the Bologna Declaration in 1999 signed by 30 countries, with the objectives of facilitating mobility of students, graduates and higher education staff, and to adapt the content of university programmes to social demands through the creation of the European Higher Education Area (European Higher Education Area, 2010). We here review the most recent implementation of the Bologna process at the Agrifood and Forestry Science and Engineering School of Lleida ETSEA-UdL).

Forestry degrees in Lleida 1992-2009

Since the establishment of the University of Lleida as an independent higher education institution (HEI) on December 12th 1991 (Universitat de Lleida, 2013), study plans followed a structure already compatible with other HEIs in Europe. A first cycle of three years was conducive to a Technical Forest Engineering degree (TFE, *Ingeniero Técnico Forestal*), followed by an optional second cycle on Forest Engineering (FE, *Ingeniero de Montes*), organized in two years. The study plans of these programmes are presented in Tables 1 and 2.

The balance of these years was positive, as many students successfully graduated (reaching more than 80 TFE per year in 200-2004, and more than 100 FE per year in 2002-2005), and the majority incorporated to the job market. Mobility was encouraged by the development of the Erasmus programme since 1992, and the relatively high percentage of elective courses in the study plans (even more than 50% in FE depending on previous background). The number of forestry students in mobility programmes, including Erasmus, grew from 21 in 1998-1999 to 41 in 2002-2003, but dropped to 23-25 after 2004. Adoption of the European Credit Transfer and Accumulation System (ECTS) took place in 2003 after a Royal Decree (RD 1125/2003, de 5 de septiembre) was approved.

Forestry degrees in Lleida 2009

In 2008 the Spanish Government established a new educational organization of Bachelor and Master-level programmes by issuing a Royal Decree (RD 1393/2007, de 29 de octubre). Regulations were developed to set competences to be acquired, or learning outcomes, and contents in degrees with professional qualification for the Bachelor programmes (O. CIN/324/2009, de 9 de febrero), and for the Master of Forestry (O. CIN/326/2009, de 9 de febrero) programmes. The application of new regulations triggered new curricula in Lleida: a 4-year Bachelor in Forest Engineering (*Grado en Ingeniería Forestal*), and a 1-year Master (*Master Ingeniero de Montes*). The study plans of these programmes are presented in Tables 3 and 4.

The new system presented some important new aspects for academic life, mechanisms of adaptation to the EHEA that induced the students to acquire the competences described as the learning outcomes of the educational programmes:

Table 1. Study plan of the former Technical Forest Engineering (Forest Exploitation) programme (first cycle) at the University of Lleida.

First year			
First semester		Second semester	
Credits	Subject	Credits	Subject
6	Biology	6	Forest botany
6	Calculus	4.5	Forest ecology
6	Mechanics	6	Electromagnetism and thermodynamics
6	General chemistry	6	Algebra and statistics
4.5	Topography and cartography	9	Geology, soil science and climatology
		6	Organic chemistry and biochemistry
Second year			
Credits	Subject	Credits	Subject
9	Forest protection	6	Construction
7.5	Hydraulics & water engineering	6	Forest mensuration and inventory
4.5	Graphic expression	6	Forest mechanization and electrification
6	Surface hydrology and soil conservation	4.5	Range management
4.5	Forest zoology	9	Silviculture and reforestation
Third year			
Credits	Subject	Credits	Subject
4.5	Environmental impact assessment	9	Forest harvesting and road management
9	Economics	4.5	Forest management
6	Wildlife, fisheries and game management	6	Projects
4.5	Optional 1	12	End-of-cycle project (TPT)
4.5	Optional 2	4.5	Optional 4
4.5	Optional 3	4.5	Optional 5

- Evaluation was based on continuous assessment. This forced to consider testing, lab reports, exams, oral presentations, resolution of study cases, and more variety of other assessment activities than previously. Regulations were established to have at least 3 evaluation activities of different type for each course, all evaluation activities should represent ≤ 50% of final grade, and a second chance for written tests counting 30-50% of final grade was to be given.
- Focus on practical training. One ECTS credit was made equivalent to 10 hours with instructor and 15 h of individual or group student work (25 h in total). Out of the 10 h with instructor, at least 4 h should be devoted to practical training in small groups (less than 20 students). Besides, special courses of integrated practical work were made compulsory each annual period (6 ECTS credits), devoted to a basic environmental study (1st year), a watershed scale study (2nd year) and a forest management plan (3rd year). The last year of the programme the student would spend an applied period in a company or institution (6 ECTS credits) and publicly defend a final degree professional project (12 ECTS credits)
- Student's personal attention. For many years, the faculty was required to keep (and make public) 6 h/week free in their schedule for tutoring students, though

students did not very often use this time allotted to them for one-on-one interaction. In an effort to increase availability outside the class and provide better counselling and assistance to students, a tutorial program called Nestor has been established. Nestor makes use of a Sakai platform to favor interaction with students, who are assigned the same tutor from the first year throughout the fourth.

Table 2. Study plan of the former Forest Engineering programme (second cycle) at the University of Lleida.

First year			
First semester		**Second semester**	
Credits	Subject	Credits	Subject
9	Forest protection	6	Silviculture and reforestation
4.5	Hydraulics & water engineering	9	Forest harvesting and road management
6	Wildlife, fisheries and game management	6	Forest inventory and mensuration
6	Surface hydrology and soil conservation	4.5	Construction
6	Project management	4.5	Range management
9	Forest product industries and technology	4.5	Geographical information systems
Second year			
Credits	Subject	Credits	Subject
4.5	Project engineering	4.5	Forest management
4.5	Statistics in forestry research	4.5	Advanced forest management
4.5	Numerical methods	4.5	Forest policy and legislation
6	Business management and organization	6	Silvicultural techniques
6	Physical planning and landscape architecture	15	End-of-cycle project (TPT)
15 – 60 credits of optional subjects depending on student's background			

At the time of the issuing of the degrees, in 2008-2009, though, the number of TFE and EF graduates had dropped both to 50 per year. By 2012, enrolment of incoming students (TFE) had dropped from 130 per year to less than 60, a trend common to other Engineering studies in Spain, which in turn reduced the academic level of entry requirements demanded for new students. The number of Erasmus mobility students had remained around 25 a year, but in 2013-1014 only 14 have applied for the grant. A rise in tuition approved for 2012 is expected to create problems to new and former students, and the more traditional forestry job market is basically non-existent at this time.

There are yet no graduates from the new Bachelor programme in forest engineering (until 2014), but preliminary results from a survey in 2012 showed an acceptable level of student satisfaction on the implementation of the Bologna Process and the resources made available to them at the School of Agrifood and Forestry Science and Engineering of Lleida (UdL), which might support the impression that the university system is improving its quality and competitiveness as expected with the Bologna process.

Table 3. Study plan of the current Bachelor programme in Forest Engineering at the University of Lleida.

First year			
First semester		Second semester	
Credits	Subject	Credits	Subject
6	Forest biology and genetics	6	Mathematics II
9	Physics	9	Forest botany
6	Mathematics I	6	Earth sciences
9	Chemistry	9	Ecology, plant ecophysiology and forest zoology
Second year			
Credits	Subject	Credits	Subject
6	Hydraulics and water engineering	6	Business economics
6	Forest hydrology	6	Statistics and computing
6	Graphic expression and cartography	6	Forest mechanization
6	Integrated practice I	6	Integrated practice II
6	Topography, GIS and remote sensing	6	Reforestation
Third year			
Credits	Subject	Credits	Subject
6	Inventory, forest mensuration and forest sampling	9	Wood-industry chain
6	Forest engineering	9	Forest fires and forest health
6	Wildlife management	6	Integrated practice III
9	Range & forest management	6	Silviculture
Fourth year			
Credits	Subject	Credits	Subject
9	Land and environmental planning	6	Placement
6	Forest policy and legislation	12	End-of-programme project
6	Projects	12	Optional subjects2
12	Optional subjects1		

Table 4. Study plan of the current Master programme in Forest Engineering at the University of Lleida.

First year			
First semester		Second semester	
Credits	Subject	Credits	Subject
6	Business administration	6	Business management
4	Renewable energies and biomass	4	Forest governance
4	Tree breeding	6	Round wood industries
6	Board and cellulose industries	6	Environmental management of forestry activities
6	Land use planning tools	4	Non-timber forest products industries
4	Planning and management of protected areas	4	Environmental policy
Second year			
Credits	Subject		
12	Master thesis		

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[2] Four different optional subjects will be offered every year for each of the two mentioned (Natural system management and Environment and landscape). Students who follow three optional subjects of the same mention will be given a quotation in their records.

Concluding remarks

Some crucial questions remain to be answered:

Will these structural changes implemented really allow our forestry students to cope better than before with current and rapidly changing demands in a volatile job market? What will be their chances for specialization if regulated study plans in the different Forestry Schools (16) in Spain have made their backgrounds more homogeneous?
If length of study programmes separates us in fact from other European countries with 3-year Bachelors and proportion of electives has been drastically reduced, what opportunities for mobility are we providing?

As the forestry job market has practically disappeared in Spain, will we be able to provide placements that are compulsory to obtain a degree? Can we enforce them even if that means that students may have to move to other provinces, regions or even countries, and assume the costs?

We propose that the future will give more and more importance to the development of more diverse and international backgrounds, and a return to the 3+2 system, which was in place before 2008.

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GOOD BYE DIPLOMA, WELCOME BACHELOR AND MASTER: ON THE EXPERIENCES OF TRANSFORMING STUDY PROGRAMMES IN FOREST SCIENCES AT TECHNISCHE UNIVERSITÄT DRESDEN

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Abstract

The Department of Forest Sciences in Tharandt of the Technische Universität Dresden (TU Dresden) introduced the bachelor programme "Forest Sciences" in 2006, followed by the homonymous master programme "Forest Sciences" in 2009. An Advisory Board (Programmbeirat), consisting of representatives from different groups of employers, accompanied the reform. Because of a 'real' switch with new contents and methods from the beginning on, the change to the Bologna system was a challenging task for students, lecturers and administrative staff. Although some traditions and familiar things like the German Diploma degree and - at least partly - the lecturers' individual freedom of teaching were lost, some advantages and achievements became obvious. To these belong, amongst others, a stronger commitment for quality in teaching, a new culture of communication between lecturers, and an increasing flexibility for the students with regard to future employment.

Keywords: Higher education; Bologna process; academic reform; forest sciences; students; lecturers; administrative staff

General features of the transformation

As has been reported earlier within the SILVA Network by Grosse *et al.* (2013) and Böhnke and Weber (2013), the Department of Forest Sciences in Tharandt of the Technische Universität Dresden (TU Dresden) has been deliberately replacing the former diploma education with regard to contents and didactics. This decision followed the intention of a general improvement of university education in forest sciences, the actualization of teaching contents, and an improved employability of the graduates. Consequently, the Bachelor programme "Forest Sciences" was introduced in 2006, followed by the master programme "Forest Sciences" in 2009.

The activities within the reform resulted in several major changes:
- A polyvalent orientation of the bachelor education, opening two ways for the graduates: a direct entry into the job market and an opportunity to continue studies in a master programme, respectively;
- An interdisciplinary organization of modules with at least two professors involved in a module;

- An orientation of name and contents of the modules towards qualification instead of representing academic disciplines;
- An orientation along the Dublin Descriptors for elaborating the different levels of difficulty in the bachelor and the master programme;
- The design of new modules for transferable skills (in German language AQUA - *Allgemeine Qualifikationen*) with a total of 20 credits;
- A large share of semi-obligatory modules, allowing students to diversify their studies according to individual profiles;
- The modification of teaching methods (increasing students' contributions in the form of seminar papers, oral presentations, assignments, team work etc.).

The reform was accompanied by an Advisory Board (*Programmbeirat*) consisting of representatives from different groups of employers who were appointed by the Rector of TU Dresden (see Grosse *et al.*, 2009). The changes were also communicated to forest authorities and enterprises as a marketing activity for future graduates. In this article, the main focus is laid on the experiences with the bachelor programme in Forest Sciences until today and some preliminary observations about the master programme in Forest Sciences are presented.

Personal experiences from the view of a lecturer

Within the transition, major challenges arose with regard to teaching contents, teaching methods and organizational issues. Especially the question of teaching contents was highly controversial, at least at the beginning of the reform. However, after several discussion rounds in the Commission for Study Affairs of the Department (*Studienkommission*), the Advisory Board (*Programmbeirat*) and additional Meetings of the Lecturers (*Hochschullehrer-Vollversammlung*), a consensus was found towards interdisciplinary cooperation, leading to the request that in almost each module at least two lecturers from different professorships should be involved. In some cases, three or more lecturers were taking part in one module. Even more crucial was the necessary reduction of teaching contents as a consequence of the increased share of self-study elements. Due to the shift from the teaching-oriented to the learning-oriented perspective, each lecturer had to decide which teaching issues were absolutely necessary and which ones were 'nice to have'. In addition to that, several subjects were modernized and adapted to changes in the forestry sector and societal developments. For example, the former lecture series in forest administration of the diploma programme was split into several lectures on forest organization (including private entrepreneurship) in the bachelor programme and a module on forest governance in the master structure.

It goes without saying that the change of subjects and teaching forms, relating all forest faculties in Germany, was critically accompanied by practitioners from the forest sector. Especially state forest authorities and enterprises, still a very important group of employers for graduates in forest sciences, were afraid of reduced core competences in forest sciences after the introduction of the Bologna

System. During a regular meeting of the German universities engaged in forestry education (*Forstlicher Fakultätentag*) in Tharandt in 2010, these concerns were intensively discussed with leading representatives of the forest sector. Another question to be solved was how to deal with deficits in school education of first-year students. A preliminary solution was introduced in the form of pre-study courses in chemistry and informatics.

In a survey of the 74 Bachelor students enrolled in 2011, before starting with the study programme of forestry, 35% have completed a voluntary ecological or social year, military service or alternative civilian service; 11% dispose of a completed professional education; 11% have started with another study programme before; 8% stayed abroad or made a practical training.

Lecturers were affected by organizational issues in several ways. Firstly, freedom of teaching to a great extent was replaced by co-ordination and control. Descriptions had to be drafted for each module and inserted into official forms edited by the ministry and modified by the university. As a new task, each lecturer had so specify his or her proportions in teaching contributions to each module with regard to hours and teaching forms, the data being submitted to the university administration after each semester. Secondly, combined lectures between several study programmes (within the Department of Forest Sciences; within the Faculty of Environmental Sciences - then Forest, Geo and Hydro Sciences - and other Master courses at the university) reminded to an unsolvable Sudoku. Thirdly, the ambitious education aims (e.g. opportunities to make a selection between several courses) necessitated an increased share of external lecturers who had to be financed within a budget that was not increasing. Finally, all the courses from different lecturers had to be organized within one module and within a schedule without buffer times.

Until today, the issue of examinations has been a tricky one. Especially the former decision on university level that each module (even modules with 5 ECTS) had to be finished with two examinations resulted in an enormous workload for lecturers as well as students. Moreover, as a voluntary courtesy, Bachelor students were allowed to repeat examinations after each semester and not only after one year. It should also be mentioned here that the implementation of the structural alignment concept proved difficult.

With regard to the Bachelor´s theses, it was necessary to find a lot of issues suitable for the students to be accomplished in three months. Requirements (outline, lengths, scientific standards, citation etc.) had to be defined and the evaluation procedure had to be decided on. For handling the additional workload for the evaluators, a standardized form was developed. This form enables an assessment on two pages, including an evaluation of formal questions and the scientific content by ticking the respective line under five columns ranging from 'excellent' to 'not satisfying'. Concerning the defence, there was a broad consensus to introduce the requirement of a public defence for the master students as well as for the bachelor students.

However, in the latter case the conditions have been fixed on a lower level and the time for presentation and scientific discussion limited to 25 and 20 minutes, respectively.

In addition to the above mentioned phenomena, intermediary challenges had to be met. For a period of several semesters, diploma and bachelor courses had to be offered at the same time. Due to limited capacities of lecture halls, this was not easy to handle. Although this is an exception, even today some people have not yet completed their diploma thesis. A second problem arose because of the official teaching capacity calculations (cf. sub-national, i.e. Saxonian regulation for lecturing obligations of the staff). According to the official calculations, the average teaching load for the Department made 80-90%, but most of the lecturers had a "real" teaching load of more than 120%.

