QUALITY ASSURANCE AND CURRICULUM DEVELOPMENT IN FORESTRY AND AGRICULTURE RELATED SCIENCES

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Acknowledgements

PREFACE

Society is continuously changing, increasing and sharpening its demands on academic education. The Conference of European Ministers of Education and the European Commission are also influencing the pace of change, clearly determined to enhance the quality of the education, to encourage the exchange of students and teachers, and to simplify the access non-EU nationals and markets.

In this framework, the SILVA Network, being true to its primary objective "to stimulate and facilitate educational co-operation in the field of forestry in Europe", organizes regularly meetings where a number of subjects regarding forestry curricula are discussed, on the basis of presentations by teachers and or students. The SILVA Network conference

Quality Assurance and Curriculum Development in Forestry and Agriculture related Sciences

held in Valencia, Spain, is a worthy continuation of this series. The challenge for quality assurance, or how to guarantee and demonstrate the quality of the curriculum, is an issue of utmost importance for both students and future employers. Curriculum development is a continuous process, requiring attention from universities, teachers and students every day. Both are and proved to be worthy of an intensive discussion.

Pieter Schmidt

Participants of the meeting during their visit to AIDIMA. From left to right: Markus Schaller, Andrew Cobb, Petrovic Nenad, Hernán Peredo López, Paavo Pelkonen, Petrovic Vusnja, Rosario Fanlo, Annette Schuck, José Vincente Oliver (AIDIMA), Martin Ziesak, Sanna Härkönen, Aki Villa, Lech Plotkowski, Siegfried Lewark, Eduardo Rojas-Briales, Julio Javier Diez Casero, Paula Serrano (AIDIMA). Not on the photo: Pieter Schmidt.

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SUMMARY: QUALITY ASSURANCE AND CURRICULUM DEVELOPMENT IN FORESTRY AND AGRICULTURE RELATED SCIENCES

PIETER SCHMIDT

Universities have a large responsibility offering curricula which inter alia should
- Fulfil society's needs;
- Be attractive to students;
- Produce highly qualified and competent alumni;
- Be accessible for students from all over the world.

These qualifications require
- High quality curricula;
- Engaged and qualified teachers;
- Good roots in society;
- Intensive quality control;
- Agreed intended learning outcomes.

The European Union by its Commission and its Council is stimulating the debate on the processes necessary to fulfil these qualifications. Indeed, some European towns have lent their name to these initiatives.

Forestry in general is changing continuously and forestry education has to adapt to these changes. At the same time forestry education has also to cope with these European initiatives to ensure the quality and standards of their curricula. SILVA Network meetings have regularly given a platform for forestry teachers to exchange experiences with their colleagues and with experts from other institutions. Quite a number of different aspects have been discussed, with curriculum development seen as fundamental. Here, in Valencia, quality assurance was added to the palette.

It is nearly impossible to discuss all aspects of curriculum development in one meeting; on the other hand it is surprising how many aspects can be touched upon in two days. How a curriculum should be developed is not discussed, but quite a number of building stones were given. A short overview, not in a chronological but a logical sequence:

The last subject to be discussed was the need for a mission statement. Surprisingly, because in this statement the need, relevance, quality and subject of a forestry curriculum is given and thus should be placed at the start. Annette Schuck described the relations of the mission statement and thus the curriculum with the environment and concludes yes, Curricula need a mission and the SILVA Network needs it now.

Based on literature research and his experiences in accreditation, Hernán Peredo follows with the somewhat shocking observation that there is a gap between education and praxis, between curriculum and profession[1]. The relevance of a curriculum for society is the only reason for its existence. Teachers and employers differ in their view on the content of the education and the contact between the two is often low. Peredo formulates ways and means to improve the relevance.

Even if the relevance of a curriculum is good, it should be moulded into the regulations and rules formulated by the government of a country and the EU. Eduardo Rojas-Briales gives an insight in the political movements to implement the Bologna Declarations in Spain and the reactions of the academic world, resulting in a white book with proposals for the general set-up for forestry and agronomy curricula. Decisions, however, have not yet been taken…

As stated above, curriculum development was not touched upon as a main subject during this meeting; interested readers are referred to other SILVA Network publications. Both Siegfried Lewark and Martin Ziesak, however, used the curriculum (development) in Freiburg im Breisgau and in Munich, respectively, as basis for the discussion of the introductory course to the former curriculum and for quality assurance in the latter one.

Siegfried Lewark emphasized the importance of an introductory course, taught by the university itself to put the students on the right study trail. This course is aiming at giving students a better study attitude, both as individuals and as members of a group, a better motivation and an enhanced curiosity. Overall assessment by the students was good.

ITC tools flare up in (forestry) education. They for instance make it possible to simulate and demonstrate forest growth. Sanna Härkönen evaluated a course using an interactive forest growth simulator based on Finnish data with both Finnish students and students from tropical countries. Both students groups were happy to use the simulator and learned a lot, seeing the effects develop before their eyes. Non-Finnish students complained, that is was difficult for them to check the reliability of the results. Regular visits to the forest can apparently not be replaced by a computer. The necessity of face-to-face education was confirmed during the general discussion.

When the curriculum development is finished and the courses are being taught, the quality should be maintained. According to Andrew Cobb, each university should develop a quality assurance system to continuously enhance the quality of its education, and assure the outside world (public including employers, students, donors) that its reputation is good. Three main actors are involved: external examiners who based on regulars visits once in the five year judge as critical friends; internal colleagues who monitor each year the status of courses not taught

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[1] Härkönen described the use of older software in education than in practice.

by themselves, and students, not only as source of information but also as member of each and all boards involved in this process and involved in managing universities. In a second article, Cobb gives a detailed description and process proposal for quality assessment. Martin Ziesak gives more detailed information on quality assurance as practiced in the Munich curriculum "Sustainable resource management" for international students. Finally, Cobb gives in the general discussion an overview of standard practices in Europe and of current issues and concerns.

1 INTRODUCTION

PAAVO PELKONEN

The European Higher Education Area (EHEA) is developing fast. In this moving context the ministers of education of the participating countries have decided on a framework for qualifications comprising three cycles (BSc – MSc – PhD), generic descriptors for each cycle and credit ranges for the first and second cycle. The universities in various countries have taken this challenge seriously. Curriculum development and description of teaching and learning processes have been carried out intensively and with great enthusiasm.

The processes of teaching and learning at universities in the integrating Europe have to be open, transparent and of high quality. The development process of the European Higher Education Area, which started in Bologna, has adopted standards and guidelines for quality assurances. The participating countries have committed themselves to introduce the proposed model of peer review by quality assurance agencies on a national basis. These agencies will be linked to the joint European register of quality assurance.

In some education areas transnational evaluation and accreditation is envisaged. One of these highly international fields is forest sciences. Integrated study programmes, such as joint and double degree curricula require a collaborative effort of the national accreditation agencies or a fully new approach such as an Europe wide accreditation in a specific field of higher education. Some new European quality labels will be tested, among them the label for life sciences and rural development. For this purpose the Association for European Lifestyle Universities (ICA) has launched a project QUALITY: Quality Assurance and Accreditation of International Master Degree Programmes in Life Sciences and the Rural Environment (EU Funded Project 2006) for developing a new international agency of quality assurance.

Jointly approved procedures of quality assurance are preconditions for recognition of curricula offered by universities in the future. This is a very basic right of the students in the integrating Europe. The development of joint European Masters degrees in the frame work of Erasmus Mundus plays also a key role in the development of recognition. Participating countries have started modifying legislation but still universities face great problems when promoting international cooperation and partnerships.

The European Union supports 80 joint and or double Masters' degrees, 19 of which have even an additional dimension of international (non-EU) partnerships. In the domain of the SILVA Network, three Erasmus Mundus Masters' programmes exist. Hence, the SILVA Network has a special need to participate in the development of international quality evaluation and accreditation procedures.

ICA's mission (according to the project) with regard to quality assurance is "to enhance the quality of degree programmes in life sciences and the rural environment, through quality assurance and international accreditation. The aim is to award the European Accreditation Agency for Higher Education in the Life Sciences quality label to degree programmes in higher education institutions that have achieved the appropriate quality and standards in their educational provision".

The role of the SILVA Network is to improve the opportunities of Higher Education Institutes to modify their teaching and learning processes to meet the demands of the developing European Higher Education Area. How to develop and define a joint mission for curricula that promote European dimensions? How to adopt appropriate and relevant methods and tools? How to spread good practices for increasing attractiveness and competitiveness of the academic forestry education in Europe? These and many other questions will be asked when quality assurance will be implemented. This workshop on quality assurance processes in forestry curricula aims to help answering these questions.

2 QUALITY ASSURANCE, COURSE MONITORING AND REVIEW: SHARING GOOD PRACTICE

ANDREW H. COBB

Introduction

Harper Adams University College provides higher education programmes to more undergraduates in the UK than any other higher education institution in the academic fields of agriculture, land management, agricultural engineering and veterinary nursing. As a specialist UK higher education institution, it is subject to regular audits by the UK Quality Assurance Agency and follows the guidance listed in the Codes of Practice of the agency (see QAA (2006) for further details). It therefore devotes considerable resources to maintaining and enhancing the highest quality and standards in its academic provision.

The institution has a comprehensive Quality Assurance (QA) system and an Academic Quality Assurance Manual that details all operational procedures. The Academic Standards Committee is the central focus for QA policy and strategy, whilst operationally responsibilities are vested in course management teams for each academic field of study. Harper Adams University College aims to continually enhance the quality of its academic programmes and maintain the standards of its awards. It is important that these aims are met

- To provide information to the general public and the government on the quality of the programmes;
- For recruitment of both national and international students;
- To secure additional funding;
- To enhance the general reputation of the institution.

This paper presents and overview of the Quality Assurance process of course monitoring and review at Harper Adams University College, as a cornerstone of the maintenance and enhancement of quality and standards. Whilst the processes described are effective and in widespread use in the UK, they may not be appropriate to all higher education institutions in Europe and should not be seen as a biased framework for Europe. Instead, it is presented as a process that works well and aspects may be of value to other European institutions, as is the nature of sharing good practice.

Principles of the UK Quality Assurance System

The UK Quality Assurance System for Higher Education is described and maintained by the Quality Assurance Agency. This national body has established Codes of Practice to guide institutions through the process, Benchmark Statements that list the appropriate learning outcomes for a particular academic discipline, and

a Framework for Higher Education Qualifications that defines levels of study. Its aim is "To promote public confidence that the quality of provisions and standards of awards in higher education are being safeguarded and enhanced". It takes action where weak provision is found and the outcome of its periodic audits helps to secure public funding by the institution.

A cornerstone of the quality assurance process in the UK is peer review. The Quality Assurance Agency recruits auditors from the sector to review the provision in an institution, whilst the institution itself invites peers from other institutions to monitor and review the student experience. These External Examiners act as critical friends, providing constructive feedback on a programme of study in an annual report. They visit the institution once or twice each year and keep in regular contact to oversee student work and the assessment process.

In addition, internal colleagues act as course monitors for courses which they do not teach on. They attend course committees and provide an annual report on the health of the course, especially identifying items of good practice, issues to be resolved and indicating where action plans have been completed.

Within the institution the policy for quality assurance is debated and decided in the Academic Standards Committee, whilst operational issues reside with the course teams. Hence, the powers of policy and implementation are kept separate. Responsibility for action is devolved to the course team and to individual module leaders.

Finally, and perhaps most importantly, there is student participation at each stage of the process. Student representatives are elected by their peers to sit in the course committee and are encouraged to report the views of the student body. Further students are elected to sit on Academic Standards Committee and Academic Board, the ultimate academic body in the institution. Hence, the "student voice" is heard loud and clear throughout the institution on all academic matters. Their presence on key committees is likely to gain even greater significance with the introduction of tuition fees and more customer orientated procedures.

Some Definitions of the Monitoring and Review Process

- Monitoring Annual evaluation of modules and courses to improve delivery and assessment.
- Periodic Review   Critical evaluation every five years to assess and renew the programme.
- Validation The process by which a course is judged to have met the requirements of all stakeholders, including the awarding body and professional organisations. Re-validation every five years.

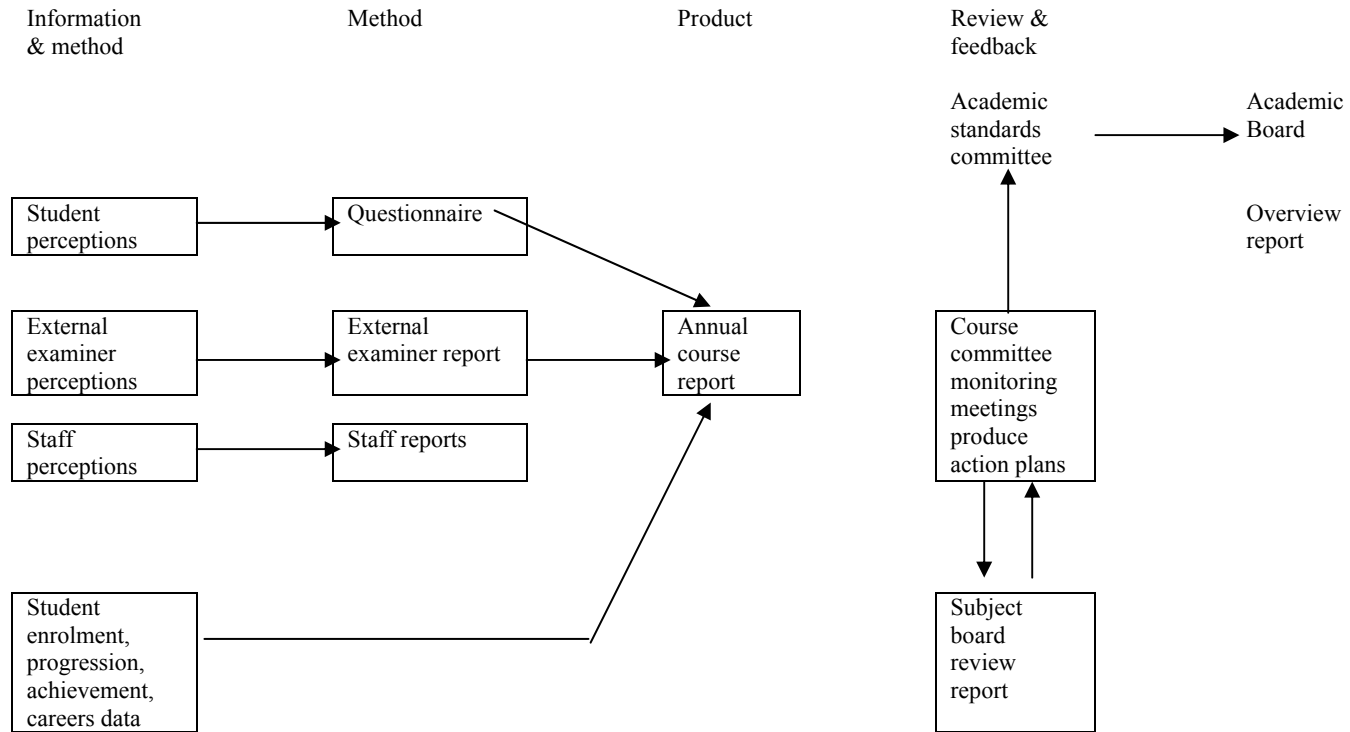| Information & method	Method	Product	Review & feedback	
			Academic standards committee	Academic Board
				Overview report
Student perceptions	Questionnaire	Annual course report	Course committee monitoring meetings produce action plans	
External examiner perceptions	External examiner report			
Staff perceptions	Staff reports			
Student enrolment, progression, achievement, careers data			Subject board review report	

Figure 1: A diagrammatic representation of the course monitoring process

Periodic Monitoring and Course Review

This process evaluates the strengths and weaknesses of a course and asks whether the learning outcomes remain appropriate. It asks whether the course is still fit for purpose and proposes changes, particularly in light of academic developments in the field of study or advances in pedagogy. The review is evidence-based and undertaken by the course team. It builds on annual monitoring data and reports, and takes into account the responses to validation events; changes since the validation; reports from the external examiner; data on student applications, admissions, progression, achievement and career development; and feedback from students, academic staff and employers.

