

# ENVIRONMENTAL EDUCATION AND INTERNATIONAL KNOW-HOW-TRANSFER BETWEEN UNIVERSITIES – RESULTS FROM A PILOT PROJECT IN COOPERATION WITH GERMAN, POLISH AND CZECH UNIVERSITIES

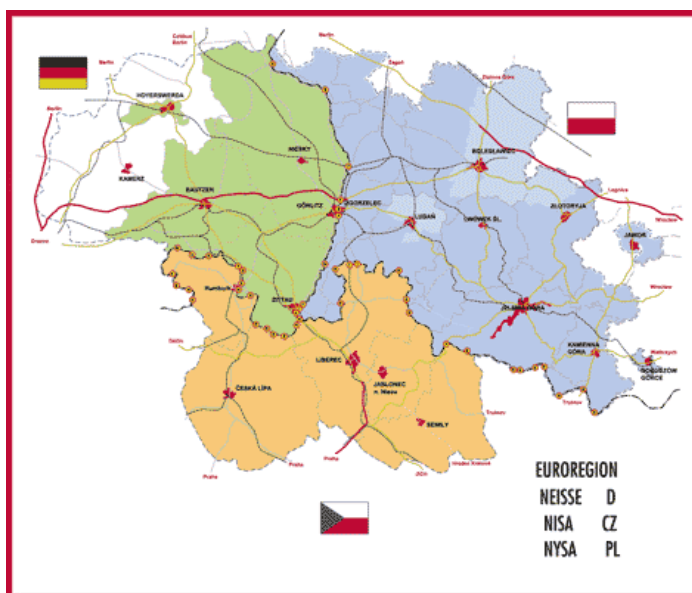
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## 1. The International Graduate School Zittau (Internationales Hochschulinstitut IHI Zittau) – an innovative university model for the European integration process

The IHI Zittau will be ten years old this year. The foundation philosophy has not lost its actuality and perspective. The givers of the idea and the responsible persons for the foundation decision have formed an international university model, which has a unique position regarding institutional partnership not only for Germany, but for Europe too. Indeed remotely located in Saxony the IHI Zittau belongs to the German university society, i. e. the organisation responsible for various study and research conditions, but is also based on common decisions of cooperating polish, czech and german universities.

All the cooperating universities are located in the so-called „Euroregion Neiße“, a consolidation of three border areas situated in Germany, Poland and the Czech republic (see *figure 1*).

**Figure 1: Location of „Euroregion Neiße“ [1]**



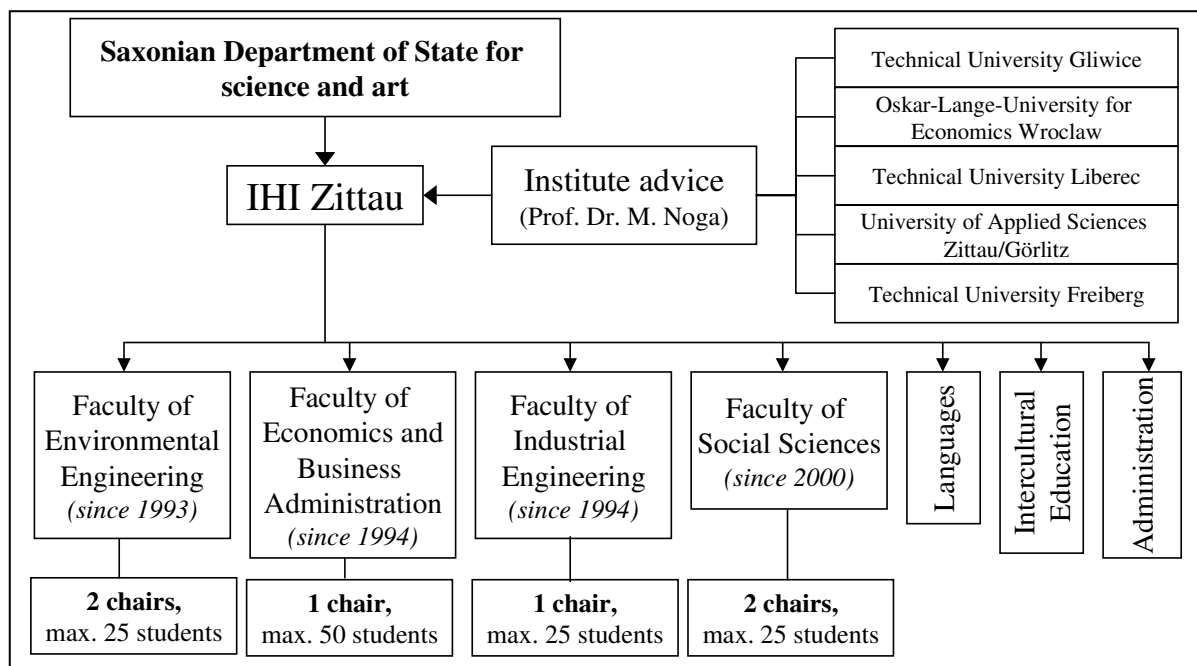
What were now the reasons and the aims for the foundation? Some short remarks:

- political orientation:
  - to save and to develop possibilities for university-oriented qualification in the region;
  - to accompany democratic processes in the direct neighbourhood of Saxony in two former countries of the eastern block;
  - to use advantages of the region position and of border-crossing;
  - to bring people from different countries together;

- to support the common responsibility for the future generations, to take part actively in the formation of a sustainable development.
- social orientation:
  - to support intercultural communication;
  - to create acceptance for differences, especially concerning history, culture and traditions, economic and politic circumstances;
  - to support an international community.
- economic orientation:
  - to take part actively in restructuring processes from a plan-oriented to a market-oriented economy;
  - to transform the experiences of the German reunification to the future members of the European Community, especially Poland and the Czech republic;
  - to create motivation and quality for foundation ideas to establish new enterprises in the region;
  - to use the international advantages of the location, especially considering the chances of a border region.
- ecological orientation:
  - to restructure the nature in one of the most polluted regions of Europe, the so-called black triangle;
  - to create and to develop international programs, especially for this region, for securing the ecological quantity and quality.

So in principle a new study and research profile was defined, oriented by international, intercultural and interdisciplinary aspects. To realise this, we came to the decision to offer four study and research possibilities for economics, environmental engineering, industrial engineering and social sciences (see *figure 2*).

**Figure 2: Structure tree of IHI Zittau**



Source: International Graduate School Zittau

## 2. Some special remarks in view of the faculty of economics

The students community of the IHI Zittau consist mainly by qualified young people from the middle and eastern european countries, especially citizens from Poland and the Czech Republic, but from Hungary, Ukraine, Lithuanian, Byelorussia and other countries too. In average, nearly 80 % from our students are coming from the countries, which are defining the “Euroregion Neisse”, the difference from about nearly 20 % is principal open for students from other countries. The *figure 3* illustrates the conditions for a study in Zittau very concentrated.

**Figure 3: Study possibilities and perspectives**

<p><u>Admission requirements:</u></p> <ul style="list-style-type: none"><li>• conclusion of (basic) study</li><li>• language courses in German speaking (6 weeks in summer and 4 weeks in winter) with examination (for not Germans)</li></ul> <p><u>Study characteristics:</u></p> <ul style="list-style-type: none"><li>• study offer with adjustment up Middle and Eastern European Countries</li><li>• a lot of practical like different conferences, excursions, case studies</li><li>• average period of study: 10 terms<ul style="list-style-type: none"><li>* basic study at cooperation universities</li><li>* 4 terms specialized studies</li><li>* 1 term specialized practical course</li><li>* 1 term diploma</li></ul></li></ul> <p style="text-align: right;">} at IHI Zittau</p>
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Source: International Graduate School Zittau