Other difficulties occurred as a consequence of the intermediary situation at some chairs where the incumbents where not yet appointed. It proved difficult to take the interest of these disciplines into account without knowing about the preferences and profiles of the future professors.

A look at the students - from a lecturer's view

From the perspective of a lecturer (and of the Dean of Studies), the change from diploma to bachelor and master programmes had positive as well as negative consequences for the students.

Negative aspects of the reform became visible soon after introduction of the new programmes. Many bachelor students are complaining about a high workload as a corollary of many examinations. In spite of the fact that study fees are not imposed in Saxony, most of the students are earning money in side jobs. Alarming is the reduced interest in social commitment at the university as well as in public life. Some students even need psychological support to handle the challenges of the study. A permanent problem becoming obvious from the evaluation sheets is the discrepancy between the necessity of self-study and the time actually dedicated to these studies. However, this is not a genuine problem of the Bologna system. Similarly, this is true for the discrepancy of the wish to enable tailor-made education profiles for each of the students and the teaching capacities. In practice, there is a limited amount of places in special modules (e.g. where technical equipment is limited or where the time for oral presentations is restricted). This often makes it necessary for students to postpone their participation into the next year or even to choose an alternative module.

As a consequence of the obligatory courses and the increased amount of examinations, it became difficult for students to replenish their studies with courses in other study programmes at the university going beyond forest sciences. Further shortcomings also cannot be attributed to the bachelor and master system. To these

belongs the fact that many students are looking for the easiest way to acquire their degrees, including the phenomenon that elective or semi-elective courses are only attended at the time when presentations have to be delivered. Free rider effects in group work are also possible in any kind of study programmes.

As is the case in many other bachelor programmes in Germany, a real reduction of the study time has not been achieved. Many students are still writing their bachelor thesis when they are already inscribed in a master program. This is possible because of a special clause that enables students having already collected 80% of their ECTS in the bachelor to commence master studies. Mobility of the students within the bachelor programme did not increase. On the other hand, after the bachelor examinations there is a kind of 'brain drain' because some of the best students change the universities to inscribe for a master programme elsewhere.

With regard to the master students, due to the fact that the study programme "Master of Forest Sciences" was only introduced in 2009, there are not so many experiences available. However, some deficiencies became already obvious. Students are not always satisfied with the teaching contents, some of them missing a clearer distinction between contents and requirements for the bachelor and master programme. On the other hand, the aptitude test procedure, scheduled before admission to the programme, proved as a suitable instrument for allocating students to one of the three specialisations within the master programme. These are Management of Forest Resources (*'Management von Waldressourcen'*); Biodiversity and Organisms (*'Biodiversität und Organismen'*); and Forest-Environmental Systems in Change *('Forstliche Umweltsysteme im Wandel').*

Taking a look at the positive effects, from the lecturer's perspective it is joyful to see how most of the students develop their professional knowledge as well as their personality during the Bachelor studies. Although there is a visible stronger variation in comparison to Master defences, within Bachelor defences the candidates are able to demonstrate that they have accomplished the state of 'employability', even if most of them decide to continue their studies in a Master programme. The fact of inter-university mobility of the Bachelor graduates, mentioned as a disadvantage in the case of brain drain, also opened new chances because TU Dresden gained promising students for the Master courses from other universities and universities of applied sciences, respectively.

Another positive effect has to be seen in the regular evaluations by the students of the teachers. However, the mid-term evaluation as prescribed by the University was not working efficiently. Due to the above mentioned fact that many modules were designed by two or more teachers, the contributions of the lecturers active in the second half of the module were not covered by the evaluation. Regulations have been changed recently, so the time of the evaluation has been shifted to the end of the respective semester.

Student tutor's contributions proved extremely helpful for the implementation of the ambitious education aims in the Bachelor courses. These students are guiding the beginners in many fields of study, ranging from the introduction to methods of natural and social sciences to courses in botany and other specified fields. Unfortunately, the financial budget for the tutors is very limited.

Challenges for the administrative staff

The reform brought about a lot of challenges and burdens not only for lecturers and students. It was especially the administrative staff who had to care for organizational implementation of the ambitious objectives. For that purpose, first of all the study conditions and examination regulations had to be drafted and adapted in an iterative negotiation process with the university administration.

A lot of framework conditions on international level (e.g. Dublin Descriptors) as well as national level (e.g. recommendations of the German Conference of Ministers for Education (KMK), Conference of Rectors of the Universities (HRK), Saxonian Ministry of Science and Education) had to be screened with regard to their relevance. Changes in the structure of the studies also had to be communicated and discussed in international (e.g. SILVA Network) and national networks (e.g. Association of German Faculties of Forest Sciences - *Forstlicher Fakultätentag*).

Many students sought advice about the new study programmes and were asking recommendations about individual profiles. The number of examinations to handle increased significantly, many examinations had to be scheduled and the examination results had to be processed. Timetables had to be tuned not between different study programmes and even across different sites with lectures in Tharandt and in Dresden (it should be mentioned here that some modules involved up to seven lecturers from different faculties of the University). The extended share of seminars and group work necessitated a detailed disposition of classrooms and software solutions had to be developed to handle the enormous amount of data. A difficulty still not completely solved is the enrolment of students for elective and semi-obligatory courses, although there are no more 'night queues' for favoured courses with a low number of available places.

Further challenges

It was in July 2012 when Technische Universität Dresden was awarded as one of only eleven Universities of Excellence in Germany. In addition to the establishment of new research branches and graduate schools, especially the *Zukunftskonzept* (Concept for the Future) has many implications for all units of the university. The first changes already took place, leading to the introduction of five so-called schools above faculty level. Hence, the role of the faculties and departments has to be redefined. The name of the faculty changed its name from Faculty of Forest, Geo and Hydro Sciences to Faculty of Environmental Sciences, belonging to the School

of Civil and Environmental Engineering now. With regard to teaching forest sciences, the following aspects are relevant:

- Introduction of a university-wide quality management for teaching, including system accreditation; coordinators for each study programme (one from the group of the lecturers and one from the group of students, respectively); and obligatory evaluation of lectures;
- Introduction of comprehensive electronic data processing systems for Enterprise Resource Planning (ERP) and Student Lifecycle Management (SLM);
- Partial reduction of personnel (professors, academic staff, administration) for securing the sustainability of newly introduced research fields in natural sciences and engineering sciences;
- Deliberations for a common introductory year for all study programmes at the level of the new Schools;
- Efforts for an intensified internationalization in education.

At the moment, the Department of Forest Sciences at TU Dresden is realizing a 'reform of the reform' of the Bachelor programme. This step is a consequence of the above-mentioned observations. It also enables the Department to adapt education to personnel cutbacks to be expected in the medium term. The changes include, amongst others, a moderate strengthening of fundamental sciences/basics (chemistry, mathematics, biometrics); a re-arrangement of responsibilities for modules; a reduction of 'micro-teaching' contributions, i.e. contributions of less than five hours per module; a reduction of the number of examinations; and a window of opportunity in the 5th semester for enabling mobility within the programme. In parallel, the Commission for Study Affairs has started discussions about how to reform the Master programme in forest sciences. With regard to the third cycle of the Bologna process, the Department has been actively involved in the Erasmus Mundus PhD Programme FONASO (Forests, Nature and Society). In addition, special courses for PhD students are offered on Faculty level.

Conclusions and outlook

After the official introduction of the Bologna System in higher education in Germany, many critical voices from actors in university education as well as from the employers' side were heard. Even today, the reform is still in critique, although many graduates with a Bachelor and Master degree found an adequate employment. In the field of forest sciences at TU Dresden in Tharandt, the introduction of Bachelor and Master programmes was a challenging task because of a 'real' switch with new contents and methods from the beginning on. In spite of some reservations towards the Bologna system as a whole, the lecturers were following the intention to use the full potential of the new structures for fundamentally improving university education in forest sciences. During implementation, it proved that in some cases with small contributions to several modules, organization of teaching demanded even more time than the teaching itself.

As a consequence of the decision for Bologna, some traditions and familiar things were lost. To these belong, above others

- The famous German Diploma degree in forest sciences (*Diplom-Forstwirt Univ.*) that was well-known and highly accepted by the employers;
- The individual freedom of teaching with regard to contents and forms;
- The former three week semi-obligatory intensive courses as a central element for advanced students in the Diploma programme.

On the other hand, some advantages and achievements became obvious, especially a stronger commitment for quality in teaching and a new culture of communication between lecturers about teaching affairs. For the students, there is a possibility for re-orientation after the Bachelor programme. According to their preferences, they can decide to study in different Master programmes at the Department or at another university in Germany or abroad, respectively. Only a small amount of them decides to apply for a job directly.

During the time of transition, some facts proved to be very helpful. As a kind of Advisory Board, the so-called *Programmbeirat*, has supported the Department by providing concrete advice as well as communicating the changes in the respective fields of work where the future graduates should be employed. Furthermore, the Michael-Jahr-Foundation supported the process by awarding the best Master graduate with a price (Bonn and Weber, 2012).

After the introduction of bachelor and master programs at TU Dresden, an assessment of the heads of state forest services and enterprises in Germany acknowledged that students aspiring to a position in the public forest service are disposing of the expected knowledge and skills. Besides, the introduction of the bachelor level enabled students to officially apply for the education for the higher intermediate civil service (*Anwärterzeit*) after graduation. Furthermore, the bachelor degree as a 'breaking point' increases students' flexibility, as they can choose between several master programs at TU Dresden or anywhere in the world. In the near future, a new survey about the employment of forestry graduates, designed in cooperation with other universities offering forest education in Germany, will answer the question to which extent the graduates with a Bachelor or Master Degree were able to find adequate positions.

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FORESTRY STUDY PROGRAMMES AFTER BOLOGNA: DO THEY QUALIFY OUR STUDENTS FOR THE JOB MARKET?

ACHIM DOHRENBUSCH

Abstract

More than ten years after the Bologna reform for the European universities, the situation of the academic education is regarded for the forest sector. The main goals of Bologna – a faster study and a better focus on learning outcomes instead of learning specific knowledge, did not bring the expected success. In addition to the general Bologna problems for all disciplines there is a specific situation for the forest education, because the forest administrations have clear demands concerning the education contents that do not correspond in all areas with the Bologna goals.

Keywords: Bologna process, forestry education, forest administration.

Introduction

During the last decades education principles have changed at all levels: At secondary school level we already have some results about the advantages and disadvantages of different education systems in the different parts of the world. The PISA study for elementary school level showed big differences in learning competences between countries and states. A central result was that both – how and what pupils learn is important for a successful education. On university level, the situation is more complex and there is a big variety of disciplines and traditional cultures. The following short contribution is dealing with the question, whether the academic education in forestry is on a good or a critical way.

The Bologna process – hope and reality

The so-called Bologna Process, a reform of the traditional academic education, significantly changed the education principles at university level. Studies should be

- Faster;
- More structured;
- Focused on learning outcomes (these ELO should prepare for the job).

In response to these goals, the question will be addressed, if the current BSc and MSc programmes can provide sufficient competences and skills, which are relevant for the job market.

The average study programme for students should be faster, that means shorter in comparison to the former diploma study programme with a regular study duration of four to five years. The Bachelor concept should qualify students already after

three years for a job. An assessment with 121 new students starting their first semester forest sciences in Göttingen (Anonymous, 2012) showed that only 11% of this group intended to finish studying definitely after the three years Bachelor study. For 35% it was clear that a master study will certainly follow. The majority, or 54%, were undecided and would make their decision depending on the future study development, the job market situation or the personal financial condition. Thus, for the majority of the students the goal was to be prepared for the job market not before the master degree, and this means a significant longer stay at the university in comparison to the former diploma degree. In this respect, this central Bologna goal has failed.

Another important Bologna goal was that the students should learn less, particularly less detailed facts. They should have greater general knowledge of the basics and should be able to solve problems on their own. In this context, soft skills should have been more important elements of a study programme. At first sight it seemed logical, that six semesters of a Bachelor study meant less subject matter to learn than eight semesters of a diploma study. In fact, it is a difficult task to convince professors that they really must reduce the contents of their lectures, seminars and exercises. According to a survey with 277 students between 1983 and 2010 by the University of Konstanz, Germany, the strain felt by the students has reached dramatic values, in particular compared with former diploma study programmes (see Bargel *et al.*, 2009). Nowadays 40% of the bachelor students complain about too many examinations per semester, whereas only 17% of the group of diploma students have had similar problems. In addition, they have felt more uncertain about the requirements during the study: Only 22% of the bachelor students believe that there are clear examination requirements, under the diploma students this portion was 50% higher!

Figure 1 (next pages). Forestry Bachelor study programmes of the four German universities with academic forestry education, Göttingen (page 37), Dresden (page 38), Freiburg im Breisgau (page 39) and Munich (page 40) as downloaded from their websites and from Anonymous, 2013.

1. Semester (Wintersemester, 31 Credits)					
6 C B.Forst.101 Grundlagen der Fostbotanik	6 C B.Agrar.xyz Grundlagen der Betriebs- und Volkswirtschaftslehre	6 C B.Forst.103 Naturwissenschaftliche Grundlagen	7 C B.Forst.104 Grundlagen der Biometrie und Informatik	3 C B.Forst.105 Forstzoologie u. Waldschutz	3 C B.Forst.106 Wildbiologie u. Jagdkunde

2. Semester (Sommersemester, 29 Credits)					
6 C B.Forst.101 Grundlagen der Fostbotanik (Forts.)	6 C B.Forst.107 Ökopedologie	5 C B.Forst.108 Bioklimatologie	6 C B.Forst.109 Rechtliche Grundlagen	4 C B.Forst.105 Forstzoologie und Waldschutz (Forts.)	2C B.Forst.110 Vorbereit. Berufs-praktikum

3. Semester (Wintersemester, 30 Credits)				
7 C B.Forst.111 Waldbau	3 C B.Forst.107 Ökopedologie (Forts.)	3 C B.Forst.112 Forstliche Marktlehre	5 C B.Forst.113 Forstgenetik	12 C B.Forst.110 Berufspraktikum (8 Wochen + Nachbereitung) - ingesamt 14 C mit der Vorbereitung im 2. Semester -

4. Semester (Sommersemester, 30 Credits)				
5 C B.Forst.114 Waldbau - Übungen	6 C B.Forst.115 Naturschutz u. raumbezogene Informationssysteme	6 C B.Forst.116 Technische Produktion im Forstbetrieb	6 C B.Forst.117 Forstliche Betriebswirtschaftslehre	7 C B.Forst.118 Methoden der Erfassung von Waldbeständen

5. Semester (Wintersemester, 30 Credits)			
12 C B.Forst.201 (Wahlpflicht) Vertiefungspraktikum (Forschungsprakt. u. Literaturseminar) 12 C Bachelorarbeit	6 C B.Forst.119 Waldwachstum und Forsteinrichtung	6 C B.Forst.120 Forstliche Biometrie	6 C B.Forst.3xx Wahlmodul

6. Semester (Sommersemester, 30 Credits)				
12 C Bachelorarbeit 6 C B.Forst.202 (Wahlpflicht) | 6 C B.Forst.203 (Wahlpflicht) Betriebsanalyse | Anwendungsorient. Projekt	5 C B.Forst.121 Holzbiologie, Holztechnologie und Holzkunde	5 C B.Forst.122 Politikfeldanalyse Forstwirtschaft	6 C B.Forst.3xx Wahlmodul	2 C B.Forst.123 Präsenta-tion wiss. Arbeiten

■ Wissenschaftliches Profil   ■ Anwendungsorientiertes Profil   ■ Berufspraktikum   ■ Wahlmodul

Wahlpflicht: (à 5 ECTS)	Internationale Forstwirtschaft	Nachwachsende Rohstoffe: Züchtung und Plantagentechnologie	Stoffflüsse in Waldökosystemen
	GIS	Naturschutz und Umweltrecht	Gehölzmedizin

Bachelor of Science in Forstwissenschaft und Ressourcenmanagement

(1 Semester = 30 ECTS)