The course team is chaired by the Course Manager and consists of members of academic staff who teach on the course, student representatives and members of academic support staff. It meets as a course committee once each term and additionally for course monitoring. Each of the four annual meetings is minuted and the minutes are circulated widely within the institution. Feedback from module and course monitoring generates an Annual Report to the Academic Standards Committee each January and issues identified for action are considered in the annual staff development reviews, with operating plans submitted to the Academic Board (see Figure 1).

The monitoring and evaluation of each module also follow an evidence-based approach. Students meet in discussion groups and complete questionnaires regarding their perception of the content and teaching of the module. Academic staff reflect on their own contributions and their own teaching is observed and commented on by others. This is particularly helpful for new members of staff and aids their personal development. Reports from the external examiner are also influential and student performance is also considered with assessment by both coursework and examination.

Institutional Audit

Every five years there is an external audit to consider the effectiveness of the internal quality assurance systems to enhance quality and maintain standards. Peer review teams test the quality assurance process
- Through audit trails (by reading policy and strategy papers and committee minutes; by meeting staff and students and reviewing student work);
- Against national and international reference points;
- To make judgements on the management of standards and quality of courses at all levels (including bachelors, masters, and doctorates);
- To establish the management of quality enhancement within the institution;
- To ensure the accuracy of information published by the institution.

At first glance this may appear to be a heavy quality assurance burden for a higher education institution, at considerable cost in both time and resources to all members of the institution. It is, in the opinion of this author, an appropriate investment to ensure that the academic quality and standards of our programmes of study are being maintained and continually enhanced. This is in the best interests of the students, the institution, the European Higher Education Area, and Europe itself.

Acknowledgement

I wish to thank my colleague, Dr Abigail Hind, Head of Educational Development and Quality Enhancement at Harper Adams University College, for sharing an internal presentation on Quality Assurance, on which this paper is based.

References

QAA, 2006: www.qaa.ac.uk. Cited November 2006

3 QUALITY ASSURANCE AND CURRICULUM DEVELOPMENT IN FORESTRY AND AGRICULTURE – RELATED SCIENCES IN EUROPE

ANDREW H. COBB

Introduction

In 1999 the Education Ministers from the European member states met in Bologna, Italy. In what is now referred to as the Bologna Declaration, they identified the need to promote European co-operation in higher education, particularly in relating to its quality assurance (QA), by proposing the development of comparative procedures and methodologies. In the Berlin Communiqué of 2003, Ministers referred to an overarching framework of qualifications for the entire European Higher Education Area and the Dublin Descriptors were accepted in 2004, defining the learning outcomes expected from study for Bachelors, Masters and Doctorates (the three cycles of Higher Education). The underpinning goals of these cycles of study are shared, including

- The development and maintenance of a broad, advanced knowledge base in a field of study;
- Preparation for the labour market;
- Preparation for life as an active citizen in a democratic society;
- The development of personal and transferable skills.

More recently, in the Bergen Communiqué (2005), Higher Education Ministers recognised the need for the development of a Europe-wide QA and accreditation system, and that there was much progress to be made in the pursuit of international co-operation and development of QA processes. In January 2006, the European Commission paper "From Bergen to London – the EU Contribution" supported the establishment and evaluation of a trans-national system of quality assurance. Thus, the recommendation of the European Parliament (2006/143/EC) proposed that member states choose QA agencies in Europe that meet their needs and that their higher education institutions work to a complementary assessment by such agencies. These developments should lead to a greater coherence and co-ordination of QA in Europe, as envisaged by Bologna. Furthermore, common systems may make European Higher Education more accessible and understandable for students from third countries, whilst enhancing reputations for quality and standards within the European Higher Education Area.

This paper presents a brief glossary of quality assurance terms and then presents a draft QA Framework developed from an Erasmus Mundus – funded project, as a case study, to which the author has contributed.

Some Definitions of the Quality Process in Higher Education

- Quality or fitness for purpose describes how a programme of study meets or conforms to generally accepted standards, as defined by an accrediting or a QA body.
- Quality Assurance is the means by which a higher education institution confirms that conditions are in place for their students to achieve the standards set by an accrediting or a QA body.
- Quality Enhancement is the expectation that the higher education institution will have in place a plan to monitor and improve the quality of its programmes.
- Best practice is the most effective practice within a higher education institution that others would benefit from adopting or adapting.
- Learning outcomes describe what a student should learn after a period of specified and supported study.

A more extensive glossary of terms is given in box 1. The reader is referred to the following sites for further definitions and descriptions of the QA process in Europe and elsewhere, www.qualityresearchinternational.com, www.qaa.ac.uk; www.chea.org; and especially www.enqa.eu/)

The AMEU Project (2004-2007)

This Erasmus Mundus–funded project is co-ordinated by ICA, the Inter-University Consortium for Agricultural and Related Sciences in Europe, and is entitled Enhancing the Attractiveness of Masters Programmes at European Universities in Agriculture, the Applied Life Sciences and the Rural Environment. Its project outcomes are to develop:
- A searchable database of masters programmes in Europe;
- A handbook of good practice for the care of international students;
- A methodology for the comparative quality assurance of master's degree programmes.

The last outcome has been achieved by developing a draft Framework of benchmarks (or standards) and evidence-based indicators to allow for QA processes to be compared across the European Higher Education Area (see box 2). It is proposed that the Framework will be used by students and their advisors, in helping them select a European higher education institution to study at, and by the higher education institution itself to enhance the quality of its master's programmes and to compare itself against national and international standards.

Box 1: A glossary of terms used in quality assurance.

Accreditation	The approval of a higher education course by an authorised body
Aim	An overall statement of the intention of a programme of study or mission or policy
Assessment	A general term that includes all methods used to judge the performance of a student, group or organisation
Benchmark	A standard against which comparisons can be made
Best Practice	Effective or ideal practice within an HEI that others would benefit from adopting or adapting
Competence	The acquisition of knowledge, skills and abilities at a level of expertise sufficient to be able to perform in an appropriate setting or level
Criteria	Standards for accreditation of an HEI or programme. Elements against which a judgement is made
Curriculum	A programme of learning, including philosophy, content, approach and assessment
Employability	The knowledge, skills and abilities that may make graduates more likely to be successful in their chosen occupation
Enhancement	A process of improvement
Fitness for purpose	When quality equates with the fulfilment of a specification or stated learning outcome
Fitness of Purpose	An evaluation of quality-related intentions of an HEI or programme of study
Graduate	Someone who has attained a Bachelor's or higher degree
HEI	Higher Education Institution, usually a university or college of higher education
Indicators	A set of tangible measures designed to provide accountability and subject to informed interpretation and judgement
Learning Outcome	The specification of what a student should learn after a period of specified and supported study
Master's Degree	Awarded to graduates who have undertaken a further course of study after a Bachelor's degree
Master's Programme	A course of higher education leading to the award of a Master's degree
Modular Programme	A programme of study in which a student chooses a number of short modules, the satisfactory completion of which leads to a degree
Peer Review	External review and evaluation of the quality and effectiveness of an HEI's academic programmes, staffing and structures, carried out by a team of external evaluators who are specialists in the fields reviewed and knowledgeable about HE in general
Postgraduate Student	A student on a course which normally requires a Bachelor's degree as a condition of entry
Programme	A study curriculum undertaken by a student that has co-ordinated elements which constitute a coherent named award
Quality	'Fitness for purpose'; meeting or conforming to generally accepted standards as defined by an accrediting or QA body
Quality Assessment	A diagnostic review and evaluation of teaching, learning and outcomes based on a detailed examination of curricula, structure and the effectiveness of the HEI. Designed to determine if the HEI and/or the programme meets generally accepted standards of excellence
Quality Assurance	Quality Assurance (QA) is the means through which an HEI confirms that The conditions are in place for students to achieve the standards set by the HEI or another awarding body
Quality Improvement or Enhancement	The expectation that an HEI will have in place a plan to monitor and improve the quality of its programmes, as an ongoing process
Report	The documented outcome of an evaluation process

Stakeholder	A person or organisation that has an interest in the activities of the programme or HEI
Standards	The level of requirement and conditions that must be met by HEIs and programmes to be accredited or certified by a QA or accrediting agency
Subject benchmark	A reference point against which learning outcomes can be measured
Tuning	The process in Europe of adjusting degree provision so that there are points of similarity across the European Higher Education area
Validation	The process by which a course is judged to have met the requirement for an award by a relevant awarding body
Value added	The enhancement that students achieve (e.g. to knowledge, skills and abilities) as a result of their HE experience

Process to be followed

It is planned to pilot the Framework at selected higher education institutions in Europe in 2007. The individual institution will be requested to produce a Self Assessment Document that addresses each benchmark and general indicator highlighted in the Framework. Specific indicators are included as prompts for the self assessment and the reviewers to address. Thus, an evidence-based approach will enable a review team to provide confidential feedback on the international master's provision and to indicate their confidence that the quality and standards of the programme are broadly appropriate. The review will also highlight examples of good practice and identify scope for improvement.

If successful and considered effective by the ICA member institutions, the Framework could provide a firm basis for quality assurance in our academic sector. In the longer term, this approach could enable ICA itself to accredit taught master's programmes and act in a central role as a representative professional body in the European higher education area.

Acknowledgements

Box 2: A draft framework for the comparative quality assurance of international master's degree programmes in agriculture and related sciences in Europe

Categories	Benchmarks		General Indicator	Specific Indicator (Prompt for Self-Assessment)
1. Internationalisation	1.1	Strategy for internationalisation	Does the HEI embed internationalisation in all its activities?	
	1.2	Statistical information for international students	What percentage of full-time and short-term students is international?	
2. Needs, Aims, Objectives and Learning Outcomes	2.1	Needs of all stakeholders	Have the needs of all interested parties been identified?	Refer to international students and their employers
	2.2	Educational aims and objectives	Are the educational objectives consistent with the needs of stakeholders?	Are the educational objectives relevant to international students?
	2.3	Programme learning outcomes	Are the learning outcomes consistent with the Dublin Descriptors?	Is an international perspective evident in the programme outcomes?
3. Educational Process (Teaching, Learning, Assessment, Guidance)	3.1	Curriculum planning	Does the curriculum ensure the achievement of the learning outcomes?	Is an international perspective evident in the curriculum?
	3.2	Teaching and learning process	How does the strategy of teaching and learning achieve the learning outcomes? How does the HEI ensure that students enrolled on the programme have the knowledge and attitude to achieve the learning outcomes in the expected time?	How has the Learning and Teaching Strategy taken into account the cultural background of international students? (plagiarism, independent learning, language skills, academic pre-requisites)
	3.3	Assessment of learning outcomes	How has the assessment process been designed to demonstrate achievement of the learning outcomes?	How are international students informed of assessment and grading procedures?
	3.4	Guidance in the learning process	Is academic counselling offered to students to promote their achievement of the learning outcomes?	What are the special needs of international students and how are they accommodated?
4. Student Support (Non-educational)	4.1	Pre-induction and selection arrangements	How does recruitment and selection of students take place?	How do these apply to international students and their diverse educational backgrounds?
	4.2	Induction arrangements	How are students welcomed and introduced to university life?	Are there different induction arrangements for international students?
	4.3	Welfare support services	What support services are provided to address the needs of students?	Are additional services provided for international students?
	4.4	Cultural and social needs	How are the cultural and social needs of students addressed?	What are the particular requirements for international students?
	4.5	Financial information and support	How are students informed of financial information relating to their programme of study and living costs?	Are scholarships and other sources of funding available for international students?
5. Educational Resources and Partnership	5.1	Staffing	How to the competences of academic, technical and support staff relate to the learning outcomes? Do staff have international experience in relation to their teaching and research?	What is the international experience of the faculty? (Are staff involved in international networks; do they attend international conferences; are there international staff on the faculty; are visiting professors evident; are there publications in international journals?)
	5.2	Facilities	How do the general (library, classrooms, etc) and specific (laboratories, equipment, field) facilities support the learning outcomes?	Do the facilities support the needs of international students?
	5.3	Resource allocation	How is resource allocation related to programme delivery?	Are additional resources allocated to the needs of international students?
	5.4	Interactions with external	How do interactions with external organisations contribute to	Is there evidence of the international employment of

			organisations (e.g. Industry, professions and other HEIs)	the learning outcomes?	graduates by international stakeholders?
6.	Student Progression	6.1	From application to graduation	How is statistical information collated, analysed and utilised, including enrolment, progression, entry qualifications, gender and nationality?	What is the international diversity of students on the programme?
		6.2	Completion rates	What proportion of national and international students graduate from the programme of study?	Can any observed differences be accounted for by the experience of international students?
		6.3	Employability	Do graduates enter an occupation or further study corresponding to their qualification?	What proportions of international students enter employment or pursue further study?
7.	Quality Management and Enhancement	7.1	Decision-making process	How are the organisation and decision making processes implemented to achieve the programme outcomes?	What account is made of the international perspective in the decision-making processes about the degree programme?
		7.2	QA and enhancement systems	How do the quality assurance systems evaluate the programme outcomes? How does the QA process lead to the continual enhancement of the programme?	How have international developments in higher education influenced the QA process?
		7.3	Inclusion of the 'student voice'	How are students involved in the decision making processes and in the evaluation and monitoring of the programme of study?	Is there an international student presence on university and programme committees?
		7.4	Complaints and appeals	How are complaints and appeals by students addressed?	Are there particular issues in relation to complaints or appeals by international students?
		7.5	Staff development	How are staff made aware of both pedagogic and international developments in their subject discipline? How does staff development enhance the experience of international students?	How are staff managed to enhance their contribution to international programmes?
		7.6	Ethics/equal opportunities	How is the gender and equality policy of the institution related to the needs of international students?	Are there specific ethical and equality issues related to international students?