The profile of the economical faculty is so defined and organized, that the students are motivated, to study not only their compartment, but be open for social, ecological and cultural aspects too and be interested, after finishing their study to stay in a network as a multiplier for developing an international network for interdisciplinary excellence. Therefore the study and the supervision concept is highly oriented by modules and cooperation profiles. An very important additional approach is, to develop the study activities not only for the students (passive), but by the students too (active), for instance realized by summer camps, summer schools, practice oriented working in projects (case studies) and interactive realized offers for position indepentend e-learning/teaching components. An other aim is, to set always a focus by themes, which are allowing it, to consider consequently main aspects of the european integration process.

The demand for the responsible persons of the economic department were consequently not only to develop a book „classical“ study offer with centres in business administration, international management, accounting, marketing and so on, but to realize a specialty, the challenge for the formation a sustainable development with a regional focus considering. The idea, to develop an international, interdisciplinary environmental management offer within the economic profile was born. The first step now was, to analyse existing offers with the

introduction, to use this experiences for a know-how-transfer to Zittau directly or indirectly by specifying this knowledge for the more different situation and the aspired new study profile in Zittau. The next chapter shows therefore the results from an intensively analysis of environmentally oriented curricula in economics and business administration at German, Polish and Czech institutions of higher education.

### **3. Environmental education and international know-how-transfer between universities – results from a pilot project in cooperation with German, Polish and Czech universities<sup>1</sup>**

#### **3.1 Some principal remarks for sustainability responsibilities in institutions of higher education**

Environmental issues cannot be removed from public debate since the book „Limits to growth“ [2] showed that human economic activities change the natural environment (climate change, resource degradation, decreasing biodiversity or water shortage) endangering the future of mankind.

The final report of the Brundtland Commission on Environment and Development „Our Common Future“ presented the concept of sustainable development. „Sustainable development is a development that meets the needs of the present generations without compromising the possibility of future generations to meet their own needs.“ [3, p. 46]

In this context, environmental education, especially environmental research and teaching at universities and other institutions of higher education has gained importance. Future leaders in politics, business and sciences are educated being confronted with the sustainability concept. Therefore, at universities and other institutions of higher education is a need of top priority for:

- Individual and social learning on a cognitive and emotional level to understand and increase the awareness of environmental and social problems;
- Trust in, communication, and cooperation with other scientists in collective action to solve environmental, social and economical problems;
- Deliberation, participation and self-organization in order to gain economical and political influence for promoting sustainable development.

This importance is also reflected in Agenda 21 submitted by 170 States at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. This action program for the 21st century contains a chapter on science for sustainable development (chapter 35) as well as a chapter on promoting education, public awareness and training (chapter 36) [4]. Mainly the Copernicus-Charter, the university charter for sustainable development, promotes the implementation of Agenda 21 at the level of universities and institutions of higher education. Many European universities have signed the Copernicus Charter committing themselves to ecological and ethic actions. It contains a 10-point action program for implementing sustainability at universities [5]:

- Institutional commitment,
- Environmental ethics,
- Education of university employees,

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<sup>1</sup> The following remarks are mostly taken out from two papers: see [22, 23]. This papers are based up results out of analysis at the department of bussiness economics at IHI Zittau, worked out through Dr. Jana Brauweiler, Prof. Matthias Kramer, Thomas Krivanek, Kathrin Rheinländer and Maria Urbaniec.

- Programs in environmental education,
- Dissemination of knowledge,
- Interdisciplinarity,
- Networking,
- Partnerships,
- Continuing education programs,
- Technology transfer.

It is shown that this charter not only includes ecological aspects in teaching and researching, but also structural/organisational and social targets. This is a very wide program in order to reach and interest as much people as possible to build a better future.

If we compare the implementation of the Copernicus Charter in different countries, we find that the implementation of the above mentioned aspects in university curricula strongly depends on the development of the social and political environment in each country. So it is necessary, to distinguish between the examined countries, in the following between Germany, Poland and the Czech Republic.