6 SS	Bachelor´s Thesis	Bachelor´s Thesis	Wahlpflicht	Projekt	Praktikum	Praktikum
5 WS	Landschafts-entwicklung	Forstbetriebliche Informatik und wissenschaftliche Methoden	Wahlpflicht	Forstplanung	Rohstoffmärkte und Qualitätssicherung	Wald- und Umweltpolitik
4 SS	Waldstandorte	Forstliche Verfahrenstechnik	Zivil- und Öffentliches Recht	Waldbau	Technologie und Verwertungslinien von sonstigen biogenen Rohstoffen	Waldschutz
3 WS	Natürliche Ressourcen: Boden und Standort	Ergonomie und Arbeitsrecht	Forstliche BWL	Wald, Wachstum und Umwelt	Technologie und Verwertungslinien von Holz	Tierökologie

2 SS	Mathematik II	Ökoklimatologie I	Organische Chemie	BWL	Inventur		Physik	Biologie II
1 WS	Mathematik I	Ökoklimatologie II	Anorganische Chemie	VWL	Allgemein bildendes Fach	Eigenschaften von Holz und sonstigen biogenen Rohstoffen	Informations-kompetenz	Biologie I

Curriculum Umweltnaturwissenschaften
(Durch Klick auf die Modultitel erhalten Sie weitere Informationen)

6. Sem.	BOK extern		Bachelor-Arbeit		Praktikum
5. Sem.	BOK extern	Projektstudie	Wahlpflicht	Wahlpflicht	Nebenfach
4. Sem.	Mikrobiologie 61430	Stoffkreisläufe in Ökosystemen 61440	Umweltsystem-modellierung 61450	Wahlpflicht	Nebenfach
3. Sem.	Geomatik II (GIS) 61395	Statistik 61305	Geschichte, Politik und Ökonomie 61325	Physik 61340	Nebenfach
2. Sem.	Landespflege 61205	Geomatik I (Kartographie, Fernerkundung, Datenbanken) 61295	Biologie und Ökonomie 61225	Ökochemie und Bodenschutz 61240	Nebenfach
1. Sem.	Allgemeine + Anorgan. Chemie 61130	Klima und Wasser 61195	Biologie und Ökologie 61225 / Boden-kunde 61125	Mathematik f. Naturwissen-schaftler 61140	Geomor-phologie 61165

Bachelor-Studiengang Forstwissenschaften Ablaufplan Module

1./WiSe	Biometrie 1 **Berger** Römisch	Rohstoff Holz 2 **Bues** Fischer	Biologische Prozesse 3 **Roloff** Roth Krabel	Fauna 4 **Roth**	Böden 5 **Makeschin** Feger	Ökologie 24 **Dudel**	Englisch 46 **Bauch**	Waldbrand-schutz 47 **Müller**
2./SoSe	Dendrologie 6 **Roloff** Schmidt Bues	Stoffhaushalt 7 **Feger** Makeschin	Waldmess-lehre 8 **Röhle** Berger	Inventur-Verfahren 9 **Maas** Möser Bitter	Informatik 43 **Berger**	Rohholz-sortierung 26 **Bues** Röhle	Flora 27 **Schmidt** Roloff	Wildbiologie 28 **Herzog**
3./WiSe	Forstrecht, -geschichte 10 **Weber** Schmidt Marsch Koch	Bestandes-behandlung 11 **Wagner** Erler Müller	Produktions-leistung 12 **Röhle** Bitter Deegen	wissensch. Arbeiten 13 **Pretzsch** Uibrig, Dudel Erler, Weber Vogel	Klima und Standort 14 **Bernhofer** Feger	Osteuropa 29 **Bemmann** Große Pretzsch Schmidt	Holzver-wendung 30 **Fischer** Bues	Jagd **Herzog** fakultativ! Krüger
4./SoSe	Rentable Bestandes-wirtschaft 15 **Deegen** Wagner Erler	Hiebsarten 16 **Wagner** Wolf	Wildtier-management 17 **Herzog**	Vegetation 18 **Schmidt** Feger	Komplex-exkursionen 38, 39, 40, 41	Walder-schließungs-planung 25 **Erler** Bitter Möser	energetische Holznutzung 31 **Bemmann** Große, Fischer Albrecht, Bilitewski	Englisch 46 **Bauch**
5./WiSe	Waldschutz/ Grundlagen 19 **Müller** Fischer Herzog Roloff	Betriebliches Management 20 **Bitter** Deegen	Forst- u. Naturschutz-politik 21 **Weber** Schmidt	Soziale Kompetenz 45 **Erler** Herzog Pretzsch	Weltforst-wirtschaft 32 **Pretzsch** Uibrig Schmidt Bemmann	Erntenutzung 33 **Wagner** Schmidt Wolf Deegen	Naturschutz 34 **Schmidt** Pretzsch Wagner	Partizipative Planung 35 **Bitter** Weber
6./SoSe	Personal-management 22 **Erler** Bitter	Forstplanung 23 **Bitter** Schmidt Wagner	Umweltkom-munikation 44 **Roloff** Weber Sandfuchs	Privatwald-Politik 36 **Weber** Deegen Koch	Waldschutz/ Praxis 37 **Müller** Bues, Herzog Roloff	**Bachelor-Arbeit**		

23 Module des Pflichtbereichs

wahlobligatorische Module, von denen 8 zu belegen sind:
Wahlpflicht "fachlich" (mindestens 4 von 14)
Wahlpflicht "Aqua" (mind. 1 von 4)
Wahlpflicht Komplexexkursion (mind. 1 von 4)

The specific situation of forestry education

The central question is „Does the Bachelor and Master system provide students with those competences and skills that are relevant for their future life?" This cannot be answered for all study programmes in the same way. Different disciplines and studies have different cultures and traditions. There is a wide range from very open and flexible study structures with many elective courses and few clear job related ELO (Expected Learning Outcomes) on one side (i.e. humanities, social sciences) to study programmes with strong structures, mostly compulsory courses and many clear job related ELO on the other side (i.e. medicine, engineering sciences). Forest sciences are situated in between these two study structures. The forest sector is a very special one: Forestry education at university level is required to find the balance between the expectations of a research orientated university and the demands of the forestry administrations. Demands set by forestry administrations have a major importance for graduates because many of them find an employment in this economical sector. Forestry administrations demand a minimum of selected forestry related disciplines and practical parts, and this is operationalized through administration orders, direct negotiations and by the participation in accreditation processes.

In the meantime all academic forest universities in Germany have a similar structure in the BSc curriculum with clear blocks of the relevant disciplines (Figure 1). For the Master level, universities are forced to create a wide offer of study programmes to prepare the students for a changing and more diverse job market. The Master courses in Göttingen offer specifications in five options: Forest management, Forest nature conservation, Wood-biology & technology, Forest ecosystem analysis and Tropical & international forestry. On all levels soft skills are important elements for academic studies, which includes not only presentation techniques, abilities to work in a team, to lead and instruct a team, scientific working, IT knowledge, but also foreign languages and communication skills.

Conclusions

"Do we provide a study programme which qualifies our students for the job market?" The answer depends on the group which is interviewed. An assessment under 121 students of the first semester Bachelor in Göttingen (Anonymous, 2012) about their job perspectives shows that nature conservation and environment protection seems to be the most attractive option for a future job (49%), working in a forestry administration is regarded as a goal for 44%, occupation at international enterprises in foreign countries is attractive for every third student and 27% would prefer a job at national companies, dealing with energy, timber, industry and others. A scientific career seems attractive for 14%. Only 7% have an open mindset. And it is interesting to know that the interviewed persons seem to have a certain

experience: 61% of the new students have already had a practical or a study experience (another study started or finished, practical ecological year, apprenticeship).
e
The employers' side (especially forestry administration as a potential employer) expects more practical competences in the traditional forest disciplines. There is a permanent criticism through forestry administrations that graduates from university study programmes have un-sufficient knowledge concerning practical issues. Now, even if the job perspectives of forestry administrations for forest graduates have been improved during the last couple of years, it will be an option only for a part of our graduates. Graduates should be prepared for a wide range of job options, including forestry administrations. Thus, most of all education must improve the competence of the students to solve problems. And this qualification can be successful even if students do not know all specific details, as forestry administrations often demand. Soft skills have become an increasing importance in the academic education, but we should take care that this strong focus on soft skills on schools and universities will not replace expertise to a critical extent.

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APPROVAL OF EXTERNAL ECTS POINTS – THE BACKBONE OF STUDENT MOBILITY: DEFICITS AND CHANCES FOR IMPROVEMENT

GERHARD MÜLLER-STARCK AND MARTIN ZIESAK

Abstract

The frame conditions for student mobility have been improved gradually during the past 15 years. Political declarations and the corresponding re-structuring of curricula, particularly the establishment of the Master and Bachelor degrees and the European Credit Transfer and Accumulation System (ECTS), opened the door for a new dimension of student mobility. In contrast to these developments, the majority of European higher education institutions neglected cooperation with respect to the acknowledgement of course achievements abroad. As a consequence, students risk an involuntary prolongation of their studies if they spent a term at another Higher Education Institution abroad. Such cases are presented and deficits of Higher Education Institutions are described. Troubleshooting activities are presented exemplarily for two institutions, i.e. the Technische Universität München (TUM), Germany, and the Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften (HAFL) in Switzerland. It is concluded that an improvement of the current situation is urgently necessary. A set of possible solutions is compiled.

Key words: ECTS, student mobility, curricula, course achievement, BSc, MSc

Introduction

The "harmonisation of the architecture of the European Higher Education System" was initiated by the "Sorbonne Joint Declaration", signed 1998 by France, Italy, the United Kingdom and Germany. In 1999, the "Bologna Declaration" proceeded by establishing a new category of curricula within the European higher education systems: the Diploma was replaced by the Bachelor degree as the first cycle (BSc) and the Master degree as the second one (MSc). One of the major issues of the "Bologna Process" addresses student mobility by providing a "European Credit Transfer and Accumulation System" (ECTS). This system is the precondition for the approval of periods of study abroad. It opens up the possibility that students integrate external course achievements in their studies without prolongation of their curricula.

The two "Bologna Cycles", i.e. BSc and MSc, offer two kinds of flexibility:
- Each cycle can be completed at a different higher education institution;
- Within each cycle, periods of studies abroad can be integrated.

The last named type of flexibility is the focus of the present study. The integration of studies abroad and corresponding experiences are considered as a significant element of any higher education. In this sense, both Bologna cycles are concerned, although difficulties concerning the integration of studies from abroad may be cycle specific because of the different duration and structure of curricula.

Evidently, course achievements from abroad are not acknowledged sufficiently in many cases. Unexpected prolongation of curricula will hinder student mobility and counteract joint European efforts such as the ECTS rules schema. Some ideas for improvement were already presented 2012 in St. Petersburg, particularly with respect to the structure of curricula (Ziesak and Müller-Starck, 2014). The present study will focus on the way of approval of external ECTS points. Cases of non-sufficient acknowledgement of course achievements will be pointed out and contrasted with troubleshooting scenarios of other institutions. In order to improve the current situation, pathways will be described and possible solutions offered in order to overcome obstacles in the approval of external course achievement within BSc or MSc curricula, respectively.

Curricula, credits and mobility

Two higher education institutions will be in the focus in order to demonstrate deviating concepts in the approval of external ECTS points, which are the Technische Universität München (TUM), Germany, and the Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften (HAFL) in Switzerland.

Technische Universität München (TUM)
The two Bologna cycles, BSc and MSc, at TUM were addressed 2010 in Zagreb and the PhD curricula as a third one (Müller-Starck *et al.* 2013). A detailed description of the matrix structure at the "Centre of Life and Food Science" (Wissenschaftszentrum Weihenstephan für Ernährung, Landnutzung und Umwelt, "WZW") is given there. The peculiarity of this structure is the integration of six schools and six research departments.

At the School of Forest Science and Resource Management one bachelor and two master curricula are offered (internships included) as well as one PhD programme:
- Bachelor: Forest science and resource management (German); Undergraduate programme, 3 years (= 6 semester);
- Master: Sustainable resource management (English); Graduate programme, 2 years (= 4 semester);
- Master: Forest and wood science (German); Graduate programme, 2 years (= 4 semester);
- PhD student programme: Sustainable management of environment and resources (German/English).

Although TUM accepts modules with up to 12 credit points according to the ECTS scheme, the School of Forest Science and Resource Management has a consistent module structure for all curricula:

Each module comprises a workload of five ECTS, each semester in total 30 ECTS. Consequently, one term consists of six modules with exceptions concerning the duration of internships and the Bachelor and Master thesis, respectively. This structure holds for compulsory and for optional modules.

Up to 50% of the modules can be taken abroad and the external course achievements will be integrated. Consultation before leaving is facultative. Additional exams are listed in the final graduation documents, but the final mark refers to TUM credits only.

The Bern University of Applied Sciences, Switzerland (Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften, HAFL)
HAFL offers several curricula in the field of agriculture, forestry and food sciences. A BSc and two MSc programs cover forest science and forestry related environmental aspects. All students who want to study for a semester abroad and who then usually participate in the ERASMUS exchange scheme have to follow the following procedure:
- A learning agreement has to be developed together with a mentor before travelling abroad (obligatory);
- The student can go abroad only after an intensive consultation;
- The credits obtained during the exchange period are transferred to the home institution's transcript of records. They compensate the "missed credits" from the home institution. No grades are transferred; the exchange courses are either "passed" or "failed". The student gets a transcript of records from the host institution, where the grades are shown. Therefore, the final grade includes only original HAFL credits (neither credits from the exchange university nor APL credits (accredited prior learning), which could be achieved for instance from a study period at a different university before enrolment at HAFL);
- There is no obligation for the student to catch up HAFL courses which he missed during his time abroad.

This process facilitates a maximum of flexibility for the student in picking subjects of his interest at the guest university, as the size of modules does not matter at all. The HAFL recommends 30 ECTS to be taken at the host university. However, if a student wants to take fewer courses, he is then responsible to follow more courses after his return.

Drawbacks concerning student mobility

Although the School of Forest Science and Resource Management of the TUM has opened the door wide for acceptance of course achievements from abroad (up to

50% of the modules), problems arise from the fact that external modules need to be equivalent to the internal ones with respect to ECTS size and content.

This is a general problem because modularisation bundles a selected set of subjects in a curriculum-specific way. As a positive effect, the number of examinations is reduced substantially because several single-subject examinations are replaced by one module examination. As a drawback, modules are so specific that in most cases they do not correspond to those from other higher education institutions.

The major problem is the size of the modules. For instance, BSc students of the TUM who successfully apply for a semester at universities in Sweden and the West coast of the USA will experience a large range of module sizes between 2 and 12 ECTS credits. During the past five years, the examination board of the School of Forest Science and Resource Management of the TUM was confronted repeatedly every year with non-adequate modules sizes from abroad. In some of these cases, the expected fit of external courses to the internal ones was assured beforehand but then not fulfilled due to modifications of curricula of the hosting university abroad. It was not possible to avoid the non-acceptance of external course achievements. Although such courses and their marks are listed in the final graduation documents, a prolongation of the study time is a consequence which would not exist in case higher education institutions would co-operate better with respect to the module structure.

The ERASMUS Student Network may suffer from these drawbacks to a lesser extent because higher education institutions which join this network have already adapted their modules, although improvement is clearly indicated in order to avoid unnecessary prolongation of study periods.

In case of HAFL a more liberal approach helps to overcome some of these difficulties. There exists a list of accepted, trusted guest universities for outgoing students, where a mutual acceptance of each other's academic standard is settled. In addition the student is given a maximum freedom in his choice of courses at the host university, as these courses are not meant as a one-to-one replacement of courses at the home university. The consequences are the following:

- The module structure at the host university is not important at all;
- The course titles from the guest university do not appear in the HAFL transcript of records. However, the study period at the foreign institution is mentioned like: "accredited learning from other universities, x number ECTS, passed";
- No difficulties were encountered so far in this procedure.