4 QUALITY ASSURANCE IN THE INTERNATIONAL MASTER'S PROGRAMME "SUSTAINABLE RESOURCE MANAGEMENT". AN EXAMPLE FROM THE SCHOOL OF FOREST SCIENCE AND RESOURCE MANAGEMENT, TU MÜNCHEN

MARTIN ZIESAK AND SOPHIE PAHLMANN

Introduction

The School of Forest Science and Resource Management, Technische Universität München, offers three different study courses: a bachelor (BSc) in Forest Science and Resource Management ("Forstwissenschaft und Ressourcenmanagement"), a master programme (MSc) in Forest and Wood Science (Forst- und Holzwissenschaft) and an international master programme (MSc) in Sustainable Resource Management. While in all three programmes strict quality assurance arrangements are applied, and many of those are identical, some measures differ to a certain extent. The following article will focus on the international master course "Sustainable Resource Management".

The list of activities for quality assurance (QA) as presented here may neither be understood as a "complete" list nor as a universal guidance for QA measures. It is an example of the successful implementation of this aspect at our school, which may help others, not more, not less.

The study programme "Sustainable Resource Management"

"Sustainable Resource Management" is a master programme, where students will be prepared for professional work in the various fields of resource management. They will learn important concepts and techniques for sustainable management and acquire special management skills.

This programme addresses the full spectrum of natural resource management including landscape planning, plant, water and wildlife resources and the scientific methods related to resource management like system analysis and inventory methods. It takes students well beyond the boundaries of traditional disciplines, such as forestry and agriculture. An additional focus is on 'soft skills', like rhetoric and conflict management.

The MSc program is designed for four semesters (see figure 1). The first semester (October - February) covers a first set of compulsory courses, which give a first introduction in the broad field of topics in the study programme. The second semester (April-August) comprises the big part of the elective fields (two out of eight are chosen). In the third semester (October - February), the elective fields will be concluded and some further compulsory courses will be taught. The master's thesis should be produced in the fourth semester (April-August). Additionally, an

(at least) two-month internship abroad is part of the program. The students can decide upon when and where to absolve this internship: during the lecture-free time between the second and third semester, or alternatively before the study or even afterwards. A combination of master's thesis and internship is sensible, but voluntary (TUM1, 2006). For more details on the program see TUM2 (2006).
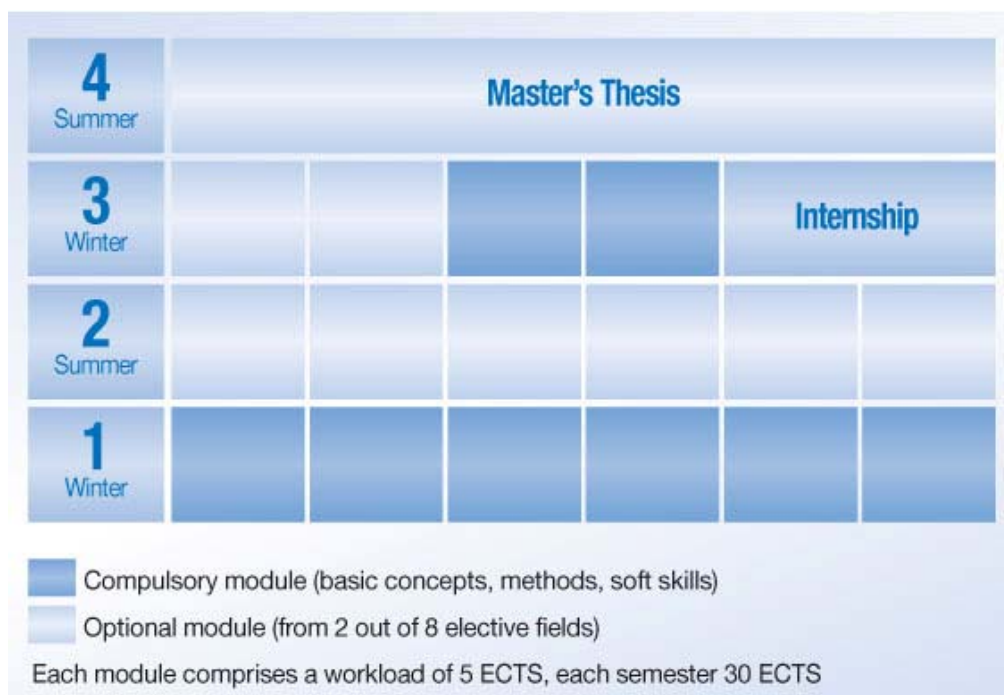

Figure 1: Structure of the MSc study programme Sustainable Resource Management

In the compulsory part the following subjects are included:
- Management of human-nature-technology systems;
- Systems analysis and inventory methods;
- Professional communications;
- Project management and presentation;
- Environmental and natural resource economics;
- Foreign language (any language other than mother tongue);
- Information management and scientific writing;
- Human dimensions in resource management.

In the optional part students have to choose two from a choice of eight different majoring subjects. Each elective field consists of four modules. Selectable elective fields are:
- Resource and environmental **economics**;
- Management and protection of **forest** ecosystems;

- **Wildlife** and protected area management;
- **Landscape** management;
- **Renewable** resources;
- **Water and soil** management;
- **Material and waste** management;
- Sustainable **agriculture**.

The programme is designed for international students; all teaching is done in English. The acceptance by the international student community is quite good, in the five years of its existence so far 63 different nationalities were enrolled; in the present winter semester the proportion of Non-German students is 87 percent.

Elements of Quality Assurance

The elements of quality assurance can generally be structured in many ways; they will always focus on the following aspects:
- Programme contents;
- Teachers;
- Students;
- Miscellaneous things like e.g. university infrastructure.

A very thoroughly prepared list of aspects is available from the European Association for Quality Assurance in Higher Education (ENQA) standards. They are not discussed here, as they are publicly available; see for instance ENQA (2005). The focus is shifted here to some of our measures for QA.

Permanent adjustment of course contents
The adjustment of course contents to the latest scientific findings and job market needs is a permanent task. This is true for the complete course as well as for every single lecture. Our programme has undergone one larger 'upgrade', when the former three semester structure was changed to a four semester structure.

Accreditation
The accreditation from an independent, external institution is important, as it will ensure a neutral view on all efforts for QA, but also make these efforts available to the public in a presentable certificate. Our master course passed a first accreditation in September 2002, the re-accreditation happened in March 2006. The new certificate will be valid till 2013. Accreditation and re-accreditation have been carried out by the German agency "Acquin", recognized by the German Accreditation Council (Deutscher Akkreditierungsrat).

Institutionalised evaluation
The evaluation of classes captures students' voice. We attach great importance to the fact that really every single course is evaluated. This can only be achieved by a streamlined, efficient procedure. In our case we have a standardised two-page

questionnaire, to be filled in by the students. The questionnaire is returned to the programme executive, who is responsible for the timely analysis and the report of the results to the lecturers. The processing of the forms itself (scanning and analysis) is conducted computer-based, thus ensuring a quick feedback (see figure 2).
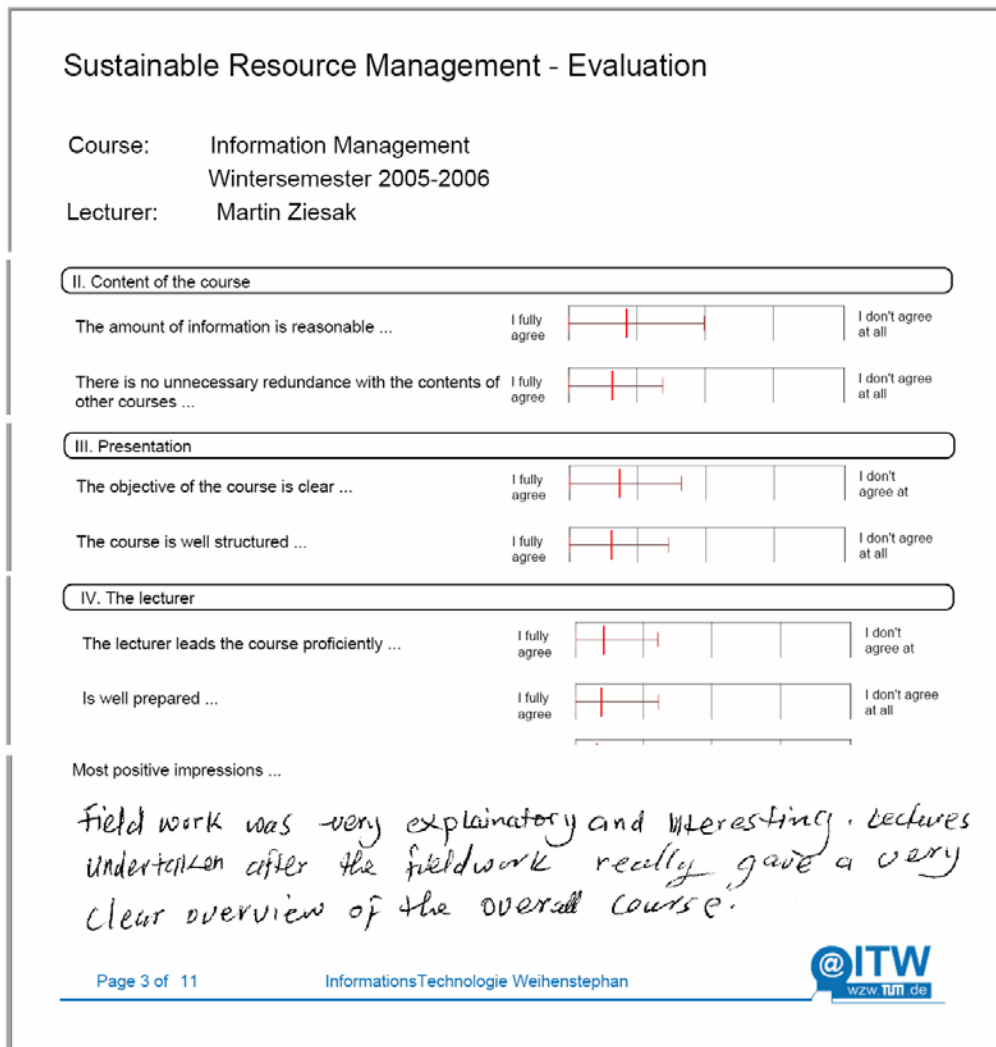
Figure 2: Selection of typical questions in the class evaluation. Here the computer analysed questionnaire with error bars plus scanned text comments are shown.

Feedback to lecturers
Besides this student-to-teacher feedback as described above, the programme administration (the programme director and the executive) ensure a constant communication with and among all teaching personnel. This helps in many aspects, typically in the communication of improvement suggestions to teachers.

Student and teacher surveys
On specific occasions we use student and teacher surveys to get broad, independent and realistic views on current questions. Such surveys are carried out by using questionnaires distributed either by e-mail or on paper. As an example the introduction and change from a three semester to a four semester programme was initiated on the basis of such a survey.

Aptitude assessment
All aspects listed so far are dedicated to programme contents, teachers and possibly also to general characteristics. But also the quality coming from the students has to be considered and must be managed.
In our case the university has the possibility to handpick the students for "Sustainable Resource Management" in such a manner, that we get the right number of highly motivated, suitable candidates.
Only students who have an above average undergraduate degree (bachelor or "Diplom') and who have a very good command of English are eligible candidates for admission. The selection of students who meet these formal admission requirements is being carried out in a two-stage process. First, the suitability of the candidates for participating in the program must be assessed. This first selection, which is based on the submitted documents[2], divides the candidates in groups of accepted, rejected and doubtful candidates. The 'doubtful' candidates will then – in a second stage - get personally interviewed over the telephone. This procedure – although being time consuming – ensures that only really highly motivated students get selected.
In the selection process also the maximum number of students to be accepted has to be considered, so that the ratio of teachers to students does not exceed a critical value. In our case we therefore limit the number of accepted candidates, although the number of applicants exceeds this capacity manifold.

Financial stability
Many of the quality assurance measures bring extra effort and can only be realised, when enough money resources are available. This trivial statement is important, because QA is not free of charge and adequate financial resources have to be set aside.

Successful and convinced graduates and alumni
In the end with all these quality assurance activities excellent graduates will be successful on the job market, which we can see from our regular graduate

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[2] The special qualifications and skills of the candidates should correspond to the Resource Management profession. Individual aptitude parameters are:
Ability to do research work and/or basic research and methodological work;
Science and engineering talent;
Interest for the current debate on environmental protection;
Relevant practical or professional experience.

destination analysis. The graduates provide positive feedback on our teaching activities, which is of help for recruitment of new students.

Conclusion

The following conclusions can be drawn:
- In order to achieve a high standard in the university education, quality assurance is an absolute must!
- Good quality assurance is based on several actions, some measures as practiced in the master programme "Sustainable Resource Management" at the School of Forest Science and Resource Management, TUM, are described.
- Quality assurance is a permanent task.
- With enduring quality assurance excellent education will ensure good acceptance of the graduates at the job market and a good reputation of the university-school is possible.

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5 THE WHITE BOOK FOR NEW FORESTRY CURRICULA IN SPAIN

EDUARDO ROJAS-BRIALES

Previous situation

Forestry and Agronomy curricula in Spain have been classified as Engineer curricula since their establishment in the mid 19th Century. The duration of the curricula has been enlarged from original four years to five in the early 20th century and in 1974 to six years. For more than a century the Forest and Agronomy Faculties were located in Madrid.

In 1983 a new law aimed to adapt the Spanish Universities to a new democratic framework (see Anonymous, 1983). As a result, new Universities where established and the number of curricula was substantially enlarged. Curricula were organized at Bachelor (Diplomatura or Ingeniería Técnica) or Master level (Licenciatura or Ingeniería). Enrolment in Master curricula could be based on a previous Bachelor degree entering in the fourth year or followed straight from high school in the first year, leading to five years studies. In the following years all Universities were devoluted to the 17 regions.

By 2000 seven Universities offered a Forestry MSc curriculum and thirteen a BSc one. Presently three models of MSc in Forestry coexist: Madrid has still not reviewed its old curriculum of 1974 (six years), whereas Lleida, Lugo, Palencia offer MSc degrees based on their own previous BSc curricula and Valencia, Córdoba and Ávila (private) have straight MSc programmes. These substantial differences cause various challenges for the Universities in the adaptation process to the new Bologna framework.

The Bologna framework for the Spanish Universities (2000-2003)

Under a conservative government (2000-2004) the Bologna process was strongly pushed forward by the Ministry of Education. Most necessary domestic reforms found an easy alibi in it. In late 2001 (See Anonymous, 2001) a new University law was passed but was conditioned by a strong opposition both from the Universities as well as from the regions and the parliamentary opposition.

The main elements of the study reform to adapt to Bologna were:
- ECTS should be implemented in every new or reformed degree (60 ECTS per year).
- Duration should be four years for a BSc degree (240 ECTS), one to two years for a MSc or a PhD (+thesis) degree (60-120 ECTS).