### **3.2 Introduction for Germany**

In Germany, environmental consciousness has developed since the 70s and consolidates at an high level now (especially [6]). An active debate of environmental aspects in the society and in politics has accompanied this development. The media has frequently reported about environmental issues. Environmental organisations and social movements surged. Now, not only the program of the green party contains environmental issues, but also the programs of nearly all other parties. Environmental policies and laws have developed. Due to this development in Germany, measures of technical environmental protection and environmental management in many enterprises have partly reduced the pressure on the environment. Many ecologically damaged sites were restored and repaired rather quickly, even if long-term solutions for a harmonic relationship between productive economic systems, satisfying social systems and functioning eco-systems are still in short supply.

Nevertheless, this long-term development also reflects in the institutions of higher education despite we can see deficits. We can find many activities for the ecological transformation of German universities and universities of applied sciences.

Ecological aspects have been included in teaching at universities by establishing environmental specialisations, compulsory and optional courses not only at the traditional environmentally oriented natural sciences and engineering faculties, but also at the faculties for economics and business administration (e. g. since 1990, a Scientific Commission „Corporate Environmental Management“ exists within the Association of University Professors of Management (Wissenschaftliche Kommission „Umweltwirtschaft“ im Verband der Hochschullehrer für Betriebswirtschaft e. V.), see: [7]). There are also several sustainability-oriented professorships (several junior professorships are planned at the moment) as well in natural science and engineering faculties, as in economics and business administration.

Due to this wide range of activities we have to focus. In our understanding economics and corporate business administration are especially important in the discussion of the sustainability concept because economic activities overuse resources and thus cause environmental problems. That's why firms are responsible regarding a sustainable use of nature and regarding intra- and intergenerational equality.

In our analysis we investigate, how environmental issues are included into teaching of economics and business administration at German universities and institutions of higher education. We take into consideration the above described developments at universities and the necessity to also (or especially) integrate ecological aspects into the teaching program of universities. Despite that aspects of environmentally oriented management are considered in many other subjects such as natural sciences, engineering, agriculture, social or administrative sciences we limit our analysis to economic majors at German universities, universities of applied sciences and comprehensive universities.

We try to analyse as many institutions of higher education in Germany as possible but this paper is not meant to be comprehensive. We offer a rough overview of the situation in some German institutions of higher education. Our aim to highlight ways to promote environmental education into university education. That is why we want to find out, to what degree (length, width and depth) environmental aspects are integrated into economic programs at German universities. We ask, if

- 1) existing programs have been widened by including ecological aspects and if yes, to what degree,
- 2) new ecological programs have been developed.

We will develop criteria by which can be investigated how far sustainability is regarded as an interdisciplinary challenge according to the Copernicus Charter.

### **3.3 Introduction for Poland and the Czech Republic**

Social development in the Middle and Eastern European Countries such as Poland and the Czech Republic has been characterised by political change towards democracy, a deep change in economic structures, and numerous other political and legal reforms. This restructuring has reduced industrial overcapacities, has modernised firms and therefore has significantly contributed to limiting the negative impact of industry and agriculture on the environment. But not all industrial sites have been cleaned up and the emissions have not decreased to the average of OECD countries [8, p. 11]. The existing environmental problems as well as the related demand for environmental technologies and professional staff to introduce environmental management to firms require the qualified and target-oriented education of professionals.

A precondition for the implementation of environmentally oriented principles is a far reaching rethinking of many areas of human activity. Research in psychology, pedagogy and environmental policy has demonstrated that environmentally friendly behaviour is strongly linked with environmental knowledge and a positive attitude towards the environment or environmental consciousness [9, p. 36]. In this context, environmental education has gained a high importance, especially in research and teaching at universities. Here, future leaders in politics, the economy and sciences are trained. It is they who have to confront the challenges of the sustainability concept [10, p. 14].