Suggestions for improvement

Derived from experiences of the authors during the membership of examinations boards and during various consultation activities, particularly concerning

ERASMUS students, the following suggestions are made in order to improve student mobility:

- An essential stepping-up of inter-university cooperation regarding module structures is an indispensable precondition for improving student mobility. Such cooperation could start with agreements with the most frequently attended universities abroad. If this type of cooperation is manifested, others may follow with exchange in both directions according to the attractiveness of the home university and the respective external one.
- „Wild cards" are considered a highly efficient tool in order to bridge discrepancies between modules. In case of TUM, wild cards for two modules per student per curriculum are in preparation. Such a regulation would facilitate the approval of external course achievements and also the work of examinations boards because the wild card module from abroad will replace a module from the home university, most likely one out of a defined set of modules.
- Consultation of students prior to their leave is particularly important in case regulations such as wild cards do not exist. Such consultations are offered by several European Higher Education Institutions, for instance by the University of Vienna, Austria (BOKU). An obligatory form of consultation is practised by HAFL, by which studies abroad can be accepted up to a duration of two semesters without prolongation of the individual curriculum. The importance of this consultation and guidance from the home university becomes particular evident when the student wants to stay for the maximum period of one year (two semesters) at a foreign university, a suitable course selection is vital then.
- Some European Higher Education Institutions offer the integration of longer study periods abroad by extending the duration of BSc curricula. An example is the "Bachelor plus" of the University of Freiburg, Germany (Mühlsiegl & Lewark 2013). The entire duration is 4 years (8 semesters) with one year studies at a foreign university, which then may be accepted as part of a subsequent Master study.
- If external modules cannot be accepted due to missing agreements or non-bridgeable discrepancies concerning its content, the minimum precondition for an improvement of student mobility is the acknowledgement of external subjects and modules, respectively, by listing them as supplementary achievements in the final graduation documents.

Conclusions

There is an obvious discrepancy between the intentions of the "Bologna Process" concerning student mobility and the reality. The ECTS rules supply a variety of ways for an integration of external course achievements but its approval is hindered by the missing of agreements between European Higher Education Institutions. Taking student mobility seriously, the present situation surely needs to be improved.

There are several possibilities but the most efficient preconditions for an enhancement of student mobility are module-specific agreements among faculties and European Higher Education Institutions. Generally, a greater flexibility regarding the approval of external course achievements, particularly modules, is necessary. Solutions may range between "wild cards" and the acceptance of external studies up to a complete semester.

In addition, in agreement with discussions during recent annual meetings of the SILVA Network, European Higher Education Institutions are strongly requested to improve guidance of students and thus to facilitate studies abroad and to intensify cooperation between universities.

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DO STUDENTS LEARN WHAT THEY WILL NEED LATER? SOME STUDENTS' PERSPECTIVES

MELANIE SCHULTE

Abstract
The main target of education in forestry is to prepare the students for the working environment. Nonetheless it often comes to the question if they are prepared for the future or not with regard to the theoretical and practical education as well as soft skills and intercultural exchange. Here two questions "Do students learn what they will need later?" and "Do students want to study abroad?" will be discussed.

Key words: offhanded survey, studying abroad, forestry education, practical experience

Introduction

There are so many discussions about how to improve the teaching and learning process at university to make students fulfil the expectations of the working environment. But do these students really feel prepared for intercultural exchange, scientific theories and findings, project management, soft skills and many more? To analyze this difficult question I started an offhanded opinion poll in my semester.

All of 45 students who volunteered to answer this survey were in the 3rd semester of the Bachelor curriculum in Forest Science and Resource Management at the Technische Universität München (TUM). This Bachelor programme takes six semesters in general and at least two months of an internship have to be fulfilled in order to receive the Bachelor's degree. The six semesters can be classified in three groups. In semester one and two the students learn basics like statistics, chemistry, biology and climatology. Semester three and four deepen the knowledge in forest science and resource management with modules like forest operations and logistics, silviculture, technology and utilization of renewable raw materials and animal ecology. Semester five and six are designed to extend the students' knowledge and to prepare for the completion of the Bachelor's degree. This can be achieved by two mandatory optional subjects, a project and a shortened sixth semester to provide time for the internship and the Bachelor thesis. The short sixth semester also offers the chance to apply for a master programme abroad. The opinions of students concerning studies abroad will also be discussed by utilizing the survey.

Method and materials

As mentioned before, 45 students volunteered to take part in this opinion poll after they were told that this survey will be used to present the students' perspectives at

the example of the 3rd semester of the TUM at the SILVA Network conference 2012. Every student received a paper with 13 questions to be answered handwritten.

Results

Studying abroad
First, students where asked whether they would like to study abroad or not. 80% stated their interest in studying abroad, the other 20% wanted to stay in Germany. The majority of the 80% would like to study in Europe - as shown in Figure 1– especially in Scandinavia, Austria and Switzerland. But most of them (62,5%) have not yet concerned themselves with this issue. The reasons for taking part in ERASMUS or choosing a master programme abroad are multifaceted:
- To get to know the differences in forestry and nature;
- To gain more experience;
- To learn more about different cultures;
- To visit better universities;
- To attend a university course which is not offered in Germany;
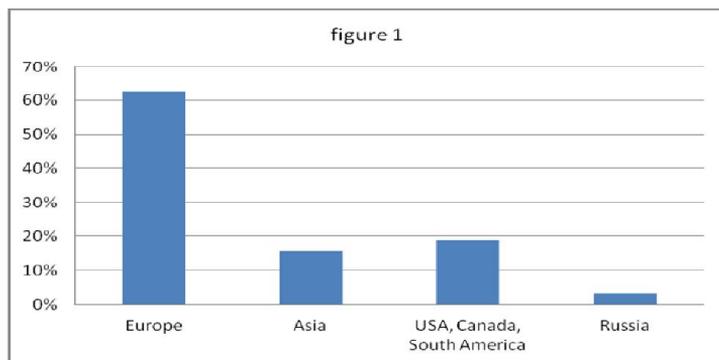- To learn another language;
- To improve own qualifications.

Figure 1: Where do TUM Bachelor students of forestry want to go, if they want to continue their studies abroad?

The main reason why students want to stay in Germany is the fear of not knowing the foreign language, financial problems and the great effort, the difficulty, in obtaining a scholarship and the longer time of studies because ETCS of courses abroad are not counted. Many times they were not sure how and where to apply or did not know how to get a scholarship or find a partner university.

Finally they were asked about their expectations concerning this topic: more transparency, more information and more flexibility are needed, according to their answers.

Do students learn what they will need later?
Since this question is very hard to analyze by itself, students were asked if they think that current research topics are integrated in the lectures. This question was answered in the affirmative by 86%. This integration was considered as very helpful and goes hand in hand with workshops and field trips. But they also specified that many lectures could be improved due to old opinions presented by or the lack of rhetorical skills of the lecturer.

With the next question it was asked if they feel prepared for the world of employment. This question was negated in general. They declared that
- Students are just learning basics;
- Some lectures were not useful at all because the lecture notes were one and the same as the lecturer's words;
- Students do not obtain practical experience.

Do students of the TUM learn administrable things? They answered with yes. All different fields are covered and connections between the different courses as well as relations to current researches can be established. But contrary to this they also have requests for improving the study programme at the TUM:
- To hear more about job perspectives;
- To have longer internships (and the time for it);
- To have a practical semester;
- To have more working groups, workshops and field trips;
- To have practical work integrated in lectures;
- To have small research projects.

Conclusion

Summing up one can say that students do not feel prepared that well for their future life in the forestry and resource management sector. They criticize the strong lecture character and the absence of regular practical work, also in the form of a practical semester. Another improvement would be the introduction of working independently for example writing assignments.

Since this survey was answered only by students from one semester of one university there might be deviating results in case of the inclusion of more participants and universities. But regardless to this, we can see a tendency that students want to get more practical experience in the education process and that more information about studying abroad would facilitate the planning process or even motivate them.

DEVELOPMENT OF MSC PROGRAMMES UNDER ERASMUS MULTILATERAL PROJECTS

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Abstract

Erasmus 2009-2013 is a cooperation and mobility program in the field of higher education aiming to enhance the quality of European higher education. It is funded by the Education, Audiovisual and Culture Executive Agency (EACEA) of the European Commission. The School of Forestry (ETSI Montes) at the Technical University of Madrid (UPM) has participated as partner in two of these projects, and leads one of them. These projects intended to deliver new Master programmes in an integrated manner using the European Credit and Accumulation Transfer System and the Diploma Supplement. A Virtual Learning Platform (VLP), containing learning materials in a digital format, was made in the framework of the projects in order to be available to all participating European institutions. A consortium of higher education institutions of five European countries (UK, Spain, Estonia, Rumania, and Hungary) are designing and delivering these Erasmus Master Courses.

Key words: Master Programme, Virtual Learning, Technical Education, Erasmus Programme.

Introduction

This paper surveys the activities conducted by the partners of a consortium in the frame of the Erasmus Multilateral Projects. These projects respond to a need identified by the promoters regarding educational provision of post-graduate programmes in the area of natural resources management in the participating countries.

The first project, started in 2010 until 2012, was the MSc programme in Technology – Enhanced Forest Fire Fighting Learning (MATEFL) (Arraiza *et al.*, 2012a). In 2010-2012 a Master programme related to Environmental Security (SEMP) (Arraiza *et al.*, 2012b) was approved to be developed between 2011 and 2013. In 2012, the MSc programme in Climate Change and Restoration of Degraded Land (RECLAND) (arraiza2012c) and the Virtual Platform for Green Technologies (VITEG) (Anonymous, 2012) were approved, all in the frame of the Erasmus Multilateral Projects.

The consortium

The participating institutions are:
- Buckinghamshire New University (BUCKS), High Wycombe, United Kingdom;
- Transylvania University (UNITBV), Brasov, Rumania;
- University of West Hungary (NYME), Sopron, Hungary;
- Estonian University of Life Sciences (EMU), Tartu, Estonia;
- Technical University of Madrid (UPM), Madrid, Spain;
- La Laguna University (LLU), Tenerife, Spain.

The partnership is chaired by the Buckinghamshire New University in the United Kingdom, which possesses extensive expertise in this type of projects. The Faculty of Forestry of the University of Transylvania, Romania, has brought to the consortium valuable experience related to environmental and learning materials aspects. The University of West Hungary possesses extensive experience in producing learning materials of proven effectiveness in postgraduate education in Hungary. The extensive connections of this university with other universities and departments across Europe through the Conference of Deans and Directors of European Forestry Faculties and Schools (ConDDEFS, see Anonymous, 2013) will contribute to enlarge students recruitment. Although the core programmes of the Estonian University of Life Sciences are focused on resources management, EMU possesses an extensive expertise in the area of Geographic Information Systems (GIS) and has developed and is currently delivering undergraduate and Master programmes on Virtual Learning Platforms (VLPs). Lecturing staff knowledge and expertise in this area are valuable and will provide EMU with a programme that is very attractive to potential students. The Technical University of Madrid has large experience producing high quality learning materials. The extensive knowledge and expertise of its staff are essential to provide an exciting and dynamic new MSc. programme at UPM. This extensive knowledge and expertise is due to the long history of Spain concerning environmental issues such as scarcity, desertification, watershed restoration and fire forest fighting (Arraiza *et al.*, 2012a).

The expertise of the participating universities is complementary and is likely to ensure the creation of a programme which is attractive for students and useful in the formation of qualified personnel in subject areas like forest fire fighting (see Arraiza *et al.*, 2012a), environmental security (see Arraiza *et al.*, 2012b), climate change (see Arraiza *et al.* 2012c), or green technologies (see Anonymous 2012).
The fact that partners come from Western and Central Europe is regarded positively by all those involved. The UK experience in developing programmes conducted on VLPs for rural communities is something that has been regarded as an innovative and therefore attractive aspect within the project. At the same time, the rich experience and the high standards in postgraduate education brought by the Faculties of Forestry from Hungary and Romania are likely to provide a programme that has strong academic and medical underpinning.

All the expertise brought together is likely to conduct to the creation of MSc programmes that will assist forest managers, landscape planners, and other graduates of resources management programmes to become experts in providing safe, reliable and efficient services to their community.

Objectives

The overall aim of the projects is to jointly develop and deliver European MSc programmes based on the "Tuning" project framework. For this, the following objectives are pursued:

Developing tailored modules
The whole programme is "module based". Each module will allow achieving specific learning outcomes. Each learning outcome is addressed through teaching units that utilize specific learning materials. For the organisation of each module, there are specific learning and teaching approaches that are specified in the module Pro-forma.
Each learning outcome is connected to the development of specific skills and competences and is being assessed through a variety of methods including oral presentations, essays, exams, portfolios, reflective reports or research reports. For each module, there are a reading list guiding students, and a list of high quality web-pages offering information in the area of study.

Developing teaching materials using Learning Objects
Learning objects is the generic term currently used in education to refer to PowerPoint presentations, images, audio-recordings, video-recordings, etc., used for educational content. Learning objects are re-usable and are accompanied by a description (meta-data) making them easily identifiable by potential users.

Developing a virtual learning environment that facilitates learning and assessment
The virtual platform is regarded as one of the most important educational tools within the programme. It will facilitate the communication between students on the one hand and lectures and administrators on the other, and between students. It will also contain learning units and learning materials available in digital format, such as presentations, core texts, audio-recordings, video recordings and links to specialized web-pages.

Disseminating the results to a wider European audience
Products of the project, and especially the MSc programme, will be made known to potential users through the development of a series of video-presentations available through WEB2 technologies, universities, VLP and on DVD. The programme will be also made known and presented to potential users by delivering presentations, seminars and workshops. Dissemination is aimed for potential students, graduates, managers of forest resources, and authorities, at local, national and European levels.

Exploiting the results by organizing the transfer to other practitioners
The target audiences for results exploitation are students from partner universities, staff and academic mentors, followed by stakeholders, supervisors from business entities and finally society at large. The key message is the importance of cooperation between universities and stakeholders in achieving mutual benefits: better education of students and finally transfer of knowledge and innovations from universities toward stakeholders.

Tester workshops were and will be organised for the adequate transfer of knowledge. End users provided feedback regarding the syllabus and this feedback will be used to adapt the structure and the content to particular needs of the beneficiary.

Methodology
During the first year of the project, partners discussed and agreed on a structure of the programme reflecting the competencies identified as being desirable for this area and also about the particularities of the countries involved in the partnership. Although not completed yet, the consortium has produced schemes for modules, a guide for students enrolling in the programme, an employability audit, a description of the context in which the programme is to be offered, quality assurance mechanisms and learning materials.

In the second year partners have completed the MSc programme, translated it from English into Hungarian, Estonian, Spanish and Romanian. All study courses are accredited in each of the participating universities in line with local and national regulations.

A Joint Delivery Agreement was signed and the programmes were made known and available to a wider academic community through dissemination and exploitation activities, including presentations, video-material and workshops. The agreement describes the procedure for the joint delivery of the programme, contains description of the admission criteria, learning outcomes, assessment, quality assurance and recognition based on the use of the European Credit Transfer and Accumulation System (ECTS) and the Diploma Supplement. It also describes the provision for staff and student mobility and agreement on further collaboration for the upgrading of the content. The programme was made available through a VLP in each of the participating universities. This facilitates evaluation, dissemination and exploitation of the results.

Dissemination activities were developed in parallel, and aim at providing information on the relevance, quality and effectiveness of the developed curricula to the wider mass of potential students. For this, publicity materials were created and these were distributed through professional networks, local authorities and organisations. Four dissemination workshops were organised in each partner university, and a sustainable internet presence was developed. The publicity

materials were developed in collaboration with the end users (potential applicants). The impact of the dissemination activities were measured by collecting feedback from the target groups.

The exploitation of results aims at identifying potential users (other universities), and convince them to adapt, to apply and to use the programme and the teaching materials, and to organise a process of translation and transferring the developed programme in other universities. For this, the consortium will identify potential universities where the study programme may be taught, organise the support for adapting and transferring of the teaching materials by preparing an implementation guide, and convince potential users of the quality and usability of the curriculum. End users will provide feedback regarding the curriculum and this feedback will be used to adapt the structure and the content to the particular needs of the beneficiary.

Conclusions

The main goal of these programmes is to modernise curricula provision in partner countries by implementing a strategic approach for applied and unified postgraduate education preparing students for the regional and global postgraduate job market.
The development of an innovative joint continuing postgraduate education curriculum which is integrated in the respective organizational structure of the partner countries represents a good example of optimal and coordinated resource utilization. The proposed MSc programme will provide a continuing education and will overcome the shortage of skills and educational resources regarding several environmental issues at the European level.