- MSc and PhD curricula were integrated: students could either end with a MSc thesis or change to the research track (PhD thesis).
- All levels would require a publicly defended final thesis, even in curricula were this was not usually done (basic natural sciences and some social sciences).
- The possibility should be opened to jump to a MSc and even a PhD curriculum from a BSc, without thesis and without receiving the lower degree but after having passed all other requirements of each level (credits).
- The BSc curricula should have a strong professional orientation and a broad scope with no option for specialization and strong guidelines from the federal Ministry covering up to 75% of the ECTS load.
- MSc programmes could be either specialized or scientific oriented (part of PhD programme), with the exception of some MSc curricula, aiming for certain complex professional competences (Engineers). MSc programmes would need external accreditation for its establishment.
- The Ministry had to approve the BSc degree catalogue and the minimum contents of each BSc degree as well as the MSc degrees aiming at professional competences.
- A broad agreement existed in the exclusion of the three years BSc. due to the low performance of the previous secondary education in Spain (OECD, 2004).
- Each curriculum reform from now on should apply the Bologna structure.

The review process of the previous Bologna approach (2004-   )

The political change in 2004 had important consequences for the University policy in general and specifically for the implementation of the Bologna agreement. The orientation changed by a decoupling of the domestic reform of the University system from the Bologna process. Also the speed was considerably slowed down and the opportunity for domestic reforms was reconsidered and uncoupled from the Bologna adjustment. The main characteristics of this process are:
- The reform of the University law of 2001 has been recently passed (See Anonymous, 2007).
- BSc specialization is reconsidered.
- Ministry will not determine the BSc degrees except in professions with regulated competences with the aim to reduce conflicts between professional bodies.
- But, how to define that a profession has regulated competences different from another?
- New MSc and PhD programmes based on the new structure substitute from 2006 on the old PhD programs (top down change).
- the undefined strategy of 2004-2007 will be most probably followed by a hurry up process to implement Bologna in 2010 (stop and hurry).
- New BSc curricula shall be implemented in 2008/9, but most probably this will be postponed to 2009/10.

- MSc's curricula with exceptional professional competences are being claimed by some Engineers careers, especially by Mechanical/Electric Engineers (old MSc) but in principle not by MSc's in Agronomy and Forestry. Nevertheless, mimetic behaviour could generalize this it to all Engineers curricula.
- Graduates of different BSc curricula will have an easy access to non regulated MSc's, despite certain standards of previous knowledge will be required.
- Periodic external evaluation (not previous) of the BSc, MSc and PhD curricula is envisaged despite still being undefined in its scope and organization.
- More freedom for Universities and regional Governments for organizing University policy and intern structure will be granted.
- The above will be the context of the coming reduction of Agronomy and Forestry student numbers due to lack of attractiveness of studies related to a declining rural society.

Most probably the Government coming after the elections early 2008 will have to speed up the reform process in order to achieve the Bologna agenda after the slow down of the past three years. Nevertheless, this delaying situation is harming the capacity of Spanish Universities to adapt their curricula to new demands as no change outside of the Bologna frame is allowed, despite the main premises for it are still lacking (list of BSc degree catalogue and minimum contents for each degree).

The White Book for Agricultural and Forestry BSc

The official Spanish Accreditation Body (ANECA) launched in 2002 grants for projects of related faculties to draft general guidelines for BSc degrees to be developed. As in most other fields, almost all (30) Faculties in Agronomy and Forestry participated in the project (2003-5). Their final proposal in the form of a White Book (see ANECA, 2005) included by consensus one Forestry (and natural resources) and two Agronomy (Agro-industries and Agronomy) BSc degrees. In 2005, the Ministry proposed instead one single mixed Agronomy and Forestry BSc (see figure 1) that was immediately rejected by the affected Universities and professional bodies and abandoned. In the end, it will probably be decided to maintain one BSc degree each for Agronomy and Forestry. The historical names (Ingeniero Agrónomo and Ingeniero de Montes) have been reserved for the regulated MSc, making it difficult to find a name for the former, whereas in Forestry the term "Ingeniero Forestal y del Medio Natural" seems to receive a broad consensus.

Regarding the teaching methodology, innovations towards more proactive pedagogical methods as included in the Tuning project methodology (González and Wagenaar, 2005) shall be applied.

The White Book included the following items/chapters:
- Introduction: Framework.
- State of the art of Agronomy and Forestry studies in Europe.

- Analysis of offer and demand per University and degree.
- Professional integration of the graduates of the last five years.
- Main professional profiles of the proposed degrees.
- General competences related to professional profiles.
- Specific competences related to the professional profiles.
- Classification of general and specific competences.
- Feed back of the professional bodies to the White Book and by the graduates[3].
- Objectives of the proposed degrees.
- General structure of the proposed degrees (incl. distribution in ECTS and hours by different broad subjects).
- Quality criteria and indicators.
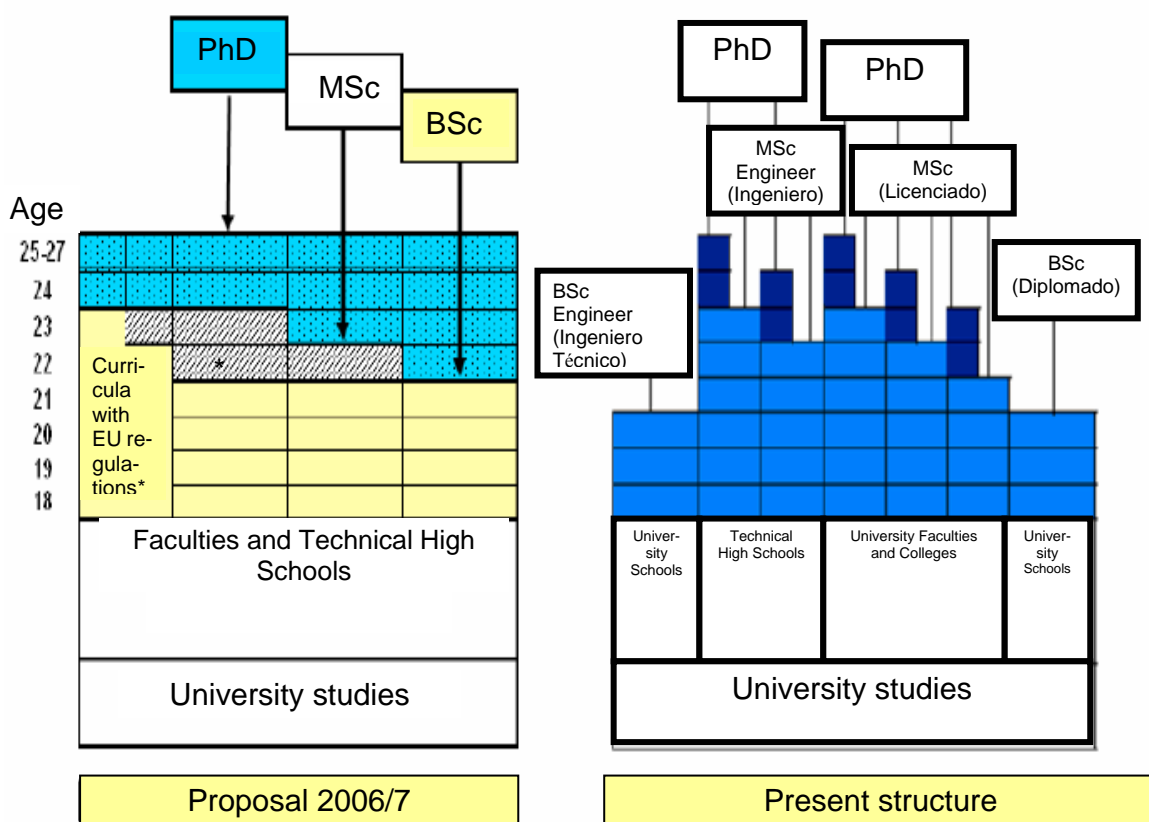
*) Medicine, pharmacy, architecture   **) Practicals and final thesis

Figure 1: Structure of the university studies adapted to Bologna as proposed by the Ministry of Education in 2006

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[3]) Unfortunately this second part could not been realized.

All three proposed degrees (two Agronomy and one Forestry BSc) were based on 75% of compulsory content to be determined by the Ministry before 2004: 180 ECTS, including the BSc thesis and practicals (30 ECTS) with no specialization. The remaining 25% would be determined by each University.

The higher degree of freedom expected after the changes in 2004 could open the scope reducing the compulsory part determined by the Ministry as well as reconsider the possibility of specializations of BSc curricula (Mención). Nevertheless, it is expected that the Guidelines of the Ministry will be mainly based on the White Book, mainly due to its main strength, the broad consensus.

In Forestry the process will automatically bring a reduction of the number of Faculties (14-15) engaged in Forestry education now and by it a melting process of faculties. A similar process will occur in Agronomy, compensating to some extent in both cases the reduction in student's number.

Conclusions

The main conclusions of the Bologna process in Spain may be summarized as follows:

In general, a broad acceptance of the Bologna agreements is observed.

Structural problems are identified were MSc curricula have not been integrated in the past with previous BSc curricula. This will most probably require a melting process of Faculties.

Conflicts may be observed in the allocation of exceptional competences to certain MSc degrees, in the definition of the naming and professional competences of certain degrees in respect to others and in the opportunity for taking the change for domestic driven reform processes in the Universities.

The implementation of MSc and PhD programmes under the new frame work before the new BSc curricula are implemented generates quite a lot of confusion for the development of new MSc curricula.

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6 RELEVANCE: AN ESSENTIAL PREREQUISITE FOR THE DEVELOPMENT OF FORESTRY AND AGRICULTURAL SCIENCE CURRICULA AND FOR QUALITY ASSURANCE IN PROFESSIONAL EDUCATION.

HERNÁN PEREDO

The lack of relevance

During the discussion panel "Graduate Profiles and Program Accreditation" held as part of the 2005 International Seminar "Quality Assurance: Impact and Projections" (Higher Council of Education, Chile), it was argued that the definition of graduate profiles for Chilean undergraduate programs lacked relevance, particularly in agriculture and forestry. Various proposals were made to significantly improve this definition (Peredo, 2005).

Starting from a very general point of view, the irrelevance of graduate profiles was illustrated on that occasion through Schön's (1983) theory that professional training should focus on developing the ability to "reflect in action", such that professionals internalize the habit of continuous learning as they solve problems over the length of their career. Delors (1997), in turn, emphasized at the heart of his proposal that it is no longer possible for professionals to rely solely on the finite bank of specific information received during their education in order to solve the current problems of their profession. Moreover, Teichler (1998) has shown that in all professions there is a temporary gap of essential knowledge in the transition from academic training to the real world of work which is currently taken on with increasing reluctance and impatience by employers. The World Bank (2000) has warned of the danger that developing countries may become further marginalized if they are not able to generate and use relevant knowledge in their education systems. In addition, the inevitable acceleration of technological changes in communications makes it essential to clearly define the minimum competencies that youth must possess in order to face the current world of work and to prepare them for constant adaptation to the requirements of new jobs (CERI, 1998).

The Tuning Europe project (González and Wagenaar, 2003) showed a clear difference of opinion among academics, young professionals and employers in terms of the relevance of professional program content, expressed as competencies. The study found only 46% agreement between academics and young professionals (3 to 5 years of experience) and just 54% agreement between academics and employers with respect to the skills that are currently necessary for good professional performance. This contrasted with at 89%. a significantly higher rate of agreement between employers and young professionals on the same subject.

Relevance in agricultural and forestry curricula

This lack of linkage to professional performance has been experienced personally while participating in processes of accreditation of professional programs in Chile. The technical commissions which set graduate profiles only rarely consult with practicing professionals, employers, and researchers working in the area of professional training. Moreover, the process of institutional self-evaluation is carried out almost completely by academics belonging to the institution, with little or no participation by outside examiners. The final stage of the process of accreditation involves considerable participation of external peers, but they are almost all academics. House (1993) shares these criticisms entirely and identifies the same inadequacies in accreditation processes, asserting that many academic problems are long known by institutions but are only acknowledged during the process of evaluation. He also makes apparent the almost complete lack of consultation with the clients or consumers (employers) and the nearly inexistent participation of students and graduates.

In the context of the agricultural sector in Latin America and the Caribbean, Zepeda and Lacki (1993) point out various shortcomings and discrepancies in professional training over more than a decade. These are related to the low relevance of education, excessive academic load, limited learning, irrelevant content, excess of theory and lack of practical activities. In the training of foresters at the international level, Sample *et al.* (1999) found a significant difference of opinion in the USA between what academics want and what employers require in terms of content in professional performance nowadays. Meanwhile in Chile, Klagges' (1975) diagnosis of the lack of a sector-specific plan to guide national forestry education remains almost unchanged after 30 years. The definition of levels of training in this area is still insufficient and linkage with the real world of the profession is almost non-existent. Some advances have been made in the development of mechanisms which favour reforms in professional education, but they do not function as optimally as expected. The incongruity of this situation is that despite the failings discussed above, almost all of the eight forestry programs currently offered in Chile are accredited, some for the maximum period allowed for undergraduate programs (seven years).

Closing the gap between the academic and the work world

All of these facts point in one way or another to the need for relevance in each of the academic processes involved in professional education. While the above inadequacies are discussed in the context of the definition of professional profiles, they are just as applicable to curriculum development, accreditation processes and quality assurance, especially in forestry and agricultural sciences programs. The concrete proposal to make mandatory the consideration of the international context and the opinions of employers, young professionals and academics in the definition of professional profiles is thus also completely valid for the development of

relevant curricula. The weighting of these opinions is shown in Figure 1 (Peredo, 2005), and is open to discussion as long as the opinion of academics is not given majority consideration. In order to increase the relevance of the process of program accreditation, it is also necessary to include the participation of employers and young professionals as much in the self-evaluation of programs as in committees of external peers.
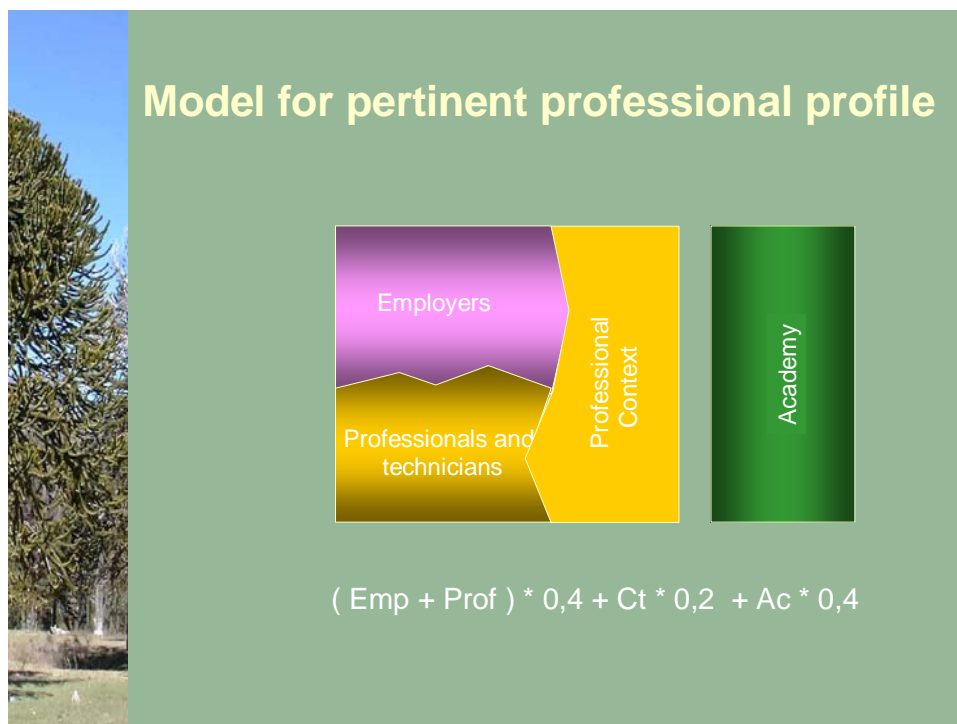

Figure 1: Weighting of opinions that should be mandatory for consideration in the definition of relevant professional profiles (source: Peredo, 2005).