It is only possible to adapt education to these needs in the middle or long run. But in the short run, the education at Polish and Czech universities is characterised by dynamic tendencies to increasingly include the challenges of sustainable development into knowledge transfer. Given this background, it was interesting to conduct an empirical and comparative study of the status of the environmental education at Polish and Czech universities. The aim of the study was:

1. to find out what extent environmental aspects are integrated in teaching and

2. to elaborate on *commonalities* and *differences* regarding the intensity of the environmentally-oriented teaching at Polish and Czech universities. It should be established if possibilities exist to bundle the strengths and to decrease the weaknesses within the framework of the curriculum. For this reason the results of the two studies cannot be compared, but they can be used for developing a boundary-spanning curriculum.

### 3.4 Criteria for the analysis

#### 3.4.1 *Two categories for the investigation*

According to the aim of our research we are especially interested in

- 1) the importance of environmental education in the courses as an indicator for the importance of courses and
- 2) their specific contents in order to define the strengths and weaknesses of environmental education in economics and business administration in Germany, Poland and the Czech Republic.

Therefore, we can derive the following two categories for our investigation (see *table 1*).

**Table 1: Criteria for our investigation**

<i>Criteria</i>	<i>Operationalised by:</i>
<b><i>General information about the university</i></b>	<ul style="list-style-type: none"> <li>• Name,</li> <li>• Faculty, Institutes,</li> <li>• Programs,</li> <li>• Integration,</li> <li>• Subjects with environmental orientation,</li> <li>• Type of subject,</li> </ul>
<b><i>Contents</i></b>	<ul style="list-style-type: none"> <li>• Environmental policy,</li> <li>• Environmental law,</li> <li>• Economy – Ecology Relationship,</li> <li>• Strategic environmental management,</li> <li>• Environmental management instruments, (Input-output-analysis; LCA; environmental cost accounting; EMAS; Eco-controlling; Eco-labelling)</li> <li>• Corporate Environmental management systems (EMAS, ISO 14000, ff.),</li> <li>• Environmental technology, (waste; energy; water; soil; air)</li> <li>• Environmental informatics,</li> <li>• Operational environmental management, (products; procurement; production; marketing; logistics; organisation; human resource management; finance)</li> <li>• Environmental psychology,</li> <li>• Global environmental problems,</li> <li>• Local environmental problems,</li> <li>• International orientation, (Czech Republic-Germany; Poland-Germany; Western Europe; Eastern Europe; USA)</li> </ul>

Source: International Graduate School Zittau

The first category comprises of general information about the university such as name, address and the organisational embeddedness of the environmental education in the courses. The second category comprises of specific course contents which are investigated using the presented catalogue of criteria. The focus of our investigation is on economic contents but we consider the interdisciplinary ideas<sup>2</sup> asking for aspects from policy, law, natural sciences, techniques, economics and behavioural sciences. The data relate to the period from the summer term 1998 to winter term 1999/2000.

### 3.4.2 Data base Germany

We investigated universities, universities of applied sciences and comprehensive universities from all over Germany in order to obtain a most comprehensive overview as possible about environmental education in economics at universities. We were not able to investigate all universities that's why we limited our analysis. Due to a high number of universities with environmental education in their curricula (above 170 degrees outside economics and business administration at universities and 120 degrees outside economics and business administration at universities of applied sciences) [11] and our limited research capacities we limited our analysis to graduate programs in economics and business administration at German universities, universities of applied sciences and comprehensive universities. We know that aspects of environmentally oriented management are considered in numerous other programs such as natural sciences, engineering sciences, social sciences, administrative sciences and agriculture.

We obtained the necessary data in three steps (*table 2*).