The impact and benefits of these programmes for the students and practitioners are
- Providing innovative and more effective teaching and learning techniques in environmental subjects, and be able to apply these in their work and study;
- Giving the opportunity to take an active part in the project on a European level, to travel, to learn a foreign language, to experience different cultures and to see opportunities for work or further study in other parts of Europe;
- Teaching how to deal with the specific problems and challenges of intercultural communication, which will expand their horizons;
- Setting up lines of communication with counterparts in partner institutions, which will be extended beyond the end of the project and may result in continuing relationships;
- Providing a sustainable resource in a VLP;
- Motivating learning by using attractive ways of education and have the possibility to learn in an attractive and enjoyable way;
- Providing an opportunity for personal self-education and to improve knowledge on specific subjects;
- Acquire knowledge on education methods used by institutions from different European countries;

- Exchange innovative practices in education and try to apply new ways of education in the partner's country, and to acquire experience in organizing international meetings.

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AGROFORESTRY IN SPANISH FORESTRY CURRICULA: AN INTERESTING TOPIC TO APPLY IN A MEDITERRANEAN COUNTRY

ROSARIO FANLO AND MARC TAULL

Abstract

Agroforestry is a form of soil management combining agricultural and forest practice, which delivers a degree of sustainability in soil use in various areas throughout the world. One of these areas is the Mediterranean, where agroforestry is a necessary practice to obtain forest land yields. However, combining different techniques and strategies requires specialised expertise which should be present in the curriculum of the Degree studies of Forestry Engineering. In this paper we comment on the insufficient implementation of this knowledge within Agroforestry Degrees in Spain, a country in the Mediterranean basin.

Key words: Agroforestry, forestry curricula

General remarks

Agroforestry is a land-use system in which tree-growing to obtain forest products is combined with agricultural activities (such as crops and pastures) and/or animal production (Allen *et al.*, 2011). Other techniques are sometimes applied, such as agro-silvo-pastoralism or grazable forestland. All these terms refer to combinations of different land uses, one of which is forestry. In general, we use the term "agroforestry system" when agricultural, pastoral and forestry strategies are combined in the same place. This is obtained either by planting trees on agricultural land or by cultivating (for example after thinning) on forested land. Agroforestry systems are useful in Mediterranean countries and are a good option in the cases of abandoned agricultural land and unproductive woodlands, in order to prevent wildfires and to obtain a complementary income from low productivity vegetation communities.

An important milestone in European agroforestry

The publication in 2008 of the book "Agroforestry in Europe, Current Status and Future Prospects" (Rigueiro-Rodríguez *et al.*, 2008), was important because it presented a good compilation of the existing research teams in different countries. The interest in agroforestry flourished with the increasing activities of organizations: in May 2009 IFSA (International Forestry Students' Association) and IAAS (International Association of Students in Agricultural and Related Sciences) France, organized the International Agroforestry Symposium in Nancy "What can

we learn from current practices?" and "What are the opportunities under a temperate climate?", and on December 16th, 2011, the European Agroforestry Federation (EURAF) was founded in Paris. The 242 founding members representing 17 European countries approved the constitution of the Federation. The main objective of EURAF is to promote the adoption of agroforestry practices (trees on farms) across Europe. To achieve this aim, EURAF will support any effort to develop awareness, education, research and policy making that could foster the use of trees on farms in Europe. For further details please refer to the EURAF constitution, available on the EURAF website (http://euraf.isa.utl.pt/).

Agroforestry under Mediterranean conditions

The current Mediterranean landscape is the result of three important agents: wildfire, grazing and human action through cultivation. These agents have been present since prehistory, but in the last century the level of impact has changed dramatically. In the north of the Mediterranean basin abandonment is general, whereas in the south overuse, especially overgrazing of natural vegetation is increasing with clear examples of increased soil erosion.

In Mediterranean forests summer drought can limit the primary production of timber in quantity and quality. But the Mediterranean forests have a large specific richness and play an important role preventing erosion processes. Open forest and shrub coverage are also important elements in the Mediterranean landscape. We are talking about the "multi-use" of Mediterranean forestlands. The multifunctional use of the forest land (by the owner or by tenants) can include other forest uses such as hunting, grazing and cultivating (or obtaining secondary products, such as mushrooms) or a combination of these. It may also include obtaining a product (hunting-trophies, meat, milk, fodder or cereals) and services such as wildfire prevention, leisure, etc. Nowadays, over 65% of the total economic value of Mediterranean forests comes from non-wood forest products (NWFP) and services. However, forest owners and managers, whose land-use decisions affect the provision of these goods and services, cannot capture this value, as most of it remains outside the traditional markets. Payments for environmental services (PES) may offer one solution to this challenge; however, in the Mediterranean region payments for environmental services are the exception (EFIMED, 2012).

All the aforementioned make it clear that our graduates have to understand these problems and should be able to design solutions to maintain, save and protect the natural systems to the benefit of all.

Agroforestry and related subjects in Spanish curricula

The previous information can lead us to believe that in countries with a Mediterranean climate, the Forestry and Environmental Engineering curricula should contain subjects related to this topic. Curiously it is not the case with

Spanish degrees; moreover, there are also differences between Universities or Faculties. What is the reason for these differences, when the Ministry of Education is prescribing the inclusion of a minimum of 6 compulsory ECTS credits on agroforestry in the curricula? It is the "sacred freedom" of the Universities and their commission members, often anchored in their own history and not in the current reality.

There are different words in the terminology related to the term "agroforestry", and this can be confusing. Terms referring to grazing land, i.e. 'grassland/pastureland' overlap with the term 'herbaceous' and at times with 'wood species' which are harvested by grazing; also 'grazable forestland' which is a forestland with vegetation that can be grazed (when 'forestland' is understood as: 'vegetation dominated by trees'). In the management terminology, 'agroforestry' designates systems where trees are used for forest products combined with agricultural production, 'agro-silvo-pastoralism' (typical management in the old Spanish dehesa) in which trees, crops and husbandry are combined and 'silvo-pastoralism' describes the use of land for forest products and animal production.

Table 1. Spanish universities offering forestry curriculum and kind of courses in range science, agroforestry and other relate sciences.

University	Locality	Subject	Category	ECTS
Castilla-La Mancha	Albacete	Range science and agroforestry systems	compulsory	6
Católica de Ávila	Ávila	Range science and agroforestry systems	compulsory	6
Córdoba	Córdoba	Range science and agroforestry systems The dehesa and other agroforestry systems	compulsory optional	6 4.5
Extremadura	Plasencia	Range science and agroforestry systems	compulsory	6
Huelva	Huelva	Range science and agroforestry systems Silvopastoral management of Mediterranean proprieties	compulsory optional	6 4.5
León	Ponferrada	Range science	compulsory	4.5
Lleida	Lleida	Range science	compulsory	3
Oviedo	Avilés	Range science and agroforestry systems	compulsory	6
Politécnica de Madrid	Madrid	Range science and agroforestry systems	compulsory	6
Politécnica de Valencia	Valencia	Range science	optional	4.5
Santiago de Compostela	Lugo	Range science and agroforestry systems	compulsory	4.5
Valladolid	Palencia	Range science and agroforestry systems Silvopastoral management	compulsory optional	6 3

Traditionally 'Range Science' (study of natural rangelands in botanical, ecological, productive aspects; Pascicultura in Spanish) and 'Pastoralism' (study of rangeland management; Pastoralismo in Spanish) were the most frequent subjects in the Spanish university curricula. Actually in all Mediterranean countries at graduate and/or postgraduate level, in Forestry Engineering Schools and Forestry Faculties (the name depends of the country) there are some Range Science, Agroforestry Systems and/or Pastoralism courses in the curriculum. It is also possible to study Agroforestry and related subjects in other Degrees or Master's Degrees (Biology, Environmental Sciences and Agronomy Engineering).

Nowadays in Spain there are 12 Schools of Forestry Engineering. The possibility of learning Range Science, Agroforestry or related sciences is shown in Table 1. These subjects are included in the Forestry Engineering curricula at graduate level (a Spanish graduate has a workload of 240 ECTS).

We can see that the time devoted to this subject ranges between 1.25% (only 3/240 ECTS) and 4.40% (10.5/240 ECTS) of the total number of credits in the existing Spanish study programs. If we consider that 10 out of the 12 Schools of Forestry Engineering are situated in the Mediterranean region, and that this region includes more than 75% of the Spanish territory, we can conclude that our students don't devote sufficient time to learn these important and necessary subjects, in spite of the existence of well-developed Spanish research teams devoted to this topic. Our students need to understand that it is possible to integrate forestry practices and pastoral use of forestland and that this combination can be a good solution for our woodlands and scrublands. The combination with agricultural uses is not very productive except in conditions of irrigation, in the Mediterranean environment. Training should be based on a combination of practical and theoretical sessions to promote an integrated knowledge of management for the production and maintenance of these ecosystems.

Conclusion

According to FAOSTAT's data (2010) the timber-yielding volume in Spain ranges between 50 and 100 m-3·ha, thus being among the lowest of European countries. According to the same source, 46% of the forest surface is devoted to multiple use. Since the 1980s Spain has not produced sufficient timber to cater for its own consumption, so it is importing timber (MAGRAMA, 2012). These data give an idea of the type of existing forests (with low timber production), which have other important functions such as: carbon sequestration, soil and water conservation, hunting and mycology and range use. For all the above mentioned it would be advisable to increase the student's training in the multiple use of forest land, increasing the number of credits devoted to this subject, in which agroforestry plays an important role.

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INDUSTRIAL USE OF MEDICINAL AND AROMATIC PLANTS: A FREE CHOICE E-LEARNING COURSE AT THE TECHNICAL UNIVERSITY OF MADRID

MARIA PAZ ARRAIZA, M.A. MENDIOLA AND J. V. LÓPEZ

Abstract

The course Industrial uses of Medicinal and Aromatic Plants (IUMAP) is part of the Technical University of Madrid´s (UPM) free choice E – Learning courses programme. It is offered in every Technical School of the UPM, and also in the Universitat Autònoma de Barcelona, as a participant of the Campus Global initiative.

The purpose of this course is that students learn about the biodiversity of this plant group, its economic and social importance, industrial uses, cultivation and production processes of raw material, chemical analysis techniques and quality control procedures. It is delivered through UPM's E-Learning Office (GATE) Moodle platform, both in English and Spanish, and it has been published in the UPM's Open Course Ware.

Specific features of this innovative educational experience within the free choice Forestry curricula are reviewed here.

Keywords: E-Learning, medicinal and aromatic plants, Moodle, Open Course Ware, Campus Global.

Introduction

Aromatic and medicinal plants belong to the so called non - wood forest products (NWFPs). Pharmaceutical, cosmetic, perfume and food industries are very interested in these plants, which constitute an alternative to traditional crops, with species in high demand in today's market worldwide.

The purpose of the course is that students learn about the economic and social importance of such plants, knowing their industrial uses, modes of production and cultivation of the raw material and chemical analysis techniques and quality control procedures.

Objectives of the course

After completing the course, the students should be acquainted with the main medicinal and aromatic plants (MAPs) of commercial interest grown in Spain and other countries, their cultivation, harvesting, processing and production of essential oils, extracts and other forms of uses of the raw material. They should be able to identify the main groups of active ingredients found in these plants. And they should be aware of the existing legal regulations in Spain and the European Union.

Moreover they should understand the basic criteria of chemical analysis, quality, safety and efficacy applied to MAPs.

Specific features of the course

The course Industrial Uses of Medicinal and Aromatic Plants (IUMAP) is part of the UPM's free choice E – Learning courses programme, and is offered in every Bachelor Degree of the UPM's Technical Schools. The Universitat Autònoma de Barcelona, as a participant of the Campus Global initiative, contributes 10 student places yearly. It is a 3 ECTS course, offered exclusively online, it is taught both in English and Spanish, and is also offered as a part of ATHENS Programme (Jiménez *et al.*, 2008).

Methodology

The methodology of the course is based on Learning Objects (see ATHENS Programme, 1996). Assessment is continuous through a questionnaire proposed for each of the Learning Objects. Questionnaires are mandatory and constitute 25% of the total score. Likewise, voluntary online learning tasks form an important part of the course; completing them may increase the final point with one (1) point, provided, the student has passed the subject. The final exam in the form of an online questionnaire leads to 50% of the final grade. Also students must submit a final paper, individually or in groups (maximum three people, 25% of final grade). Educational means used are videoconferencing and forums.

Forums
The forums are used to answer questions, to propose specific conceptual themes to generate discussion and to raise current issues concerning the unit being studied at that time. The operation complies with the minimum standards of conduct, avoiding any swearing, insults or disrespectful allusions to people. In the final evaluation, participation in the forums is included.

Assessment
The course examination is based on a system of continuous evaluation, consisting of:
- Average of each unit test;
- Evaluation of the final indicators;
- Specific tasks;
- Participation in forums;
- Blog posts according to the text quality assessed by teachers.
- These five items result in the final grade, which is the average of all activities.

The course in Moodle
The course started in 2007, as a part of the Optional E-Learning UPM's Courses programme, developing parallel to one of the lines of research, i.e. Natural Products

of Plant Origin (Mendiola *et al.*, 2009). The syllabus, texts, presentations and questionnaires were made and loaded into the Moodle platform. At the same time, the UPM's Office of Innovation offered grants for teaching in English. These funds made it possible to translate all the items into English and load them in the virtual platform too.

The course has been taught both in English and Spanish every academic year since 2007. The number of students is 40 in each course (English and Spanish). Students often don't know the course is given in both languages, and they are arranged in the groups by order of application. The chance of moving from the English version to the Spanish one is offered to them, and about 50% of the students seize this option. The course seems to be harder for students who select the English version, as it takes them a longer time to read, to complete the tests and to study. But beyond that, there is no significant difference between their grades and the grades of those who study in Spanish (see Table 1).

Table 1. Student's results in the Spanish and English versions of the course.

COURSE IN SPANISH	2008-2009	2009-2010	2010 - 2011	2011-2012
Success	64	58	56	62
Absent	3	4	5	4
Failed	0	0	1	2
Total	67	62	62	68
Success	95,5%	93,5%	90,3%	91,2%
Non acquired	4,5%	6,5%	8,1%	5,9%
Failed	0,0%	0,0%	1,6%	2,9%
Average Success	B (8)	B (8)	B (8)	B (8)
COURSE IN ENGLISH	2008-2009	2009-2010	2010 - 2011	2011-2012
Success	9	15	15	9
Absent	3	3	3	2
Failed	1	0	0	1
Total	13	18	18	12
Success	69,2%	83,3%	83,3%	75,0%
Non acquired	23,1%	16,7%	16,7%	16,7%
Failed	7,7%	0,0%	0,0%	8,3%
Average Success	C (7,5)	C (7,5)	B (8)	B (8)
Total Students	80	80	80	80

After the end of the course and before the final exam, students were requested to fill in a questionnaire about the course (Figure 1). The results of the questionnaire were the following. 62% of the students indicated that the level of difficulty of the course, compared with the rest of the courses they attended; 52% of the students

indicated that the level of difficulty of the course itself was acceptable; 67% indicated the course highly motivated their interest in the subject; 67% indicated the organization of the course helped them to notice the advantage and importance of what they had to learn; 71% indicated the organization of the course helped them to learn something and not only to pass the exam; 76% followed the course regularly; 100% indicated time given for the course was enough.

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1. What are you studying?
2. Comparing with the rest of the courses you attended this semester, please
indicate:
The level of difficulty for this course:
a) Easy           b) The same           c) Difficult

3. Please indicate the level of difficulty for this course:
Very easy       1        2        3       Very difficult
4. The organization of the course and work helped me to notice the advantage
and importance of what I had to learn for this course:
Not at all       1        2        3       A lot
5. The organization of this course helped me to learn something and not only to
pass the exam:
Not at all       1        2        3       A lot
6. Please indicate which parts of the course you think were the most interesting:
Module I      Not at all    1    2    3      Very interesting
Module II     Not at all    1    2    3      Very interesting
Module III    Not at all    1    2    3      Very interesting
Module IV     Not at all    1    2    3      Very interesting
Module V      Not at all    1    2    3      Very interesting
Module VI     Not at all    1    2    3      Very interesting
Module VII    Not at all    1    2    3      Very interesting
7. Did you follow the course regularly?
I didn't follow the course at all
I followed less than a half of this course
I followed a half of this course
I followed more than a half of this course
I followed the entire course
8. Please indicate the level of usage of the materials for this course:
Texts              Not at all    1    2    3      Very interesting
PPTs               Not at all    1    2    3      Very interesting
Other sources          Not at all    1    2    3      Very interesting
9. The time estimated for the course was adequate.
10. Please feel free to take a few minutes and to leave any observations,
positive or negative, regarding your own personal experience with this course. I
am very much interested to hear your opinion, which could become helpful in
improving the quality of my teaching in the future. Thank you very much for your
collaboration and your help!
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Figure 1. Questionnaire submitted to students upon completion of the course.