In the proposal of indicators for external productivity put forth by Millán *et al.* (2003), the active participation of employers and young professionals in the creation, guiding, updating and initiation of curricula can be guaranteed by making them permanent members of program committees. Through personal experience with competence surveys and the observation of engineering and technical positions in forestry, it has also been noted that the equipment used for teaching in the majority of related programs is at least one technological generation behind that used daily in the real world of the profession. This appraisal could appear to be modern technological snobbery but, on the contrary, is a testimony to the deep technological changes in the world of work. These changes necessitate different and more appropriate equipment for relevant professional performance so as not to underscore the lack of linkage between academic education and the professional world. Program committees with external participants are thus called on to play an

important role in assuring the appropriateness of equipment used in academic settings.

The rationale for considering the international context in the definition of professional profiles and the development of curricula is that the flattening of the world described and analyzed by Friedmann (2005) is now undeniable. This has lead many countries and international organizations

- To analyze their respective workforces in terms of their countries' performance in international economic indicators (NCCP, 2005);
- To describe the jobs of the future (CCE, 2003; ANTA, 2004; GEM, 2005);
- To project the tendencies and employability of different professions (USDL, 2003);
- To examine the impact of technological advances on professional performance in the future (Zhao *et al.*, 2005).

Ignoring these realities and their implications for curriculum development could lead to educational processes which are completely disarticulated from the reality of professional performance.

In all-encompassing support for the above, it can be added that during a recent meeting to discuss the quality, equity and effectiveness of higher education in their respective countries, the Council of Education Ministers of the OECD found it valid and necessary for employers to seek assurance that professional programs truly prepare people for the world of work. They also put forth that in order to measure the quality and effectiveness of professional programs, not only should traditional academic factors such as the student retention rate and the real duration of programs be considered, but also indicators of the relevance of programs such as the employment rate of graduates and the time taken to find a first job (OECD, 2006).

Turning specifically to processes of quality assurance in curriculum development, here there is also evidence of an academic bias that leads to a rather self-approbating view of the professional programs evaluated. In a recent bibliographical revision of the art of entrepreneurial education, it was observed that those programs which were well evaluated from an academic point of view, presented serious failings in terms of relevance. In a sample of professors of entrepreneurship only 10% had ever been business owners or partners, and of the remaining 90% only 20% had worked as an employee of a company for more than eight years. All of the professors in the sample had backgrounds in economics, business and marketing and used traditional academic teaching methods, resulting in markedly irrelevant content (Bennett, 2006). In line with the majority of the above arguments, Henry *et al.* (2005) are of the opinion that the origin of this pronounced irrelevance is the lack of relationship of academics with the world of work and with businesses. Mitra (2005) goes as far as to suggest that academia and business are two irreconcilable worlds since they operate in very different ways with respect to information management, time and decision making.

Improving relevance

The relevance of quality assurance in curriculum development and the pertinence of curriculum content can be significantly improved by using Heitmann's (1995) "portfolio" concept for the evaluation of institutions which offer professional programs. This is a bi-dimensional model of performance in which "internal efficiency" rates institutional processes and "external productivity" rates the quality of education in relation to the demands of the labour market (Figure 2).
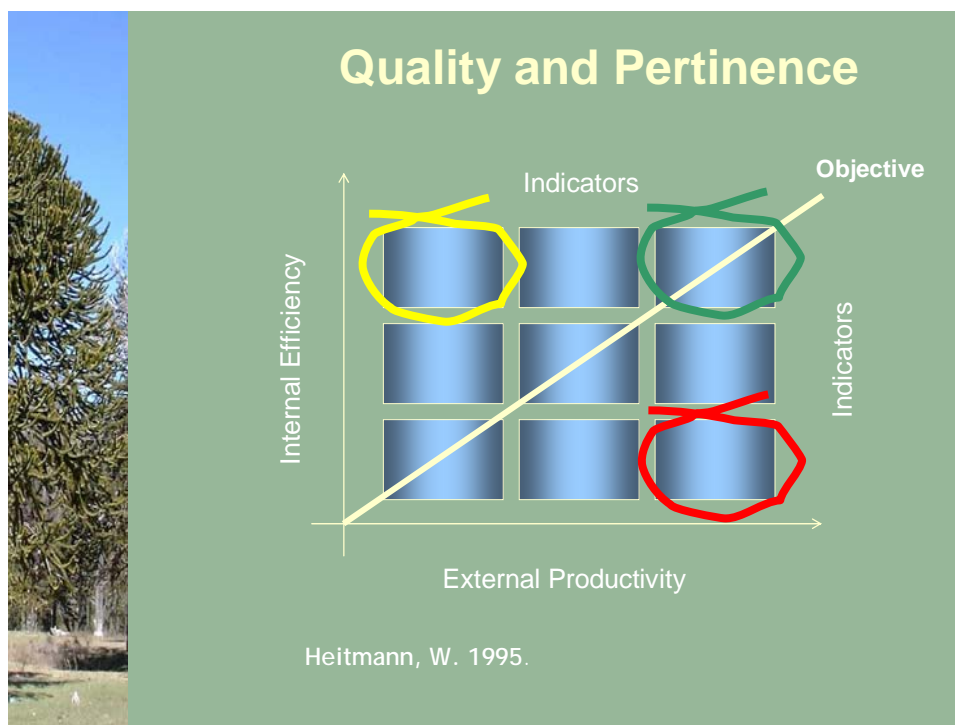

Figure 2: A bi-dimensional model to measure the relevance of professional education of technicians at the tertiary level (source: Heitmann, 1995).

Institutions are classified on this grid according to the quality of their indicators from minimum relevance (low internal efficiency/low external productivity) to optimum relevance (maximum internal efficiency/maximum external productivity). The same scale is perfectly applicable to processes such as curriculum development, program accreditation and quality assurance, where internal efficiency has been given priority over external productivity, crucial for optimum relevance.

Before listing some of the indicators of "external productivity" which improve the relevance of the evaluation of curricula, it is appropriate to mention the format and timeline of these evaluations in quality assurance programs. They generally take the

form of surveys which rate the achievement of primarily academic objectives at the end of the educational program and which do not include a control group of subjects who did not receive training in order to measure the true impact of the process being evaluated. One option for improving the relevance of evaluations is thus to add a second survey after subjects have started to practice their professional or academic activity in order that they may truly assess the effect of the educational program on their professional or academic performance.

Millan *et al.* (2003) suggest some indicators of external productivity that improve the relevance of curricula and professional education, and others have been added here after a bibliographical review of the topic. These include, among others:

- The image projected by the profession in its respective sector and in the community;
- Changes in enrolment rates as an indicator of public confidence in the quality of the educational program;
- The speed and percentage of insertion into the respective profession as an indicator of the relevance of the educational program (Lewark *et al.*, 2006);
- The movement of professionals in the organizational charts of their respective companies;
- The social acceptance of each profession;
- The personal satisfaction of professionals with the education they received;
- The capacity of the profession to transfer knowledge and technology to its respective productive sector (OECD, 2006).

It will be necessary to periodically review the definition of all of these indicators, the assignment of responsibility for their implementation and the methods that allow an objective assessment of their thorough fulfilment.

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7 A GOOD START IS A BIG STEP ON THE WAY - STARTING THE FOREST SCIENCES CURRICULUM WITH A THREE WEEKS PROJECT[4]

SIEGFRIED LEWARK, TIM BURZLAFF, WERNER KONOLD, DIRK NIETHAMMER AND UWE SCHMIDT

Introduction

Truism and general experience tell us, that we need a goal when starting to walk in order to go a short and straight way. So we need an orientation about the situation and we need perspectives. The first days and weeks of study are the time, when students get their first impressions about the high school, staff and co-students, the curriculum and the subjects which will decide about their daily occupation and their future. They get a feeling for expectations on them and try to find out, whether their own expectations will be met and have been realistic. And they start studying and find their study techniques and rhythm of work.

Realizing this it seems quite surprising that universities think so little about this crucial phase of study with so far reaching consequences for their most important group, the students. In most cases courses have been offered, structured according to the logic of the subject. And the students were left to themselves, to getting started and getting along with the implicit expectations they were confronted with.

Didactic specialists have proposed ways of arranging and shaping the beginning phase of a study and there are examples of curricula where these proposals have been realized. In Freiburg the external evaluation of the curriculum of forest sciences resulted in a revised curriculum model and concrete recommendations.

Starting from these recommendations, the curriculum commission of the Freiburg Forestry Faculty developed and proposed a special learning project for the first weeks, called ESPRO ("Erstsemesterprojekt"). It was discussed within the faculty and decided and started in winter semester of 2002. This five week project was carried out three times, till the traditional "Diplom" curriculum of forest sciences was replaced by new BSc and MSc programs of forest sciences. The new BSc program "Forest management and environment" was started in 2005 with an ESPRO with a new concept, shortening the ESPRO to three weeks, following the shortening of the curriculum.

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[4] The description of ESPRO is in many parts based on the texts by Konold and Niethammer (2003), Kopmann (2005), Webler et al. (2000), Webler (2005) and the readers for the students in the respective ESPROs

The importance of the first days as a student

Who does not remember his/her first days and weeks as a student? Memories of course will be different – between students and professors, between age groups, between subjects and universities and between individuals, men and women – but probably we will also find a lot in common. As a former forestry student in Freiburg in the late 1960s you may remember – apart from the exciting political situation – going to the first lecture in a lecture room you found out about from time schedules posted at a certain place and during the following days attending more lectures with a small group of co-students you did not know. Also you had lab classes, where you were told to draw anatomical sketches of spruce tracheids, and excursions with demonstrations in the beautiful forests surrounding the city. You had developed your first ideas about forestry during a practical training before entering university, and the foresters then had told you about the good time they had had as students, but also about the difficult job situation ahead of you, with so many graduates wanting to go into forestry (this was in the 1970s).

Obviously you were expected to listen in the lectures– also to take notes? How? What for? What to do, how to organize your week and your learning – all this was left to yourself or to the advice of the fellow students or the older ones, but did they know better? You were not expected to ask about things like this or anything else during the lectures – the professors obviously had the idea that you should have brought your learning methods with you from pre-university education; certainly it was not their job to bother about that at academia.

Things have changed in many respects since those times. Just realize, the rector of the University of Freiburg now invites the new students with their parents for a large welcome party.

But did the self understanding of academia and the understanding about the learning processes of students really change so much, as compared with the 1960s? In this text the organization of the first weeks of forestry students according to new thinking will be described, as only one example of a big change in self understanding.

The background – forestry curriculum development in Freiburg

The development from a traditional German forestry diploma curriculum to a rather innovative revised one in the middle of the 1990s and recently into a Bachelor-Master-system according to the Bologna process has been described and discussed many times (see e.g. Lewark, 1994; 2002a, b, Weber and Lewark, 2004; Fink, 2005). Special attention will be given in this text to the starting phase of the study, whereas the general curriculum development will only be summarized to the extent needed for understanding the background and the ideas for the design of the starting phase (cf. table 1).

Table 1: Stations of development of the forest sciences curricula at the University of Freiburg.

Year	Step in curriculum development	Details
1995	Curriculum revision (diploma curriculum of forest sciences)	Introduction of blocked courses
1999	External curriculum evaluation	"First semester project" proposed
1999	MSc Sustainable forestry & land use management	International study program in German started
2002	„First semester project" (ESPRO) in „Diplom" curriculum	First semester project introduced (5 weeks)
2005	BSc „Waldwirtschaft & Umwelt"	First semester project included (3 weeks)
2005	Master Environmental Governance (MEG)	International study program in English started
2005	Master Forest ecology & management (FEM)	International study program in English started
2008	Master Forest sciences (FOM)	Planned study program succeeding the traditional "Diplom" curriculum (in German)

Traditionally (in the regulations of 1954 and before) there was an obligatory practical training of six months before the first semester. Over many years the start of the first semester was supported by some days of familiarizing with localities and organisation of the faculty, the city of Freiburg and of organisational help, organised by students ("Fachschaft").

In 1995, with the revision of the "Diplom" curriculum, an introductory course of two weeks (block) was included at the beginning of the first year (taught by Norbert Weber), reduced in 1999 to one week (taught by Siegfried Lewark). At the same moment the six months practical training have been divided into four months before the first semester and two months later on, before the final exam.

Creation of ESPRO and the underlying ideas

The report of an external evaluation (Webler *et al.*, 2000) was positive with respect to the curricular and didactical concepts of the curriculum of 1995. Recommendations for further development included, beside even more orientation towards key qualifications, a new structuring of the starting phase of the curriculum. The reason was partly lying in the obligatory practical training at the beginning of the first semester, carried out in the forest service. It was highly appreciated by the students, but criticized because it gave a not representative impression of the actual field of profession and of the occupation the future graduates would have to expect. This would mislead the motivation and expectations of the students, which they realized only later on, as was stated in enquiries.

The solution, found by the faculty after a process of dealing with this problem with external moderation, was a modification of the starting phase based on a shift of the practical training to after the second semester. The responsibility of contents and

organisation of the curriculum start returned to the faculty. The ideas were to stimulate curiosity of the students, to make quite clear their own responsibility for their course of study, to introduce learning and working methods and finally to confirm their study choice. This was based on the assumption, that the first weeks of study would set the tone and would influence the whole course of study.

These first weeks – before the since 1995 proven block courses (Lewark, 2002a, b) – were to be organised in a learning project named ESPRO ("Erstsemesterprojekt") of five weeks length (later three weeks at the start of the new MSc program "Waldwirtschaft und Umwelt"). The leading ideas were: the beginners will be introduced to the broad spectrum of the curriculum with the different subjects and themes, on the other hand get an impression of the multitude of potential occupations after graduation without the earlier preoccupation from the traditional practical training. A feeling of being a group was to be created as well as identification with their chosen study program in their own faculty. The group photo (figure 1) from the first day is a small incentive in this direction – to be downloaded from the learning platform of the university, which is used for the first time for this downloading.