**Table 2: Data origin**

<b><i>Data basis</i></b>
<ul style="list-style-type: none"><li>• Guide to German universities, 56th edition</li><li>• Study Guide Environmental Protection</li><li>• Scientific Commission „Corporate Environmental Management“ exists within the Association of University Professors of Management</li></ul>
<b><i>Complementing the data</i></b>
<ul style="list-style-type: none"><li>• Internet</li></ul>
<b><i>Evaluation of data</i></b>
<ul style="list-style-type: none"><li>• universities corrected the data</li></ul>

Source: International Graduate School Zittau

In total, we processed information about 65 German institutions of higher education. At these universities and universities of applied sciences, 88 environmentally-oriented subjects/courses are taught. These subjects are offered in 104 graduate and undergraduate programs.<sup>3</sup> Due to the dynamic development in the area of environmental education at universities, we know that our data base is not complete. Therefore we would encourage our readers to inform us about changes and new developments.

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<sup>2</sup> We do not distinct interdisciplinarity and transdisciplinarity at this point.

<sup>3</sup> The difference between 65 and 88 is caused by the fact that at one university several programs in economics are environmentally-oriented. One course is offered as a minor or major in different programs, therefore the number of courses increases from 88 to 103 affected programs. We did not consider if two different subjects were offered in the same program. For that reason some programs might be counted twice if in one program an environmentally oriented specialisation is offered in addition to a comprehensive course.

### 3.4.3 Data base Poland and Czech Republic

In order to obtain the most comprehensive picture of the state of environmental education, we included in the study all universities, economic universities, graduate schools and private universities whose profiles contain environmental aspects. Very specialised programs such as nuclear power or environmental protection and foundry technology were excluded from the study. We also did not include postgraduate programs although we recognise that their importance e. g. in Poland, is increasing. It was not necessary to limit our analysis only to universities offering economics and business administration because of the small numbers involved (in Poland 13 and in the Czech Republic 8).

In total, we analysed the educational programs of 38 Polish and 18 Czech universities. We would like to point out, that universities could be counted twice, if:

1. one university offers different programs, or
2. offers different specialisations, compulsory courses or optional courses in one program, or
3. offers environmentally-oriented courses for different programs (51 in Poland and 45 in the Czech Republic).

The *database* – a compilation of universities and institutions of higher education with environmentally-oriented programs – stems from the Study guide in Poland [12] and from two information brochures in the Czech Republic [13, 14] (*table 3*). We sent a letter to universities asking for information. This information (brochures, leaflets) was entered into an access database following the above standardised criteria and the information obtained was evaluated. The obtained information was not sufficient to cover all criteria of the database and so the database was extended.

We complemented the database by visiting internet pages, interviews (mostly telephone) with the corresponding persons at the universities based on a standardised questionnaire. In addition, we included universities into our database that were recommended in our interviews.

After processing all available information following the database criteria, an evaluation of the data was undertaken. The data set was sent to the corresponding university, which was ask to correct and complete it (*table 3*).

**Table 3: Origin of the data material**

<i>Poland</i>	<i>Czech Republic</i>
<i>Database</i>	
Study guide	Information brochures about higher education institutes and universities
<i>Complementary data</i>	
Internet	Internet
Telephone and personal interviews	Telephone and personal interviews
<i>Evaluation of data</i>	
The universities corrected the data	The universities corrected the data

Source: International Graduate School Zittau

Due to continuing developments in the area of environmental education, this data cannot be regarded as definitive but it does provide a useful picture of the state of environmental education in the universities concerned, therefore we would like to ask our readers for critical

hints regarding changes or completion. In the following, we present the results of the analysis using the above presented criteria.

### 3.5 Evaluation and classification of the analysis results

#### 3.5.1 *Principal results*

We obtained for Germany a very differentiated picture regarding the inclusion into the programs and the dimension of ecologically oriented education in economics and business administration despite that we limited our analysis to the integration of environmental issues into graduate and undergraduate programs in economics and business administration (*table 4*).