The course in Athens Porgramme

The ATHENS Programme, Advanced Technology Higher Education Network/Socrates, (ATHENS Programme, 1996) is a 1-week exchange session, held twice a year (in March and in November), by a network of European Higher Education Institutions (Universities, Universities of Applied Sciences, Grandes

Écoles, etc.). The programme is coordinated by Paris Institut of Technology. This course has been offered in the ATHENS programme twice a year since 2007, with 30 students per session. The course consists in 12 to 15 seminars of two to three hours, taught in English. Students get three ECTs at their home Universities if they prove course attendance and pass the compulsory exam. They also have cultural activities during that week, carried out by the BEST (Board of Engineering Students). At first, there were very few lecturers involved, and most of the teaching load rested on just one lecturer, but with time, the programme has gained popularity among students as well as among teaching staff. Plus, lecturers get recognition of 1.5 hour per hour taught in English, as a way to encourage teaching staff to teach in a foreign language (this is often lacking in Spain, in general).

The course in the Open Course Ware

The "Open Course Ware" (OCW) (see Arraiza, 2009) is a free and open website with digital publications of high quality college and university‐level educational materials. These materials are organized as courses, and often include course planning materials and evaluation tools as well as thematic content. OCWs are free and openly licensed, accessible to anyone, anytime via the internet. The course IUMAP was published in the UPM's OCW in 2008, after arranging all the materials and getting all the permissions and contracts. It is published both in Spanish and in English under the area of Agroforestry. Also, it is on its way to be published in the UNESCO's Online Encyclopaedia, see UNESCO-EOLSS (no year).

The Web of Useful Plants

The "Web of Useful Plants" (see WUP, no year) is the result of two projects of Educational Innovation at the Technical University of Madrid: "Design and development of teaching materials and incorporating a joint support website" and "Upgrading the useful plants catalog for website teaching". These projects have been developed during the academic years 2009-2010 and 2010-2011, by a group of teachers from different schools and departments in the Agroforestry area.

It aims to increase and update the contents of various disciplines of UPM, in new and coordinated way, creating supplementary materials to enhance the teaching of these subjects, through the use of new Information Technology and Communication (ICT).

In this catalogue of useful plants the following info is included for every plant: Origin and classification, description and use, habitat, uses and applications, production and consumption and nutritional composition and active ingredients.

Conclusions

Despite the heterogeneity of students, participation results are appropriate (over 50% students pass examination). Overall, this is a course in which most of the students enrolled are motivated by their personal interest. The teaching methodology (100% online) is suitable for this type of courses, with theoretical contents but also many multimedia resources such as videos or photos.

The results of the questionnaire show quite positive opinions generally. The feedback is that the students appreciate the time teachers spend on them, the attention given and the short term response. It is often a new subject for them, but it is easy to follow, they do not drop out, and the outcomes correspond with what is expected from a free choice course.

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SUMMER SCHOOLS AS A TOOL TO IMPROVE SKILLS AND KNOWLEDGE OF GRADUATES – EXPERIENCES FROM THE 1ST IUFRO LEARNING INITIATIVE

SZYMON BIJAK, PIOTR PASCHALIS-JAKUBOWICZ AND KRZYSZTOF STEREŃCZAK

Abstract

As education is a constant, life-long process, it is important to support graduates with tools that enable them to upgrade their knowledge and skills during their professional career. IUFRO Learning Initiatives as developed by the IUFRO Task Force Education in Forest Sciences is supposed to be a set of educational events that will provide such opportunities. Covering the most relevant and up-to-date topics and realising specially design programmes with the use of modern educational techniques, they are intended to be a willingly chosen form of post-graduation education. This paper presents experiences from the 1st IUFRO Learning Initiative, held in August 2012 in Warszawa (Poland). A participants' assessment of the educational and organisational aspects is discussed.

Key words: constant education, IUFRO Learning Initiatives, assessment

Introduction

Job markets undergo constant changes all over the world. Competitive and diverse economy demands personal flexibility, mobility as well as learning capacities and skills (Langfelder and Rahlf, 2010). As a result, the requirement of being up-to-date with current knowledge and actual trends in technology seems to play a key role in the successful and satisfactory employment after graduation. That is why a life-long learning process is, or rather should be, very important for the graduates. As the universities are an excellent place to organise events providing insight into the latest knowledge and focusing on modern operational techniques, various forms of continuous improvement of one's skills can be realised at such institutions (Ziesak and Müller-Starck, 2010).

After completion of the university stage of their education, the graduates face many problems that hinder further self-development. Everyday routine and work overload together with constant 'result pressure' as well as starting a family or not-so-rare financial limitations cause decreasing interest in novel solutions in the field of their studies. Based on the above, educational offers for graduates should comprise trainings that are short and focused on a limited number of actual issues. Such course should be organised in attractive and interesting places as it should also give some opportunity to relax and make new acquaintances, which can further on develop into e.g. business or scientific relationships (Stereńczak *et al.*, 2012).

The objective of this paper is to present experiences from the 1ˢᵗ IUFRO Learning Initiative held in August 2012 in Warszawa (Poland) together with the assessment of educational and organisational aspects of this course done by the participants.

Concept of summer schools

Summer schools can be an easy-to-realise and a flexible component in the academic educational programme of a university, which can supplement the offer for the students or graduates and will fulfil raising demands for such solutions on the educational market (Lopez and Gross, 2008; Matsudaira, 2008; Ziesak *et al.*, 2008; Stereńczak *et al.*, 2012).

The course usually lasts up to two weeks, which seems to be the maximum time acceptable for employees to spend for their further personal development. However, one can find many examples of three- or four-days-long courses. Summer school topic, tutors and localisation should be selected carefully in order to have a successful event. Consulting on the scope of the training with a group of potential participants (e.g. students' organisation in a given field) seems to be a good practice to follow, because in that way they can indicate what they are really interested in. Widely-recognised experts as well as renown practitioners can guarantee the quality of the course in a professional sense and are, to some extent, a kind of an attraction in a course offer. The location is also very important as an attractive place or excursions to interesting spots may increase interest. However such 'only tourist reasons' of participation are very rare. In general, summer schools are oriented towards young (circa < 35 years old) people, just graduated or not so long after graduation, as they are the most willing to raise their competences. But, of course, older participants are included as well. The structure of a summer school is based on three main sections: theory, practice and leisure time activities. Providing the theoretical grounds within the training scope enables to equalise the starting level of participants' knowledge as well as introduces them to the topic highlights. The practical part is especially important as application of gained knowledge is the most awaited feature both by actual or potential employers and participants themselves. Leisure activities combined with excursions provide the required less-formal character of the training and enable to establish interpersonal relationships that may later on result in multilateral networks among the participants.

Figure 1. Programme of 1st IUFRO Learning Initiative.

The development of modern forest education at university level requires adjustment towards a combination of science and practice. To cope with that, IUFRO launched a special research unit, i.e. Task Force Education in Forest Science (Paschalis-Jakubowicz and Lewark, 2012). IUFRO Learning Initiatives are one of the projects realised under its auspices. They are thought to be a set of specially designed and prepared courses and workshops using a comprehensive approach and combining practice and theory to educate with various didactic methods. The topic of each event is consulted with members of the International Forestry Students Association via Internet survey. Top and widely-recognised academicians who act as tutors are supposed to provide the highest quality of education. The events are supposed to be held in attractive locations and be relatively cheap to provide if possible a wide international/multicultural range of participants. One of the most important assumptions is that students participating in the Learning Initiatives undergo bilateral assessment, for students act both as a subject and an object of evaluation (Stereńczak *et al.*, 2012).

First IUFRO Learning Initiative and its assessment

The 1st IUFRO Learning Initiative was organised at the Faculty of Forestry, Warsaw University of Life Sciences-SGGW between August 5th and 15th, 2012 and hosted 32 people from 14 countries in total. Training was led by internationally recognised academics including Hans Rudolf Heinimann, Woodam Chung and Sophie d'Amours. The event was supported financially by Polish State Forests, National Forest Holding.

The curriculum (Figure 1) consisted of issues related to precision forestry that were taught using different teaching techniques and special education programmes aimed at both the use of modern techniques of knowledge transfer as well as maintenance of high level of attractiveness of the acquired knowledge and skills. Except ordinary classes conducted at the university, the Learning Initiative students participated in a number of other cultural and recreational activities as this informal section is supposed to be very important part of the whole event.

A multi-stage evaluation was conducted during the event and consisted of participants' self-assessment on the topic of the course (precision forestry), expectation with regard to the Learning Initiative itself (carried out at the beginning, in the middle and at the end of the course) and daily evaluation of course pace and attractiveness (Figure 2). At the end of the Learning Initiative a small survey was held to recognise how the participants judged the organisation of the course. The questionnaire contained seven questions about various organisational aspects (time, facilities, additional events) and assessment was carried out in a five-grade scale (1 – very bad, 5 – very good). All 32 participants were surveyed, however not all questionnaires were returned each time.
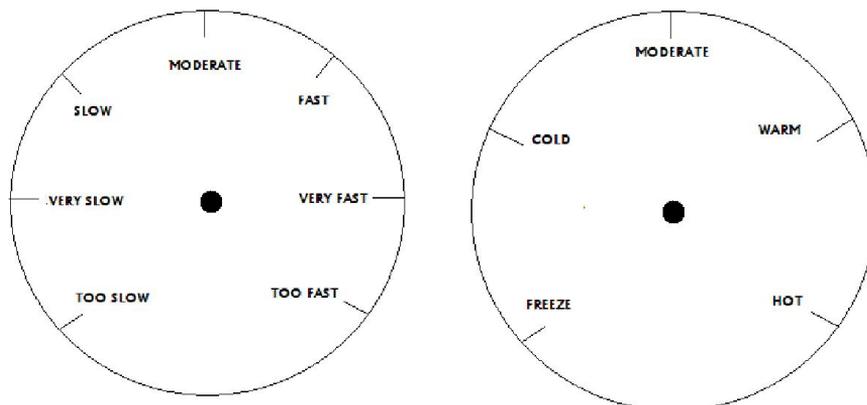
Figure 2. Tools for everyday daily assessment of pace (left) and attractiveness (right) of the course. FREEZE means totally not interesting, HOT stands for exciting and very interesting.
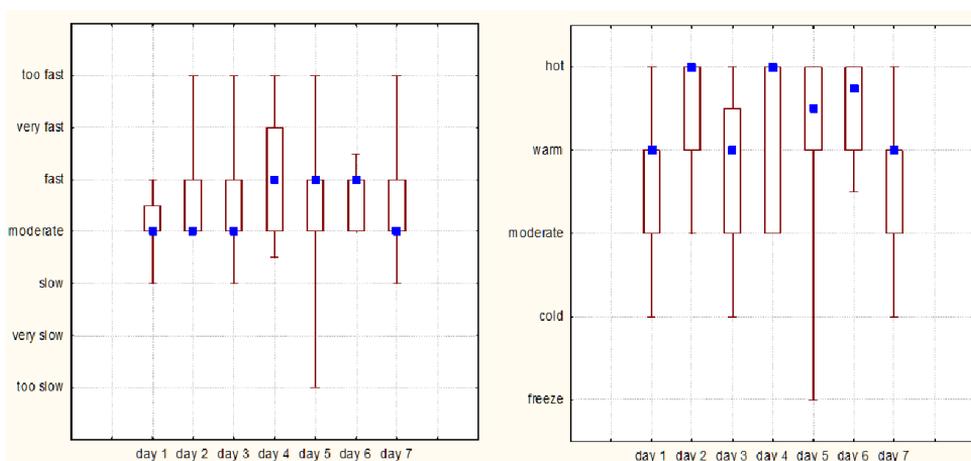
Figure 3. Results of daily assessment of pace (left) and attractiveness (right) of the individual days of the course.

At the beginning of the course none of the participants ranked their knowledge in precision forestry area as excellent. Only 19% evaluated it as good, while 34% stated that it needed improvement. After two weeks of intensive training, there still was nobody who assessed their knowledge as excellent. However slight progress in the participants' self-assessment can be noticed as almost 41% ranked their knowledge as good and only four people (12.5%) kept on thinking it still needed improvement. This suggests that, at least on this declarative level, the main objective of the course was fulfilled.

Seven days of the training (excluding the excursion) were assessed in terms of their pace and attractiveness (Figure 3). In general, participants ranked individual days as moderately or fast going. Higher variability in the opinions can be seen in the

measuring how interesting these days were. The fifth day gained the most diverse ranks. This could result from its structure (equipment presentation, lectures, laboratories), the way the classes were prepared and realised or, simply, raising excitement before the excursion.

The vast majority of participants (about 90%) judged the date and duration of the 1st IUFRO Learning Initiative as well selected. 96% of them were satisfied both with dormitory conditions and meals. Fewer found the equipment provided for the training as good and very good. In general, participants were very satisfied with the additional activities as 30% rated them as good and 70% as very good. Considering individual events, the answers were more diversified. In case of sport games one can find even negative opinions – 16% of students rate these events as bad or very bad. On the other hand, the two-days excursion to Białowieża National Park gained only positive notes (81% - very good, 19% - good). The opinion about the quality of the course organisation resulted in answers to the question about satisfaction with the crew assistance. A majority of the participants (82%) found it at a very good level.

Conclusions

Summer schools are an interesting tool of post-graduate education for alumni from all-around the world, however they require a careful combination of the topic as well as an appropriate selection of both tutors and participants in order to provide satisfactory and successful realisation.

The structure and the content of a summer school need to be under permanent assessment and improvement. Simple daily questionnaires as well as whole course assessment sheets are an excellent way to control the quality of this educational event.

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CROSS-BORDER UNIVERSITY AS AN EXAMPLE OF UNIVERSITY COLLABORATION

VADIM KOSTYUKEVICH AND ALEXANDER PITUKHIN

Abstract

The integration of Russian Federation into the international educational area entails many difficulties, associated with the structural change of education and the need for the development of academic mobility. At this stage, international educational projects, such as the Finnish-Russian Cross-Border University (CBU) offering a 2-year Master's Degree programme taught in English, are expected to be of significant help. Traditionally, studies in Russian and European universities have some differences in the design of study programmes. Therefore, the implementation of the project is supposed to reveal both positive aspects and subsequent difficulties. This article analyzes the strengths and weaknesses of the CBU project performance at the Forest Engineering Faculty of the Petrozavodsk State University, based on seven years of experience in implementing the Master's Degree programme.

Keywords: Bologna Declaration, higher education, Cross-Border University, Master's Degree programme, academic mobility

Introduction

The Russian education has been undergoing significant changes during the last decade. The reforms have also affected the higher education system. They are mostly associated with Russia's accession to the Bologna Process. The opportunity for Russian universities to become part of the European higher education area implies the change of the structure of education to the two-degree one (Bachelor and Master) and the development of both students' and teachers' mobility. Training in Russian and other European universities is quite different. A modular system of training is implemented in European universities, where part of the study programmes is taught in English. At Russian universities, during the semester students study a few subjects simultaneously (up to six), and during examination session they take several exams and tests.

As for the first stage of educational transformation, namely the transition from the educational standards of the (old) five-year specialist training to the (new) educational standards of Bachelor's and Master's degree programmes, this transition is compulsory for all Russian universities. Otherwise, they will not have a chance to obtain a license from the state to carry out their educational activities. However, although this process is on the way and the state support is duly provided, there still remains a difficulty. All the mentioned facts are not enough for Russian universities to become equal participants in international educational programmes, as almost all

study courses in Russian universities are taught in the Russian language. For this purpose, it is necessary to develop study courses in English as well as to apply modular training (Kostyukevich, 2012).

Substantial assistance in the development of courses in English can be rendered by international educational projects, such as the Finnish-Russian Cross-Border University (CBU). CBU offers a 2-year study programme at the Master's Degree level for both Russian and foreign students.

The Russian educational system

Russia joined the Bologna Process to develop joint educational areas in 2007. Nowadays, there are three higher education degrees awarded at Russian universities:
- Bachelor (four years of study);
- Master (+ two years of study);
- Specialist (five years of study) as an alternative to the Bachelor's and Master's programmes.