Figure 1: BSc students (and two professors) of the Faculty of Forest and Environmental Sciences on their first day in Freiburg, October 2nd 2006, expecting the "first semester project" (ESPRO) (Photo R. Mühlsiegl).

The objectives of ESPRO

The leading objectives (cf. figure 2) were:
- The students have a good start;
- The students improve their abilities for studying on their own and in a group;
- The students improve their competences of learning and scientific work.
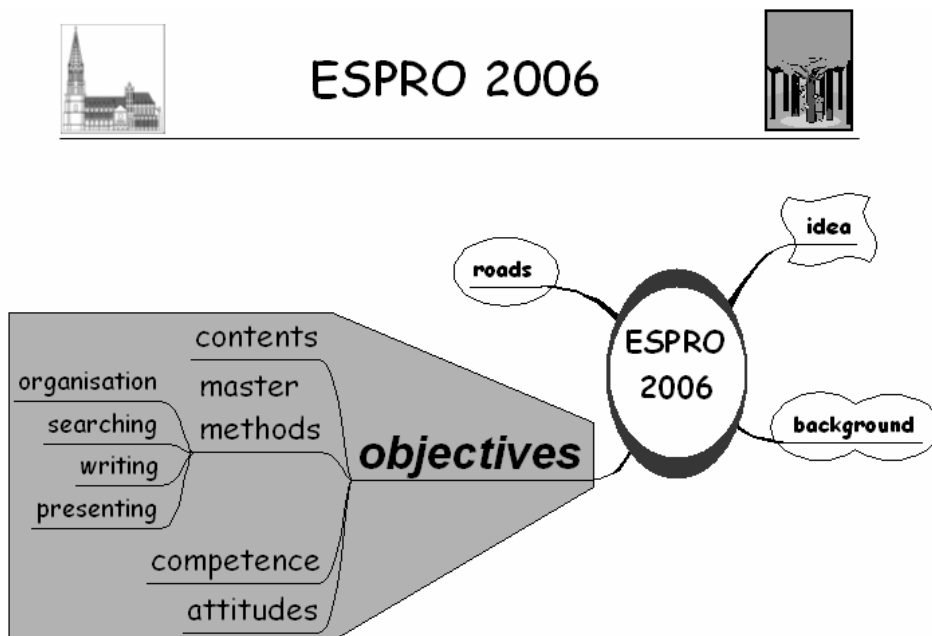

Figure 2: Presentation of ESPRO objectives in the introductory session for the students.

A good start would include ideas about the curriculum, its structures and contents, about people involved, possible fields of occupations as well as about characteristics of scientific curricula. Rousing of curiosity and motivation would be essential. Students should feel supported with their start. After ESPRO, students should be able to reflect about their choice of study.

Study skills means that students are prepared to take responsibility for their own learning process and way of studying. This is a question of appropriate attitudes as well as concrete skills and the ability to find support when necessary, either for individual self study or for working in groups. ESPRO is meant to provide positive experiences of solving tasks organised in groups and to develop social competence needed for this. ESPRO shall therefore offer insight into principles and advantages of self directed learning mainly through practicing.

The learning project at the beginning must allow using concrete learning and working techniques. This applies on the one hand to techniques of scientific working like information retrieval, knowledge of libraries and data bases, judging quality of sources of information, knowing conventions of quotation, writing of texts according to scientific standards, presentation of results. On the other hand it applies to concrete techniques of self organisation of the learning process, which includes taking notes of field trips or laboratory work and lay it down in reports, setting up of working plans, breaking down of overall goals into partial objectives, seek motivation, feedback and support and create a positive learning environment.

The objectives summarized here and laid down in detail in the readers the students get on the first day, are obviously demanding. But it is possible to achieve them through a suitable project organisation.

Program and methods of ESPRO

The approach to the objectives is based on the ideas of learning and learner oriented learning and self directed learning according to Knowles (1975). This means that learners:
- Are active on their own or with help of others, i.e. co-students, tutors and teachers;
- Diagnose and determine learning objectives and focus of contents;
- Decide independently to the greatest possible extent on learning ways, speed and places;
- Detect and use human and material resources;
- Choose and practice suitable learning techniques and methods;
- Evaluate learning process and success.

Organisation of ESPRO makes use of the principles of problem based learning (PBL). This means that:
- Learning needs to be student-centred;
- Learning has to be organized in small student groups under the guidance of a tutor;
- The learner refers to the tutor as a facilitator or guide;
- Authentic problems are primarily encountered in the learning sequence, before any preparation or study has been done;
- The problems encountered are used as a tool to achieve the required knowledge and the problem-solving skills necessary to eventually solve the problem;
- New information needs to be acquired through self-directed learning.

"The starting point for learning should be a problem, a query or a puzzle that learner wishes to solve. Organized forms of knowledge, academic disciplines, are only introduced when the demands of the problems require to them" (Boud, 1988). Starting points in ESPRO are found by the student group during a field trip, examples of authentic problems are being given in classroom on the first day. Thus

the field trip is more than a nice demonstration – the choice of subjects for the group work widely depends on what the students find here and accordingly they take an active role from the beginning (Figure 3 shows students busy taking notes).

The course description of ESPRO states: "In the frame of the first semester project students will prepare for the demands of the study program by working out tasks in groups. After few lectures, a field trip into the forests of the city of Freiburg and a panel discussion with experts, the student groups will elaborate on themes they choose for themselves and present their results orally and in a written report." Within the three weeks the BSc students will have about 35 contacts hours and 90 hours of self organised work.
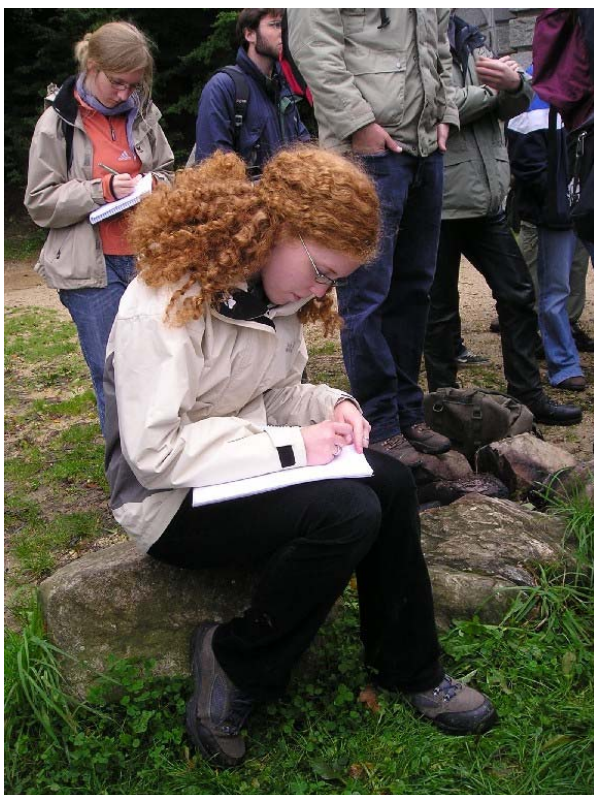

Figure 3: Introductory field trip on the second day of ESPRO 2006 – students take notes for use in group work.

Each group of ten students will have a student tutor, who has been prepared for their job by a specialist of didactics in a three days course. Most of the tutors now have gone through ESPRO themselves, and many serve as tutors two or more times, so that the tutor team brings in experience.

The learning process is made explicit by teachers at the beginning and by tutors during the course to allow the students to reflect about it (cf. figures 2 and 4). As a

consequence of the ideas stated above, the role of teachers, professors and younger scientific staff, in this course organisation is limited. They only stimulate at the beginning, serve as resource persons during the course and as audience for the presentation of results and participate in the evaluation of the results presented orally and in written reports. Of course this is a new role teachers were not used to at the introduction of ESPRO.

Experiences and outlook

ESPROs have been carried out five times since 2002, first going for five weeks, since 2005 for three weeks. The students received a reader with the ESPRO program and methodical texts at the beginning and additional material on the learning platform of the university.
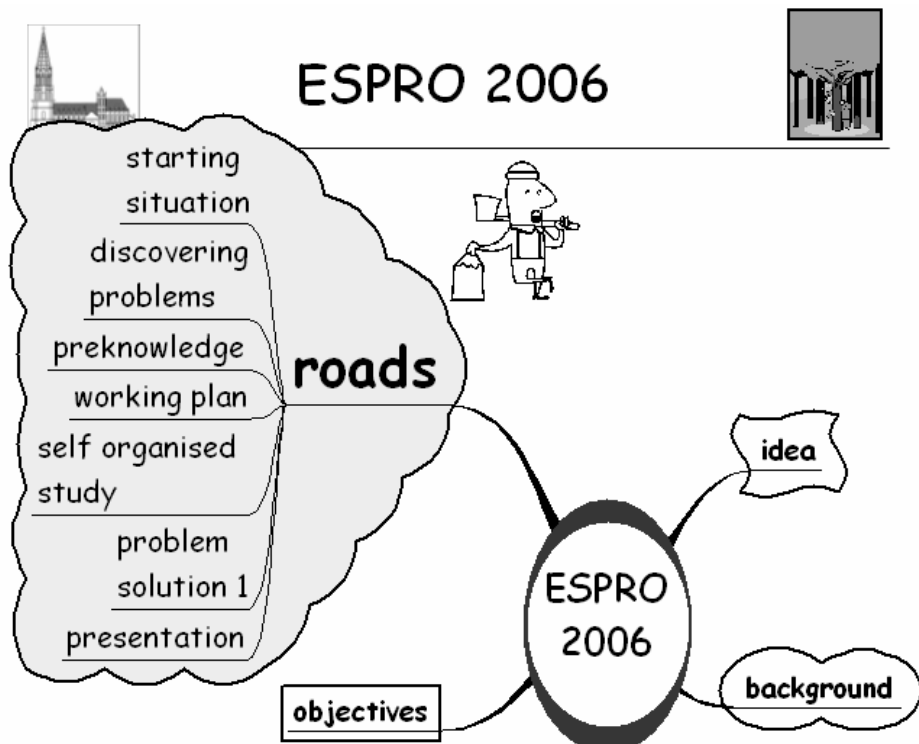
Figure 4: Presentation of ESPRO methods (roads) according to the steps of problem based learning (PBL).

Input was high in terms of number of teaching persons: 27 from seven institutes were involved, one of them as a project coordinator with a heavy input of 250 hours, but the others only with few hours input. In principle the student groups worked independently, supported by their tutors. Examples of subjects chosen and worked out by the groups as listed in table 2 show a high variety.

Table 2: Examples of subjects worked out by the ESPRO groups in 2003 and 2005.

Wood as a source of renewable energy – chances and risks
"Back to the roots" – Douglas fir in the forests of Freiburg
Lynx in the Black Forest and the Harz Mountains
Prophylaxis against storm damage – what can be learned from the storm "Lothar"
Reforestation of storm damaged stands between ecology and economy
Biotic forest damages – the example of *Melolontha hippocastani*
Monocultures in the „Mooswald" of Freiburg?
The flooded quarry of Opfingen as a field of conflicts of interest
Rain water reserves and tree stands
Allochthonous plants in the "Mooswald" ecosystem
Nature monuments in the "Mooswald"
Loss of floor space and natural resources through the motorway A5 and the planned new railway line

Objectives reached?

Legend: very good (1), (2), partly (3), (4), not at all (5)

improve study skills (average 2,0) — facilitate start socially (average 1,4) — understand curriculum structure (average 2,4)
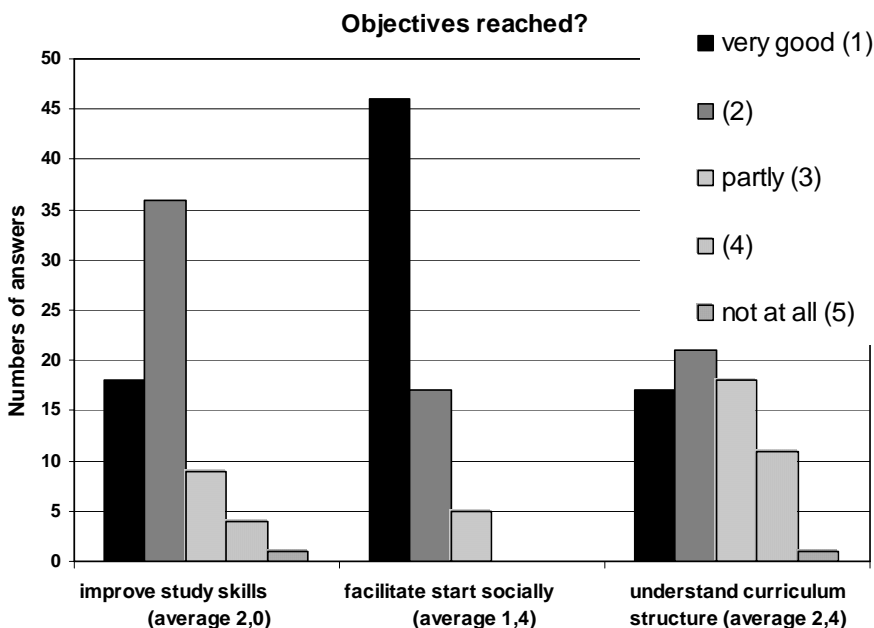
Numbers of answers

Figure 5: Students found learning skills and social aspects most successful (from the evaluation of ESPRO 2006).

Project evaluation is mainly based on detailed questionnaires at beginning and end of ESPROs, which were subject to first analyses. A comprehensive scientific

evaluation is ongoing. A particular evaluation was connected to the development of the new concept of three weeks (Kopmann, 2005).

The most important experiences as seen by the students were the social contacts and the experience with this special type of tutor guided group work (cf. figure 5). The project work was felt to be quite demanding, available time for thorough elaboration of subject very limited. The overall assessment was very positive, which was a basis for the integration of the three weeks ESPRO in the new BSc program in 2005. However the introduction and successful realization of ESPRO may be seen so far as an isolated first effort for raising competences of the graduates by didactical innovation, as the courses following ESPRO are only partly built on the competences gained in ESPRO and only some of them include elements of project work and methods trained in the first weeks of study.

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8 EXPERIENCES IN USING THE PUME FOREST GROWTH SIMULATOR IN HIGHER FORESTRY EDUCATION WITH INTERNATIONAL STUDENT GROUPS

SANNA HÄRKÖNEN, PAAVO PELKONEN AND PETTERI VANNINEN

Introduction

Use of ICT tools in forestry education increased during recent years. Different course management platforms, general tools, e.g. MS Office, simulators or totally virtual courses are available for forestry studies. ICT tools can offer very interesting and rewarding opportunities for learning, such as flexibility in terms of time and place as well as easiness to distribute material for large groups. However, there are also several threats related to them, e.g. lacking personal interaction between student and teacher and among students, as well as from the low didactic quality of the virtual learning environments (Längin *et al.*, 2004).

In spite of the increasing use of ICT in education, only a couple of studies related to educational use of ICT tools in forestry studies in Europe have been published, mainly related to internet-based learning in higher forestry education (Längin *et al.*, 2004; Vacik *et al.*, in press; Colinas and Mola-Yudego, 2004; Woehrle *et al.*, 2004; Olsen *et al.*, 2004).

When students are supposed to work independently, as it usually is with ICT tools, the key question is how to take into account the different backgrounds (e.g. knowledge of local forestry, language skills, varying learning cultures) of the students involved and to ensure equal opportunities to learn. This is a challenge which the teachers should take seriously, especially now when the number of foreign students in higher education courses is increasing (OECD, 2005).

Simulation exercises carried out with the PuMe simulator

Here, we describe our experiences related to using the PuMe simulator (Figure 1) in forestry education at the University of Joensuu, Finland. PuMe is a learning environment/simulator which has been developed for forestry studies in Finland. It includes a forest growth simulator, which allows growing of Scots pine and Norway spruce stands, and study material related to Finnish forestry i.e. text, pictures, and videos (Vanninen *et al.*, 2006).

Since 2004 students from over 20 different countries worldwide have utilized the PuMe simulator in several forestry courses at the University of Joensuu, Finland (see figure 2). In addition exercises with the PuMe simulator have been carried out in Sweden, Germany, Spain, and Russia with university level forestry students. In

total the PuMe simulator has been utilized in university level forestry education in the following courses:

- Stora Enso's trainee program (HiPo), Imatra, Finland (2004);
- M.Sc. European Forestry, Introductory courses, Garpenberg, Sweden (2004, 2005, 2006);
- Production and energy use of wood biomass course, Joensuu, Finland (2004, 2005, 2006);
- Forest growth and yield course, Joensuu, Finland (2004, 2005, 2006)
- Silviculture II course, Valencia, Spain (2005);
- Forest Modelling course, Freiburg, Germany (2005, 2006);
- Forest Modelling course, Helsinki, Finland (2006);
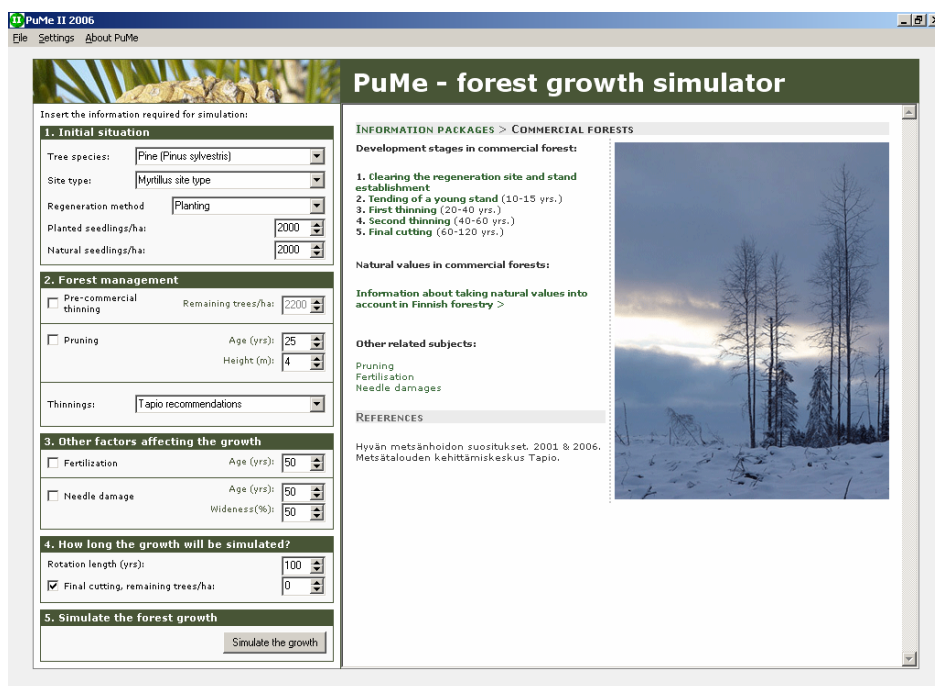- Forest growth course, Helsinki, Finland (2006).

Figure 1: PuMe simulator's user-interface (source Anonymous, 2006).

The simulation exercises carried out with PuMe vary from intensive, teacher-guided couple of hours' exercises to several days' independent project works. The exercises started usually by examining PuMe's information packages and videos related to Finnish forests and familiarizing with typical treatments used on boreal forests in Finland. The common aim of the simulation exercises was examining the different forest management scenarios with the PuMe simulator and analysing the effects of different treatments on forest growth and production (see box 1). Most of the exercises were carried out as group works, and the students were asked to write reports about their findings. Many of the exercises included too preparing a PowerPoint presentation based on the simulated results. The presentations offered

good opportunities for joint discussions concerning for example the potential differences between the actual development of a real forest and the results calculated by the simulator.

Figure 2: Students working with the PuMe simulator.

Experiences from the simulation exercises

Students' opinions
Experiences of university level forestry students about using the simulation software PuMe and other virtual learning tools was gathered in connection to the above mentioned simulation exercises. The aim was to find out which are the advantages, disadvantages and needs for development of such tools from the viewpoint of students. Here we present only the preliminary results of the study. Detailed results will be later published elsewhere.

Students found PuMe clear and easy to use. Many students commented that it was easier to understand forest dynamics when using such interactive and visual tool instead of traditional lectures. Versatile information about Finnish forestry and the easiness to compare different management scenarios were seen as an advantage too. Students from non-boreal areas appreciated the possibility to learn the typical boreal forest management practices. On the other hand, the low number of tree species and growth conditions included in the simulator and the focus on only Finnish situation were criticized. Especially many foreign students complained that they can't check how reliable the results produced by the simulator are. Some students felt that working with computers is boring. Some students also complained that they needed more advice from teachers during the exercises.

Among the answers related to the virtual learning environments in general, the independence in terms of time and place was the most common advantage

mentioned. Virtual learning environments were also seen as efficient and fast tools for learning. The main disadvantages mentioned were related to lacking social contacts and few possibilities to get feedback from the teacher. This was a common worry especially among the non-European students. Generally it was emphasized that virtual learning environments are only tools and cannot be used to replace teachers.

Box 1: Example of an exercise topic related to wood quality.

How does forest management affect wood quality?

1. Simulations

- Carry out different simulations with PuMe (all simulations with spruce, MT-site type).
    - First carry out a simulation with normal management (initial stocking density 4000 trees per ha, pre-commercial thinning, other thinnings with Tapio recommendations, rotation length 100 years).
    - Then try other simulations with different management regimes (pruning etc.), and different rotation lengths.
    - Carry out a simulation without any treatments.
- Check the following properties: wood density, height level of dry knots, and height of crown base.
- Consider why the properties above are important when valuating tree quality?
- Compare the results in managed forest versus no treatment forest and quickly growing forest versus slowly growing forest.

2. Discussion in groups and preparing a presentation

- Discuss in group and answer the following questions based on the simulations and prepare a short presentation in PowerPoint:
    - How does forest management affect wood quality? Which kind of management seems to improve wood quality? Why?
    - Compare the results to the situation in your country!

Future challenges in using ICT in forestry studies

Based on the students' answers, the lacking possibilities to get feedback and lacking social contacts are the main threats in using virtual learning environments in general. It seems that the best way to utilize ICT tools in education would be to combine the use of ICT with real classes and field trips, and to avoid totally virtual classes where the face-to-face contacts are absent. Also improving the functioning of the virtual learning tools was seen as a challenge for the future.

During the simulation exercises some of the students criticized that they cannot be sure of the reliability of the contents when they are using the virtual learning environments. For example, the results of the wood quality simulations (box 1) with PuMe are reliable when using high stocking densities, but the increased risk for wind and snow damages after harvestings is neglected in the simulator. The mathematical models are always simplifications of the real nature and the

assumptions behind these models must be understood by the users when the models are applied in practice. Otherwise there is risk for both misuse and misunderstanding. Thus, the teacher must explain the used model's background well enough to the students, as well as provide the related references for the students. According to our experience, rewarding discussions can be achieved between the students when the students are encouraged to observe the possible differences between the simulation results and reality during the exercise and critically discuss these differences.

Based on our experiences forest growth simulators seem to be efficient tools in learning of forest dynamics. In overall, use of ICT can offer great possibilities to improve forestry education both in local and international context, especially when utilizing problem-based and collaborative learning methods. However, the various backgrounds and skills of the students must be carefully considered both when developing and/or using simulators and/or ICT-tools in education. We believe, that most of the problems related to teaching of multicultural/international student groups can be avoided by careful planning of the course content, allocating enough time for the exercises and by ensuring continuous possibility to get support from the teacher.

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9 GENERAL DISCUSSION

During the second day, three workshops were organised, to discuss three main points in connection with the theme of the meeting. Participants were divided in three groups; each group discussed each subject once. Below, summarizing reports by the chairpersons are given.

Workshop 1: Quality assurance sharing good practice, issues and concerns

Andrew H. Cobb

Introduction
The aim of Workshop 1 was for the participants at the Conference to share their experiences of the quality assurance of the taught curriculum in their home universities. Individuals were allocated to a group of up to six and, during a one hour session, asked to highlight a minimum of three items of good practice and at least three items of issues and concerns. All comments were noted and discussed in full by the group. A synthesis of the outcomes of the three sessions is presented below. Care was taken to ensure that all comments listed in this overview are anonymous and not attributable to any one individual or institution.

General observations
- Considerable variation currently exists in European higher education institutions in the introduction and the adoption of quality assurance systems.
- The meaning of forestry education and science to the society of today needs to be regularly restated and reviewed in a time of change.

Shared good practice
- Quality programmes include feedback from all stakeholders (including staff, students, employers and professional bodies) on course aims and outcomes.
- A comprehensive, multilayered approach is required to consider quality assurance at each step of the learning process.
- A loud and inclusive "student voice" is essential for effective quality assurance.
- There should be a demonstrable commitment of all academic staff to teaching and curriculum development.
- Good teaching is underpinned by good research and vice versa.

Issues and concerns
- There is a continuing need for staff development for all academic staff. Attitudes to teaching and pedagogic teaching skills require attention. Staff mobility and language skills could be improved. Research in forestry education and pedagogy is lacking.
- The challenge of independent learning needs to be addressed. Student motivation could be improved by encouraging group learning and the use of

more interactive teaching methods. Teaching should become more learner orientated, rather than the sole use of traditional methods.

- Financial instabilities and uncertainties affect the quality assurance process by the erosion of resources for student learning and the prevalence of short-term decision making.
- There is generally low staff turnover in European higher education institutions. With few new staff, provision may become stale with academic staff becoming fossilized in their teaching methods, perpetuating existing hierarchies. In addition, the value of teaching should be recognised in the processes of staff recruitment and promotion.
- There is currently an over-emphasis on research, rather than teaching and learning.
- The bureaucracy of the Bologna Process may stifle progress. Not all courses and universities are the same!
- Decreasing recruitment and lower standards on entry may have led to lower student motivation. It is also recognised that some students choose to study rather than becoming unemployed. Others recognise that qualifications do not automatically lead to increased job prospects. These issues should be addressed within the second item in 4 above.

Acknowledgment

Workshop 2: Using ICT tools in forestry education with multicultural student groups

Sanna Härkönen

The aim of the workshop was to discuss how ICT tools are currently utilized in forestry education, and which kind of experiences the participants have on using new technology in teaching. Since the amount of foreign students is increasing at European universities, special emphasis was put on teaching of multicultural student groups. The profits and problems of ICT were discussed, as well as the future development needs of such technology.

The discussion showed that different course management platforms (e.g. Moodle) are nowadays often utilized in forestry studies. Software packets like MS Excel or SPSS as well as simulators are also commonly used in forestry studies. Instead, only a couple of workshop participants had organized totally virtual courses.
Most of the discussion was related to course management platforms. The participants were quite unanimous that the largest advantage of such tools in education is the freedom they offer for learning (time, place, etc.). Easiness to handle course material and students was agreed to be an advantage too. In other respects, attitudes towards ICT tools among the participants varied much. Some of

the participants were very keen on using new ICT tools and implemented them in versatile ways in their teaching. On the other hand, some participants were a bit sceptical, and emphasized the importance of "hands-on" experiences in learning. They also pointed out that the basic phenomenon should be learned in "real life" in order to understand the issues.

When using ICT in forestry education the problems were mainly related to too large student groups and to insufficient computer facilities at universities. A further problem is that not all the students have computers/internet access at home, which makes the learning possibilities unequal. Lack of good programs that could be utilized in forestry education and usability problems of existing software were also mentioned. Insufficient ICT skills of teachers were found to be quite a large problem too. Instead, usually the students' ICT skills were found to be good. Some of the teachers found the teaching platforms more time consuming than the traditional teaching methods, since the platforms are used e.g. for giving individual feedback for the students, which takes much time with large student groups. On the other hand, it was admitted that the handling of the course material and information is easier when utilizing such tools.

The experiences of teaching of multicultural student groups was not subject of much discussion, since quite many of the participants were teaching only domestic students. However, some of the participants had lot of experience on teaching international courses. When dealing with multicultural student groups, insufficient language skills was found to be the largest problem. Also different learning styles of students coming from different cultures, and the misunderstandings caused by that, were mentioned. However, even though the multicultural student groups were seen more demanding for the teacher than the traditional domestic groups, teaching of international groups was found to be very interesting and fruitful experiences, both for the teachers and for the students.

How to use ICT in education in future? Some ideas mentioned during the discussions
- When using ICT in education, blended solutions are the best option:
- Combining face-to-face teaching periods with virtual periods.
- Combining the use of ICT applications with field trips: instead of using ICT tools as "black box", teaching the basic ideas in the field before using virtual tools like simulators.
- When delivering learning material e.g. via internet, references to the content are needed!
- When developing and or using ITC tools, it is important to take into account the different types of learners and to implement the different demands caused by this,
- ICT applications utilized by forestry companies in reality could be used and or presented more in forestry education.

- International student groups can offer very fruitful and versatile learning experiences for both students and teachers, but the teacher has to allocate much more time for such groups.
- More training in ITC use is needed for teachers.
- The need for organizing a joined workshop/conference related to new ICT tools in forestry education was mentioned.

The world is changing → Forestry education must change along → A big challenge for the future!

Workshop 3: How can we make our mission sustainable?

Annette Schuck

Why do we need a mission?
The Bologna Process has given new meaning to transparency and consistency at higher education institutions. The new degree structure with Bachelor and Master Degrees calls for a redefinition of titles and descriptions of aims of degree programs. Nevertheless, few degree programs have been producing comprehensive material that can be called a well thought-through mission statement. Several faculties and universities have produced glossy pamphlets with advertisement for degrees and universities, but many of them have been produced by one or a small number of individuals who sat in their office and thought about a couple of nice sentences painting a pretty picture. But is that really what is needed?