It should be added that 2012 is the last year when the training of specialists is carried out, as it will be finished next year.

Education in Russia has its specific features. Particularly, the Educational Methodological Association establishes the State Educational Standards for all fields of study. Moreover, every five to six years all universities are obliged to go through the state inspection in order to get a license for training specialists, bachelors and masters.

The main principles of the educational programmes in Russia are shown in Figure 1. The ratio between content of Federal, Regional and University components remains during this change the same. This means that each determines one third of the content of a curriculum. So every university feels free enough to develop its own educational programmes.

Petrozavodsk State University (PetrSU) is one of the largest universities in the North-West of Russia (see PetrSU, 2013). PetrSU was founded in 1940. At present, the teaching staff of the university includes more than 1000 people, while the number of undergraduate and graduate students is more than 18500, and every year more than 4000 students take up training, re-training and professional development courses. The university is among the best twenty classical universities according to the results of the general rating of Russian Universities held in 2009 and has won the first place on the Internationalization criterion and the 6th place in the Brand nomination. The university now comprises 85 chairs and 17 faculties, the Forest Engineering Faculty being the largest among them.
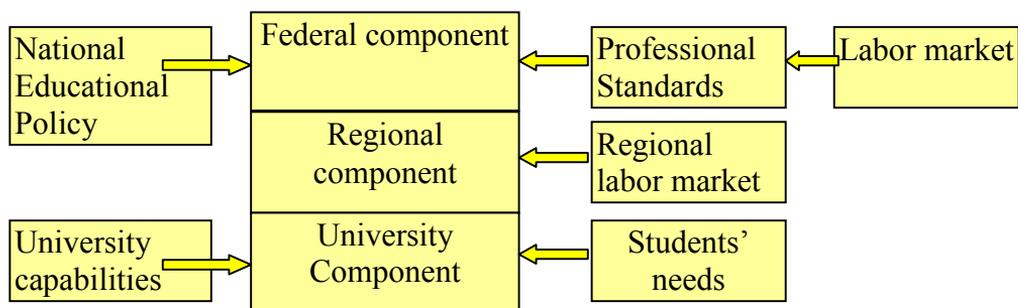
Figure 1: Educational standard in Russia

Cross-border cooperation

The geographical location of Petrozavodsk State University (PetrSU) facilitates cross-border cooperation with other European universities and, in particular, with Finnish higher education and research institutions. Cross-border cooperation with Finland and the countries of the Barents Euro-Arctic Region holds a specific place in the activities of PetrSU. The Cross Border University (CBU) is a university consortium of nine recognized universities in Russia and Finland (see CBU, 2013). These nine CBU universities are jointly offering Master's Degree Programmes in four study fields:

- Forestry and Environmental Engineering;
- Information and Communications Technology;
- International Relations;
- Public Health.

Table 1. Programme of the MSc Forestry and Environmental Engineering (FEE) at the Cross Border University (CBU). Adapted from CBU FEE (2013).

STRUCTURE OF THE STUDIES	ECTS
Compulsory courses CBU FEE	**24**
Introductory course	7
Problem oriented course	5
Intensive course	5
Current issues in forest sciences	3
Joint thesis seminar	3
Personal study plan	1
Courses at home university (choose one specialization from the four below)	**24**
I Bioenergy production (Choose at least 24 ECTS from below)	
Advanced geographical information systems	5
Advanced remote sensing	5
Bioenergy markets and policies	6
Economics of multiple-use forestry	3

European forest related policies	4
Forest information systems	5
Forestry in Russia	5
Intensive forest management and production of forest biomass	5
International forest policy	4
Logging methods: Cut-to-length method vs. tree-length method	3
Supply and energy use of lignocellulosic biomass	6
II Forest policy and economics (Choose at least 24 ECTS from below)	
Bioenergy markets and policies	6
Economics of multiple use forestry	3
European forest related policies	4
Foresight methods and applications for the forest sector	3
Forest information systems	5
Forest governance and environmental policy	3
Forestry in Russia	5
International forest policy	4
Methods of forest policy analysis	4
III Forest ecology and silviculture (Choose at least 24 ECTS from below)	
Carbon dynamics of forest soils	3-7
Current issues in forest conservation and biodiversity	3
Forest health and diseases	5
Forest pathology	6
Forest zoology	6
Silvicultural management of forests for timber production and other ecosystem services	3
Economics of multiple-use forestry	
Forestry in Russia	5
Forest soil hydrology	6
Intensive forest management and production of forest biomass	5
Literature seminar of forest soil ecology and management	3
Principles of scientific inquiry in forest ecology and biodiversity research	3
Research methodology in forest sciences	2.5
IV Forest information technology and resource management (Choose at least 24 ECTS from below)	
Advanced geographical information systems	5
Advanced remote sensing	5
Foresight methods and applications for the forest sector	3
Forest biometrics	5
Forest information systems	5
Forest resource assessment, management and planning	3
Forest inventory and modeling	8
Research methodology in forest sciences	2.5
Elective courses (at home and partner universities)	**30**
Applied period (CBU FEE)	12
MSc thesis (Agriculture and forestry)	**30**
MSc (Agriculture and Forestry), major European Forestry	**120**

The Forestry and Environmental Engineering Master's Degree Programme focuses on ecologically, economically and socially sustainable use of natural resources. The Finnish-Russian Cross-Border University project helps to develop a new two-cycle form of studies as well as international mobility and collaboration. The goal of the project lies in promoting the development of joint European Higher Education Area according to the Bologna Declaration.

The tasks of the project:
- To develop a Joint Finnish-Russian Master's Degree Programme of Higher Education. The resulting curriculum can be found in Table 1.
- To ensure the mobility of students and teaching staff;
- To provide cross-border cooperation between Finnish and Russian universities;
- To develop short intensive courses and exchange programmes;
- To design courses for visiting students as a host university;
- To develop joint distance-learning courses;
- To train specialists for international companies on the territory of both Finland and Russia.

At the Forest Engineering Faculty, the cooperation within "The Finnish-Russian Cross-Border University" has been implemented for the last eight years, and it is aimed at the development of the Finnish-Russian international MSc programme in the field of forestry.

Concluding remarks

Based on the experience of applying the programme at the Forest Engineering Faculty, we can analyze the strengths and weaknesses of the CBU project.

Strengths
- Internationalization of higher education in forestry. The MSc programme consists of the courses, which are organized for CBU students by each participating university. This ensures the mobility of students and teachers and a unique character of teaching.
- Modular structure of learning and teaching methods used in Finnish universities. The schedule of classes in Russian universities differs from that in EU universities. Usually students in Russian universities study several courses simultaneously during the semester.
- Flexible individual study plan for CBU students. Usually in Russian universities the study plan for each specialty is rigid for all students.

Weaknesses
- No federal and regional funding to support the CBU project at Russian universities.
- No official status of CBU graduates (no CBU diploma). After graduating from the CBU, students get a degree of the home university, a diploma supplement and a CBU certificate.
- No university's administration support necessary to take account of students' progress.
- Poor command of English typical for Russian students and lecturers.

Opportunities
- During the year 2009, the CBU was developing Doctoral Programmes which follow a common structure and are mutually recognized by the CBU partner universities.
- Knowledge of Forestry of Russia and Finland provides more possibilities for employability of CBU graduates.
- CBU project promotes not only international students' and teachers' mobility, but the connections between Russian universities as well.

Threats
- Sustainability of the CBU programme (dependence on external funding).
- Low attractiveness of CBU for Finnish students. On the author's opinion, the main reason for it is the lack of regular study courses taught in English.

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THE ROLE OF COMPETENCES IN HIGHER FORESTRY EDUCATION INSTITUTIONS IN THE EUROPEAN UNION AND THE UNITED STATED OF AMERICA. A COMPARATIVE STUDY

KATHARINA SCHNEIJDERBERG AND SIEGFRIED LEWARK

Abstract

In our study the current status and role of competences in higher forestry education institutions will be reconstructed based on group discussions held at international forestry conferences. There is no focus on a specific forestry study programme since participants of the discussions were students and professors from various programmes from Europe and the USA. We compare and contrast European and American expectations of higher education and descriptions of its current structure and practice. Competences play a central role in the transformation of European higher education structures as they are open to be defined by professors, students and employers in contrast to the remainder of the mostly rigid Bologna reforms.

Key words Competences, Bologna Reforms, Higher Forestry Education Institutions, Qualitative Study

Introduction

One of the restructuring objectives for European higher education through the EU Education Ministers is the shift in orientation towards an 'outcome' approach within the Bologna process (Berliner Communiqué, 2003). A plethora of suggestions from different individuals and groups - field and organization specific - highlights, which competences students should possess and which are important for the job market. With this focus on competences, the systems of higher education and employment are anticipated to be drawn closer together. This is a very ambitious undertaking: what is expected from higher education, what are the ideas students and professors have about the labour market? How is the *status quo* described and which results will follow from an outcome approach to higher education?

In this text, results of the qualitative study "Role of competences in Higher Forestry Education in the EU and the US" will be presented, which is part of an activity of the IUFRO Task Force on Education in Forest Sciences (EFS: http://www.tf-efs.proste.pl/en). We will start with the description of the method of group discussion and the study design. The focus is on results of the study, where two research questions will be dealt with:

- First, we want to show how different actors perceive the *status quo (How are the participants of the discussions handling competences?)*. A comparison between professors from Europe and the US reveals different views.
- Second, we analyse the role of competences *(Which role do competences play and which significance do they have for students and professors?)*. The thesis *"Bologna has to grow",* quoting from a group discussion with European professors, summarises essential results of the study, as on one hand Humboldt's ideal of education ("grow") is referred to, while at the same time, the ideas behind the Bologna process may be detected (see summary of group work 2 in Schneijderberg, 2014). After a short excursus to Humboldt's ideal of education (Box 1), which will be exemplified with pivotal quotations from the study, the US American handling of competences (status quo, role of competences) will be demonstrated.

In the literature no consistent and generally accepted definition of the concept of competences is found (Huber, 2004). On the other hand there are many quite different lists of competences for different fields of study, which are also changing over time (for certain aspects of competences, e.g. key competences see Rychen and Salganik, 2003; for the connection between graduates and employment see Teichler and Schomburg, 2012).

We find an individual-dispositive discourse on competences and a structural-normative one (Truschkat, 2010), which have clearly different starting points. The individual-dispositive discourse starts from the individual: the individual must decide which, how, and how many competences to achieve. The structural-normative discourse comes from employers and their requirements: which competences are wanted? This structural-normative discourse is about competitive capability in a behaviouristic sense.

Also the social dimension is important, besides the individual one: "The common popularity of the term [competence] is particularly apparent in the process of identifying, assessing and comparing individuals. This is true for the educational as well as for the employment system, which are exactly those institutions that take a central role in the allocation and distribution of social participation and hence of inclusion." (Truschkat, 2010; own translation from German).

Summarising, we may state that competences are growing in importance in connection with identification, valuation and comparisons of individuals, which are also an expression of social inclusion and participation. One could say that inclusion will depend on the existence of certain competences.

The methods of measuring the different competences of students are very much in question (Erpenbeck and Rosenstiel, 2003). Consequently, the discussion, which method is suitable for determining e.g. field skills, is still undecided. The question is, if the different defined scales of competences really are measuring field skills of

students at the end. So professors are measuring by using a scale whose standards are not exactly defined, but which has consequences for the individual social partake.

In our study we do not distinguish between competences, skills, learning outcomes, abilities, qualifications or the like since we focus on the social dimension of competences.

Study design and methods

Group discussions are standard methods of qualitative, reconstructive social science research (Bohnsack *et al.*, 2006; Flick *et al.*, 2000). Bohnsack names his approach reconstructive since he aims at RE-construction of the collective perception of the group. What does Bohnsack means with his reconstructive approach? The method is centred on the so-called "conjunctive room of experience" (Bohnsack, 2008; own translation from German), a term deriving from the field of sociology of knowledge, especially Karl Mannheim's "existential background" (ibid.). This room of experience often appears implicitly, behind the meaning of the communication of the group. In our case the objective of the use of this method is to show the collective common experience of students and professors in forestry making implied or implicit knowledge explicit. Hence, we RE-construct a social constructed issue. The method is particularly effective in cases, in which the "importance of processes of interactions or discourse in groups for the constitution of beliefs and patterns of orientation and denotation" (Bohnsack, 2010, p. 235; own translation from German) is to be reconstructed. Parts of the discussion are searched, which Bohnsack calls "passages of specific dramaturgy", with "metaphors of focusing". Hereby not only the content, the *"What"*, but also the *„How something is debated"* (ibid, 234f.) is analysed.

The evaluation is done in four steps using the "documentary method" (Bohnsack, 2008). First the discussion is transcribed completely. The next steps are an interpretation to assess the subjects of the discussion *(Which topics are discussed?)* and reflecting upon the interpretation (focus on the manner and the question: *How are the topics discussed?*); finally the case description is phrased.

The study design should secure a great variance among the participants. In our study, gender, age, nationality and work experience were diverse. We have evaluated three out of twelve group discussions so far: students from the EU, professors from the EU and professors from the US (Table 1):

Table 1: Composition of groups within the discussions

Group	Number of persons	Diverse in terms of ….
Students from the EU	12	age gender (7f/5m) nationality (within the EU) curriculum (BA, MA, Magister, PhD) and working experience
Professors from the EU	3	age gender (1f/2m) nationality (within the EU) curriculum (BA, MA) working experience (deans, specialisation in different fields of forestry),
Professors from the US	6	age gender (2f/4m) states (within the US) curriculum (undergraduates, graduates, PhD), working experience (directors, US Forest Service, researchers)

Results

The two research questions (*status quo* and *role* of competences) will be answered using main quotations from the group discussions. Main statements of the EU students, EU professors and US professors will be summarised. In an excursus about Humboldt's ideal of education (Box 1) essential quotations of the group discussion will be connected with the basic ideas of Humboldt, in order to highlight the implicit knowledge of the group of the EU professors.

EU students
The *status quo* of the EU students reveals a differentiation into two groups. The *"choice grou*p" is characterised with this quotation:
   "You are allowed to do any course in any department depending of what are your needs [...] If you think you are not competent to analyse data statistically you are going to the institute of statistics […] so it really gives you the skills you need to become what you want."

The second student group we call the *"no choices group"*:
   "The current system is really attached with the industrial revolution type [...]. Everything in module production as if we are in factory system. They have a batch and then as if we are in the factory where we have a standardisation like

we have exams, TOEFL or something. You have standardised tests as if it is ISO or something like certification."[3]
"It was a bad idea to change magister to bachelor and master the way it is now."

Between the groups of students the *status quo* is seen very differently, depending on the freedom of choice (choice of courses, of interdisciplinary options, of studies abroad) which they have or do not have during their studies. The *choices group* has the freedom to choose their courses, depending on the individual interests. The *no choices group* experienced problems in transition along the Bologna process, they feel like being in an

„[...] industrial type of module production, like a factory system, standardisation of exams and tests".

The regulations for combining courses obviously is quite differently organised in different universities. Whether the students have choices depends on:

- The frame conditions: e.g. shortage of instructors *("So two or more courses are given by the same single instructors [...] if a single instructor is ill then there is no other person who can teach."),*
- The structures of Bachelor and Master programmes,
- Possible barriers of languages (Are there courses in English or other languages?),
- Institutional transparency, information about new study programmes,

Individual responsibility: individual knowledge of what one really wants or other strategies (like *"I got my courses accidentally.").*

In summary, the choices seen during the course of studies, i.e. the chances of deepening the own competences following his or her interests, decide how the students see the Bologna reform.

EU professors
The description of the *status quo* of competences by the EU professors depends on a double change: on the one hand, how they view forestry and how forestry may change, and on the other hand, the changes of the curricula according to the Bologna process. On the one hand, some professors stress the change from "traditional" to "modern" forestry, the latter being described either as sole wood production or as "multi-branched": modern forestry is

"[...] so broad and variable – people are following different directions, some want to be more involved in the environment or in ecology, or more in forest restoration or in outdoor recreation, so that this has become a very multi-branched kind of version forestry."

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[3] TOEFL short for „Test of English as a Foreign Language", is a standardised test, often used as an admission requirement for universities. ISO is short for "International Organisation of Standardisation" which developed the ISO norms.