Traditionally companies have produced mission statements and their aim has to be to describe the companies aim and profile in a few catchwords. The definition given by Wikipedia (Wikipedia, 2007) is "mission statement is a brief (one sentence or less) description of a company or other organization's purpose. It typically explains what the organization provides to its clients, in general terms that most of the employees can relate to. Although a company might use its mission statement as an advertising slogan, a more common use is to remind executives and employees of the overall goal they are expected to pursue". Clearly this is not what we mean if we call for a mission statement for a higher education degree program.
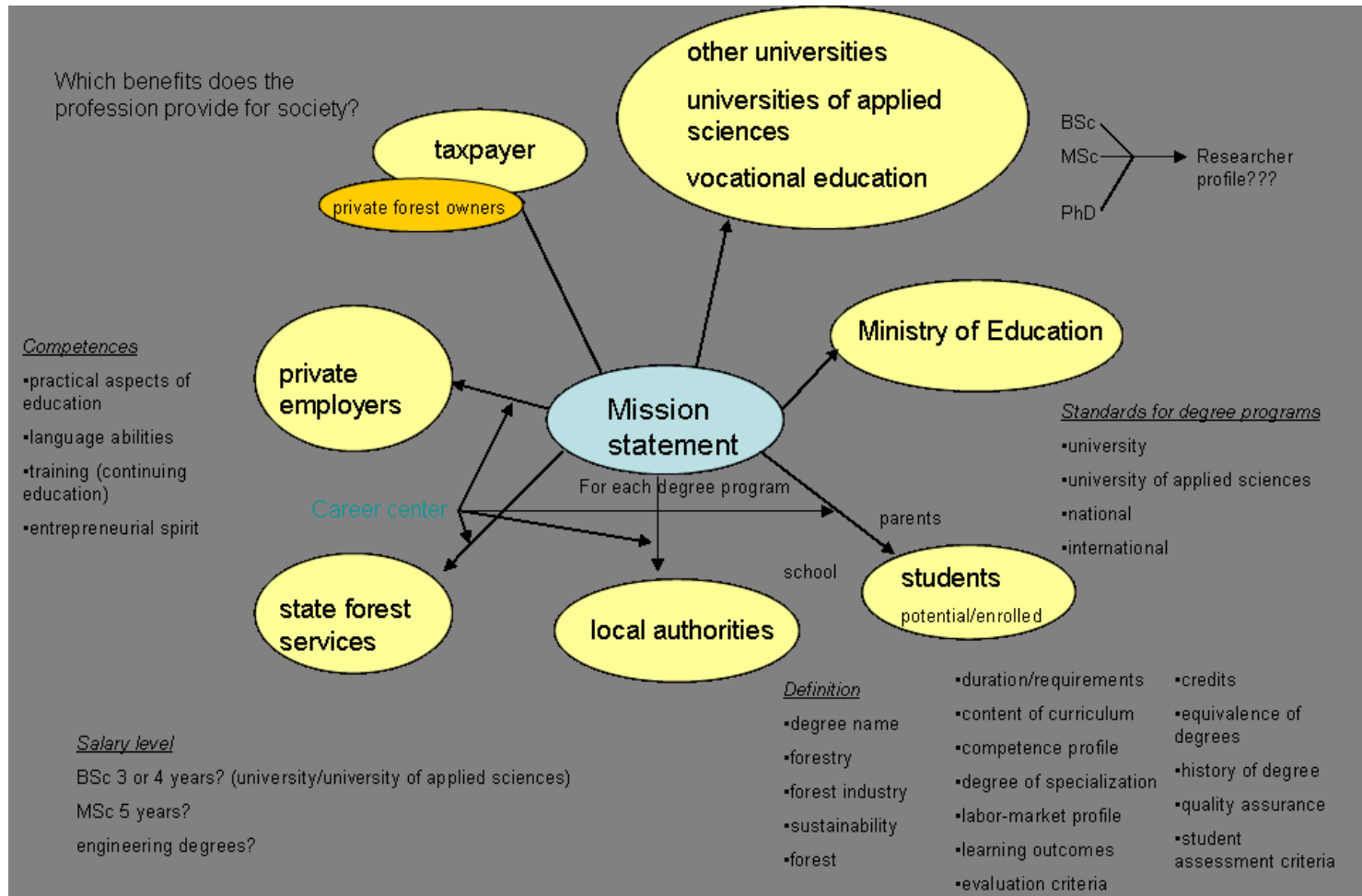
Figure 1: Results of three workshop sessions on the topic "How can we make our mission sustainable?"

The Oxford English Online Dictionary (OED, 2007) gives the following more helpful definition: "mission statement, (a) Mil., a statement of the objective of a military operation or task; (b) Business, a formal summary of the aims and values of a company, organization, or individual". Starting from here, it shows that to write a mission statement requires that first of all the demands of stakeholders and society need to be analyzed to be able to formulate aims and values To be able to come closer to a useful definition for the purpose of quality assurance of higher education, it was useful to hold a workshop at this meeting of the SILVA Network with the title "Quality assurance and curriculum development in forestry and agriculture-related sciences in Europe". The workshop was entitled "How can we make our mission sustainable?" including three workshop sessions with different participants from different countries. Interestingly, the idea of what kind of a mission statement was needed differed very much among the groups. One group put the focus strongly on a new mission statement needed for the SILVA Network, while another group focused on the university perspective and the third group on the kind of information students would need and look for. The results of the three workshops are summarized in figure 1.

This overview shows the complexity of the task. It also makes clear that first of all we need a set of definitions to work with. To produce relevant and meaningful mission statements, higher education institutions will need to come up with a structured and institutionalized procedure that will do continuous research on demands and needs linking different institutions and levels. Many European higher education institutions have not consistently mapped students' motivations and needs as well as graduates' feedback. Surveys have often been done sporadically and questions have been asked on the basis of interest without a sound grounding in the principles of qualitative research. Well-planned and consistent research into these issues is desperately needed. To deliver relevant education we need to analyze social needs, demands and values including students' and employers' opinions.

A mission statement is more than a piece of glossy advertisement; it needs to clarify the content and aims of the degree program in a structured and transparent way creating trust and credibility. If forestry education institutions want to properly address different concerns, mission statements are valuable tools that give a chance to openly address covert opinions of stakeholders that have been recognized in surveys. Provided we realize that a problem exists, we can try to find solutions or at least give sound explanations for faculty decision-making. The future of funding depends very much on the ability of higher education institutions to deliver what it promises. That also asks for indicators and benchmarks for quality assurance of a degree program that are directly related to the mission statement. We can develop these indicators and benchmarks ourselves or we can leave it to others to develop them for us - but we can trust that they will be developed. At present the choice is still ours and we can create our own yardstick that we want to be applied.

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10 CONCLUDING COMMENTS: SOME PERSONAL OBSERVATIONS

ANDREW H. COBB

With the proposed European Higher Education Area due for 2010 as part of the Bologna process, this SILVA conference for forestry and related sciences served as a timely reminder of the paths ahead to ensure a coherent European agenda. Conference papers included examples of good practice and effective quality assurance. Discussions highlighted the concerns and issues faced by colleagues in different institutions and countries in adapting to the Bologna Agenda.

Bologna, of course, is a voluntary process, neither enforced by treaty nor supported by a European bureaucracy. It is driven by the needs of the university sector and its students. Good progress has been made in the adoption of bachelor, master and doctorate qualifications and accepting a learning outcomes approach, as enshrined by the Dublin Descriptors. The pace of change in Europe is, however, mixed. There is still much baggage to be shed and good practice to be adopted.

What are the particular concerns to be overcome? Conference participants highlighted the following issues.

- The need for some countries to resolve the debate on student workloads and length of study, versus the adoption of a learning outcomes approach. It is evident that the somewhat traditional approach to delivering the curriculum based on formal lectures, hours studied and written examinations is being challenged by delivery to fit agreed learning outcomes in more imaginative and innovative ways.
- The adoption of the Dublin Descriptors, which define and enshrine the learning outcomes-based approach to higher education.
- The acceptance and adoption of a quality enhancement agenda, in which regular course monitoring and review introduces change and reinforces good practice.
- The "student voice" should be loud and listened to in all higher education institutions. How else can academics and administrators gauge student needs and opinions?
- The binary divide between "academic" and "professional" universities remains, in the considered opinion of this author, an artificial and unnecessary division in many countries in Europe. Does its continuation really serve the needs and best interests of students?

It is also essential for our European universities to modernise and embrace new modes of learning and teaching, including the "life-long-learning" agenda. Examples include the use of information technology for distance learning and to

consider the needs of those in employment, enabling them to enhance their professional skills. Indeed, the pursuit of purely academic skills may not serve the needs of the professions and the professionals in the workplace, as discussed at a previous SILVA conference (Wageningen, 2005).

Equally, European universities cannot afford to be complacent. A modern Higher Education system in which all or most universities deliver courses in English may not be far away. This will mean an increased competition for a more mobile European student population who will enjoy more choice of university and vote with their feet. Furthermore, this is not solely a European agenda, as modernisation has the potential to increase the attractiveness of European higher education in a global market.

As an optimist, I know that academic colleagues in forestry and related sciences are increasingly aware of the challenges ahead of us and consider that we can face change with measured confidence. I look forward to similar conferences in the future to record our collective progress towards the European Higher Education Area.

11 PRESCRIBED BURNING AS A MANAGEMENT TOOL, FIRE AS A MANAGEMENT OBJECTIVE

ORIOL PELLISA, MARC CASTELLNOU AND MARTA MIRALLES

Where do we come from and where are we?

Large fires are now a main threat to our landscapes, with large cultivated zones, lineal infrastructures and urban zones fragmenting the forest. On the other hand, our ecosystems have survived many centuries without trucks and planes extinguishing every fire. Now we are starting to understand that fire is a key process and a main driving force in the structure and configuration of our landscapes. The clue for the fire management is that fires with different intensities have different consequences in the ecosystem. Trying to avoid every fire, we only have to promote high intensity fires with a high fire severity, at the expense of low intensity fires with a low severity. The latter ones are easily stopped. But is that policy the right one?

Nowadays, high intensity fire exceeds the extinction capacity of fire-fighters due to (Rifà and Castellnou, 2007):

- Fire intensity exceeds the technical means of extinction, due to high flame lengths, thick smoke columns and long-range spotting;
- Fire spreading with long-range spotting moves quicker than our means of extinction.
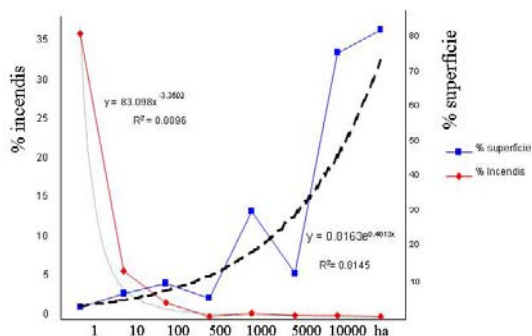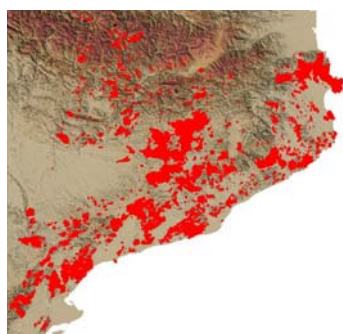

Figure 1: Left: Reconstruction of the forest fires of the last 60 years. Crop abandonment, suppression of every fire and a decrease in extensive grazing by animals in the first half of the XX century has led to an increase in forest continuity and fire is now one of the main driving forces of our landscape. Right: Number of fires (red) and surface burnt (yellow) for fires of different sizes between 1988 and 1995. Most of the fires are of small size, but the few fires burning more than 1000 ha account for most of the total burnt surface.

The problem

So, only the low and medium intensity fires can be stopped by our new and old technical means. Without a powerful prevention and without this suppression system, our landscapes would have more small and medium size patches, and not only large-sized ones.

Due to our current policy, we stop every fire we can stop, and thus, we stop the low and medium intensity ones. But stopping those fires means losing an opportunity to stop the next large fire, which can not be stopped by fire fighters but will run to death and stop in areas burned with low intensity. Hence, forest continuity increases, and so next high intensity fire can be larger.

Figure 2: Descending low intensity fire (from top right to centre), allowed the survival of the forested area (greenish part), but could be easily suppressed by fire fighters, thus preventing this low intensity fire to arrive to the valley bottom. Later, a second high intensity fire (ascending from down left to centre) started in the lowest part of the slope, killed all the trees (blackish area) and stopped in the low intensity burned zone. If fire fighters wouldn't have extinguished the low intensity fire, the high intensity one wouldn't have been able to eliminate the forest canopy. So extinguishing what fire-fighters could suppress (low intensity fire) is the cause of loosing the trees. Source: Bombers de Catalunya. Left: Large fires, causing large patches, are the dominant disturbances; hence, species adapted to large patches are becoming dominant.

Our landscape is being dominated by large patches, as we only suppress every fire but the large ones. This results too in changing the species composition of the landscape: species adapted to high intensity fires are becoming dominant.

Resprouting species, such as *Quercus coccifera* and *Q. ilex*, and species adapted to colonize large areas without shadow, such as *Pinus halepensis* and *Ulex parviflorus*, are conquering our landscape; and they are doing this with dense continuous structures, which in some years can burn with high intensity, facilitating a new large fire causing a new large patch. Meanwhile, species adapted to small patches and to low intensity fires, such as *Pinus nigra* are losing its place.

The opportunity

As fire is one of the main driving forces of the forested areas, fire must be a management objective. For areas managed for conservation, fire as the main disturbance factor must be the main management objective. In areas with multiple objectives including wood production, fire must be one objective more.
Until now, forest management has not considered fire as being a part of the ecosystem. As we have seen, this has favoured the expansion of dense forest structures, and thus the expansion of crown fires. But forest management must include the persistence of the forest, and the disturbances of this forest belong to the key processes driving this persistence.

Figure 3: Left: Stand-replacement fire in a *Quercus suber* structure. Right: Low intensity high frequency fire maintains the *Quercus suber* structure. Source: Bombers de Catalunya.

This integration process implies the understanding the disturbance regime of the ecosystem and its effects in the forest future and being able to forecast when and how disturbances can happen. Understanding the processes (effects of fire regime in every species, fire dynamics in every topography, etc.) is the key clue to be able to choose the correct tool, the best moment and place, etc. to improve the persistence of our landscapes.

Fire dynamics

Until now, forest management has not considered fire as a part of the ecosystem. As we have seen, this has favoured the expansion of dense forest structures, and thus the expansion of crown fires. But forest management must include the persistence

of the forest, and the disturbances of this forest are the key processes driving this persistence.

Figure 4: Left: Low intensity fire maintains the *Pinus nigra* structure, driving the regeneration. Source: Bombers de Catalunya. Right: Understanding the landscape is an unavoidable skill every forest manager should develop. In the image you can see an historical fire perimeter.

Conclusions

- Low and medium intensity fires create persistent structures, where large fires will loose intensity, and creating ecological diversity.
- Technical fire is a useful tool for prevention: Human tools have not the same effect as natural tools: The best remedy is using the same agent that can eliminate the ecosystem, and not another.
- To use fire in forest management, we need a deep understanding of this tool: The interactions between objective, effects, fire behaviour, and conditions (topographical, meteorological, fuel) must be understood.

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