In this multi-branched version of forestry different aspects like environmental issues, ecology, biodiversity, social aspects, forest restoration or outdoor recreation are relevant. As a logical consequence of this broadening of the spectrum, competences which support the ability to connect these aspects are regarded as more important:

> *"Nowadays the forests are part of ecosystems and they are part of the social system and are part of the landscape and so different kinds of connections are maybe needed."*

So like two sides of the same coin, modern forestry is either seen in the small discussion group as multi-branched or focused on material aspects, while a modern forestry in this latter sense, only seen as a wood producing factory, is often criticised:

> *"It became more and more the direction of a wood production scenario."*
> *"Just talking about money: how much does it cost, just thinking about the economic aspects rather than about the ecological aspects or biodiversity or the future."*

The view of modern forestry either as multi-branched or as place of wood production will have fundamental impact on the priority of students' curricula in a forestry study programme.[4]

On the other hand, we have compared statements of the EU professors regarding the structural changes of study programmes with Humboldt's ideal of education, since their thesis *"Bologna has to grow"* implies his ideal of education, as also illustrated in an excursus (Box 1).

Box 1: Excursus: comparison of three fundamental ideas from Wilhelm von Humboldt's educational ideal with statements of EU professors

1. Holistic education: („ganzheitliche Ausbildung")   *"I think the students loose the view on the whole forest while going through this technical stuff. Just at the beginning they think about the forest and at the end they think: 'well, this tree has grown quite well, I can use it, I can sell it."*
2. Science has a value in itself, it should be free from economic interests: („Wissenschaft als Bildung und individuelle Bildung um ihrer selbst willen: frei von wirtschaftlichen Interessen, unabhängige Bildung")   *"We did it in a very technical way, plowing, planting exotic species, short rotations and all of that. Very technical, very mono cultural, mono production orientated. That's what we learned to do. We learned to plant and harvest."*
3. Autonomy of science („Freiheit der Wissenschaft: der Staat soll sich nicht in Bildungsfragen einmischen")   *"We are forced, we are really forced. You have to provide bachelors and you have to prove the employability of the bachelors. This is what we are forced to do from the side of the ministry."*

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[4] In this description and the quotations above the focus is on what the discussion members have in common, not on the differences. We used a qualitative approach; we did not aim towards a representative sample.

In the overall view we found that the group of the EU professors refer to Humboldt's educational ideal. This attitude is especially apparent in the thesis of one EU professor: „*Bologna has to grow*". It implies a backlog demand of the implementation of the Bologna reform, which was forced on the universities from "up there" (EU bureaucracy and ministers of education in the respective states). That is why a catching up is considered needed in the discussion group on what was missing at the start of the reform: freedom of action. *"Bologna has to grow"* is standing for an adaptation of the intended changes to the respective structures of study programmes, to be shaped by professors in the first place in order to get away from a rigid utilitarian approach. Initially the guidelines from the EU clashed on ideas of professors how the studies should be structured. Now this deals with competences again, to be defined and redefined by professors according to intended outcomes, the competences which shall be acquired till the end of studies. Skills play a crucial role in the adaptation process between EU regimentations and EU universities. It is the role of professors to make room for Humboldt's ideal of education in the Bologna process. By means of discussing students' competences, EU professors try to give Humboldt a ride to Bologna.

US professors
The professors in the discussion describe the US American system of higher education as a liberal market model, which exists in a complex setting. When asked about the status quo, aspects like job shortage, budget cuts and hiring freeze are mentioned. The US educational system works on the level of the single state:

> *"The states in terms of higher education act as autonomous units and so it costs a student more to go from Arizona to California than it does a person just across the border in California to go to universities in California. Out-of-state students can get charged more."*

Parents of students or students pay per credit hour and often the term "credit hour production" is used:

> *"At university we are driven by credit hour production and students are enrolled within our unit and graduation rates. We felt that the natural resources management degree is a way to increase credit hour production, student numbers and graduation rates."*

Therefore the main focus is to increase the student number.

The status quo in the liberal market model is described as follows:
> *"It's like a menu."*

You can choose whatever you want. The universities are constantly competing for students and differ mostly in focusing on different competences. One university may focus on field skills:

> *"The outstanding field skills that they get, are really an offshoot of the forestry programme."*

Another university promotes social skills:

> *"We tend to resist the pull to have a very strong or stronger field component in our programme because we are trying to differentiate ourselves from the other forestry faculties and the many technical programs we have there. So we are kind of going the opposite way."*

And a third university tries to combine both:

> *"I am well aware of studies on what employers are looking for, and often when you look at those studies they're looking at soft skills and analytical skills but also communication skills and team working skills. And so we try to develop a curriculum that has that, but we still highly value the field skills and so try to find the balance. We are always fine-tuning our programs and we are really good at that."*

Universities are positioning themselves in a competitive situation through focusing on different skills.

The quotations also illustrate the role of professors: The universities have to be competitive within difficult conditions and professors have to defend their curriculum. This curriculum then has to be taught, evaluated and accredited in order to offer certified degrees. In this process methodological questions regarding the choice of assessment methods (on how to measure certain competences of students) are not specified. These insecurities are concealed by advertisement and little changes in the curricula. As a result, most of the curriculum revisions are *"window dressing"*, one participant of the discussion said. Throughout the whole discussion with the US professors, they were promoting their special curricula: They insist that their curriculum is loved by employers (thus granting a wanted job in around 50% of cases), students' parents and students themselves.

The role of students is that of customers, but in a paradox way also that of products:

> *"We have more employers looking for graduates than we are producing. There are more employers who want forestry graduates with the technical skills and the management skills than we can actually put out."*

Compared to the EU professors, the US professors do not mention – neither explicit nor implicit – Humboldt's ideas.

Outlook

For the European students the personal judgement of the new system depends on which choices and possibilities of combining courses they had during their studies. Skills are tools to express or deepen own interests.

The professors from the EU discuss about the multi-branched version of forestry versus forestry as a wood production factory, two sides of the same coin of modern forestry. By discussing competences, European professors try to incorporate Humboldt's ideas into the Bologna reform.[5] It is seen as an adaptation process between education ministers and professors in the EU.

In the US, universities are positioning themselves in a competitive situation through the focus on different skills. Competences are tools to promote the curricula. Professors have the role of promoting the programmes as well as inventing new curricula. At the same time they are evaluators. Students are treated as customers and products.

Certainly further research is needed: For example the position of US students is missing, as well as the position of employers (EU/US). It would be gainful to have more comparable groups of students and professors to contrast the described results. In this connection it is not important if the group consists only of three members, but the composition within the groups should be comparable (as described in Table 1). Also the very important question of assessment of skills (university level, accreditation/certification level) needs to be answered. The group discussion methodology appears as a suitable method to find first indications about the *status quo* and the *role* of competences as demonstrated in our study.

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HOW TO MAKE THE BOLOGNA TREE GROW?

KATHARINA SCHNEIJDERBERG

Discussion notes collected during the conference group work.

Group 1: Following Humboldt's ideal of education

Impulse
"The term education is first of all associated with school: the teachers are trying to teach their students the level of education, which is stipulated in the curriculum as appropriate. Thus education is knowledge – education is teaching and learning – education is knowledge and insights. But is that all that constitutes education?

On the threshold between the 18th and the 19th Century, Wilhelm von Humboldt is the undisputed father of the modern concept of education, as he implemented the most far–reaching education reform of the German language area. Humboldt defined education as the stimulation of all the forces in people so that they unfold through the appropriation of the world and lead to a self-determining individuality and personality. According to Humboldt's ideal, education is more than the mere acquisition of knowledge – individuality and personality as well as talent development play an equally important role. Education is a process of individuation, by which man can develop his personality." (www.bildungsxperten.net/wissen/was-ist-bildung, translated from German, Lewark)

Please discuss the connection between employability on the one hand and expected learning outcomes (ELO), competences and skill sets in the Bologna process on the other in the light of Humboldt's ideal of education. Give some conclusions and recommendations on the improvement of learning and teaching processes aiming at employability of graduates in the sense of Humboldt's ideal of education.

Discussion notes
- What Humboldt himself did, is nowadays not possible within the existing structure: He studied law, but never went to lectures. He studied on his own and passed then a test and became an educated lawyer.
- There is still a gap in terms of focussing on research and on teaching/learning. The two topics are handled in an opposite manner: There is less focus on teaching, but research is a very important factor. To become and to be a professor you have to get specialized in a certain field and you get qualified through research activities. So Bologna is far away from an equilibrium between teaching and researching.

- The development of skills is not yet an important issue. The curriculum is very much structured – maybe too much – especially on the Bachelor level. On the Master level it may be something else.
- Often free elective courses have nothing to do with forestry, e.g. the improvement of social skills, communication skills (Estonia).
- The huge variety of students was mentioned. There are certain groups of students with special needs. A selection of students was proposed: 1. weak students, 2. normal students, 3. good students.
- It is seen as an important issue to stimulate the students' own needs.
- Following the quotation of an EU professor (quoted from a group discussion, cf. Schneijderberg and Lewark, this volume) „We are forced from the side of the ministry to provide Bachelors and the employability for these Bachelors". There were contradictory statements: On the one hand it was said, that professors don't feel forced by the ministry to provide this for Bachelors. On the other hand it was mentioned, that „society is demanding" this. So it is an open question if they feel forced either from the ministry or the society.
- In Spain Humboldt's educational ideal is not so much discussed, so the question has been raised if it is a European issue or a German one. In the Netherlands, it was reported, that it is an issue. It was assumed, that this maybe more important in the Northern European countries.

Concluding, Humboldt's ideal of education is known to a very different degree and the question was asked if it is more important for Northern European countries. It was noted, that studying like Humboldt himself did, is nowadays not possible, because of the strong structure of the curriculum (especially the Bachelor curricula's). It was mentioned that the development of skills is not yet an important issue.

Group 2: Going for employability under Bologna conditions

Impulse
The Bologna process is working as a top down process, aiming mainly at the three cycles of study programmes – cf. the ten dimensions of the Bologna process in Figure 1 below.

Please discuss the connection between employability and ELO (expected learning outcomes), competences and skill sets. Give some recommendations on the improvement of learning and teaching processes aiming at employability of graduates.
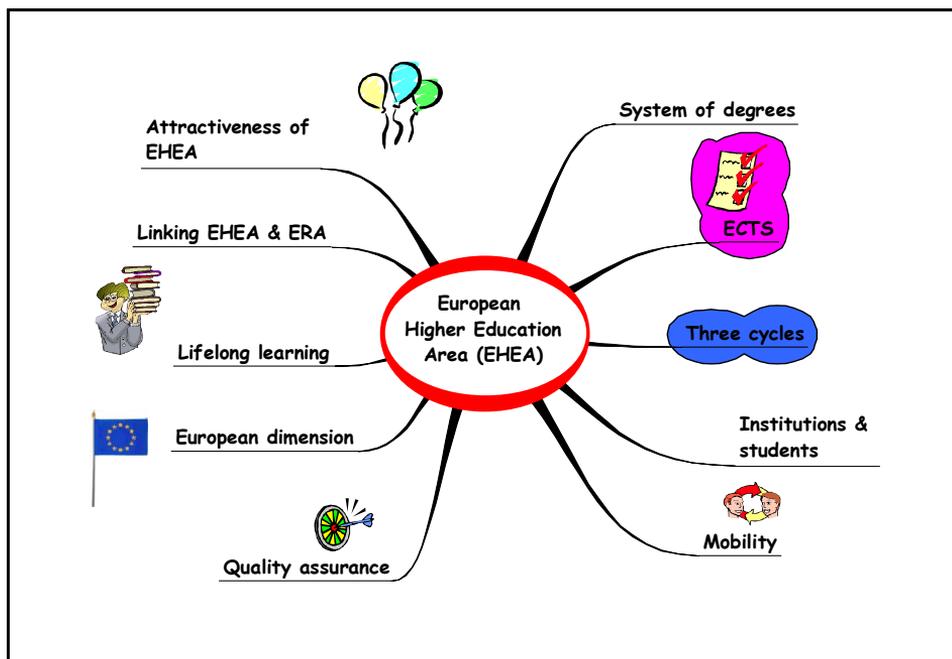
Figure 1: Ten dimensions of the Bologna process, based on the Prague communiqué from 2011 (Lewark)

Discussion notes
- Professors agree on the priority of employability and clarify the will to integrate it into the curriculum. But the operative part is very difficult and there are many questions on how to handle this. What employability is as well what the job market is demanding, both issues are heterogeneous topics.
- Professors should/could help students with job offers to open the door to the job market, but also students have to show more self-responsibility.
- Concerning curricula, students should have the choice between modules: „Nobody wants to have obligatory modules only". In general the freedom to choose courses stands in a good relationship to the job market.
- „We are shooting on a moving target!" The study structure and the job market are permanently in change and we cannot fix this. We should go towards more flexibility in terms of developing possibilities to choose modules.
- Netherlands: Humboldt's „personality" is a central issue there. This issue is also related to international mobility: If students can take a year off, it is a good way to develop into personality.
- „Individuality is under pressure": giving the freedom to choose modules is a central issue.

- Mobility: the starting ideas of the Bologna reform as well as the ideas during the founding of the SILVA network had both the motivation to improve mobility. But now we are closing mobility opportunities by completely filling the curricula with obligatory courses.

- Differences between Bachelor and Master: rigid schedules in the Bachelors, but at Master level there are more flexible structures.
- An example of a Spanish Erasmus Mundus programme was given: Showing that the programme increases mobility with the price that the fourth year of the study programmes in general is difficult

Concluding: Bologna should grow – improvement is needed! It was mentioned that the freedom to choose is important, but employability also should be an important issue when choosing the courses.

CONCLUDING REMARKS

DO OUR STUDENTS LEARN WHAT THEY WILL NEED LATER?

SIEGFRIED LEWARK

Do our students learn what they will need later? This is of course a rhetorical question, as nobody can answer it while students still are students. Who is interested in this question or rather in the answers to it? Students should be interested, they may be more or less, but are probably not much used to raise this question and may be more interested in others questions: for instance a first job. Universities on the other hand, especially on faculty level should be interested, have limited information, but could get more through graduate surveys. And finally the labour market and employers as part of it should be, will try to influence the education outcomes, but may have difficulties to express the learning needs beyond the level of single companies.

Employers and their representatives, if asked, will always give long lists of subject specific competence requirements based on and explaining the shortcomings of their young employees, but sometimes also point out the need of generic competences and transferable skills.

Will the universities learn about the experiences of graduates and employers? The universities obtain this information in an anecdotic way, for only a few alumni will inform them spontaneously – or in an organised way, if they carry out graduate enquiries and organise a dialogue with employers. This situation should not prevent universities and faculties, and especially the individual teachers, from reflecting about the question, what students will need later in working life. Examples of such considerations have been presented during this conference and are included in this volume of proceedings.

We see that discussion of learning needs is always about generic competences on one hand, and subject specific competences on the other – and about a proper balance between the two, given a very limited time, for each student, teacher and subject. The concern with the design of the learning process, by universities and individual students, is about the way to place these seemingly needed competences in a curriculum in the form of learning and teaching methods – and about a match of expected learning outcomes, study objectives, study contents, curriculum structure and course contents and ways of assessment, i.e. exams.

Recent changes of the study programmes of forest sciences have been caused by the Bologna process and by underlying as well as the Bologna independent didactical insights and development. These changes applied to structure and organisation of study programmes, learning and teaching methods as well as contents and expected learning outcomes. For years the contributions to the SILVA Network conferences have been dominated by discussions on the impact of the Bologna process, and certainly this will go on.

So coming back to the initial question: do the students learn what they will need later? This can only be answered in retrospective, looking back to study experiences and outcomes, which can be answered by alumni some time after graduation, or by employers. This information, even if known to a certain degree by the universities, can help them only to a limited degree in shaping the study programmes and the learning and teaching process. We come back to the observations that future employment of the students is not known, careers are becoming more diverse, and the labour market is developing faster and faster; competences needed later therefore cannot be known specifically. But one thing is for sure: generic competences will be needed, transferable skills, problem solving competence, team skills and the like – together with broad and deep subject specific knowledge, on exemplary level, because such knowledge and its value has to be experienced by the student: how to get it, how to use it, how to add specific competences, to fill gaps or supplement in the course of lifelong learning, how limited such knowledge is and how much situation and time dependent they are.

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