**Table 4: Programs in Germany**

- Business administration (57)
- Economics (14)
- Business engineering (8)
- Economics and business administration (7)
- Interdisciplinary (4)
- Technically oriented business administration (3)
- Business informatics (3)
- Environmental studies (2)
- Economics focusing on ecology (1)
- Environmental protection (1)
- Environmentally oriented business administration (1)
- Economic and environmental law (1)
- Economic pedagogy (1)

Source: International Graduate School Zittau

Environmental issues are included in teaching different graduate programs. Environmental aspects are included in all economic programs such as business administration, economics, business engineering, business informatics. We observe that business administration are the focus with 57 courses. Moreover, universities and universities of applied sciences have built up specialised ecologically oriented programs such as economics with ecological focus, environmental and business administration and environmental and economic law. Some universities and universities of applied sciences established interdisciplinary programs in which economic aspects have the same importance as other disciplines. Therefore these programs are open for students from other disciplines than environmental studies.

Not only the programs but also the different courses and their importance in the study programs show the broad range of the environmentally oriented education in economics in Germany. In our investigation we differentiated between graduate program, specialisation (within the framework of a specialisation in business administration or a compulsory course), compulsory courses (for all students binding) and optional subjects (additional course).

We can see, the integration of ecological issues into economics focuses on specialisations (55 %). In addition to other „classical“ subjects, environmental issues are a core of the program being eligible by interested students. But compulsory courses also are important (17 %). Environmental issues are also dealt with in compulsory subjects (24 %). Specialised programs for environmental education in economics exist, but represent a minority (4 %).

For Poland and the Czech Republic we firstly distinguished between different types of universities (university, university of technology, university of economics and business

administration, private universities and others). Among the 38 Polish and 1 Czech universities with environmentally-oriented programs we mainly found universities and universities of technology.

We can state, that theory-oriented universities as well as practically-oriented universities of technology and universities of applied sciences offer environmentally-oriented programs.

The third criteria for evaluating environmentally-oriented education at Polish and Czech universities is general information about the university. We found that at 38 Polish universities, 41 faculties and departments put environmentally-oriented issues on their agenda. Twenty out of 38 have courses or programs directed to a more technically-ecological education, 15 to aspects of business administration and six to interdisciplinary topics. In the natural sciences, faculties and departments such as chemistry and environmental engineering dominate. In the Czech Republic, 23 out of 42 faculties are directed to aspects from natural sciences and environmental technology (biology, chemistry, technical environmental protection), eight to economic aspects of environmental protection, and three to social aspects. We were not able to apply our criteria to eight universities based upon the information provided by them. Generally, we find that education in the Czech Republic has a profile focusing on natural sciences.

We can observe the range of the environmentally-oriented education not only on the basis of the programs but also on the basis of the courses and their integration into the programs. Within the framework of this investigation we distinguish between programs, specialisations, and compulsory and optional courses (*table 5*). We can see that specialisations play an important role in Poland compared with the Czech Republic. Optional courses play virtually no role. We could conclude from these facts that students have little interest voluntarily gaining knowledge in environmental courses.

**Table 5: Classification – type of studies**

Classification	Type of studies							
	Own Program		Specialisation		Compulsory course		Optional course	
	PL	CZ	PL	CZ	PL	CZ	PL	CZ
Natural sciences	-	16	24	7	-	1	-	1
Economics and business administration	-	2	11	1	5	3	-	3
Interdisciplinary	1	-	9	-	1	-	-	-
Social sciences	-	1	-	-	-	1	-	1
Not classified	-	2	-	4	-	1	-	1
<i>Total</i>	<i>1</i>	<i>21</i>	<i>44</i>	<i>12</i>	<i>6</i>	<i>6</i>	<i>0</i>	<i>6</i>

Source: International Graduate School Zittau

In both Poland and the Czech Republic, the focus of environmentally-oriented courses is on technical and natural sciences subjects. We also find, that economic aspects are only considered to a low degree in cases where courses in natural sciences are offered e. g. at Polish universities. In other cases, where specialisations exist they mostly focus on environmental protection, water and soil protection and seldom on environmental management in firms.

In the Czech Republic many courses have different names but have a similar content such as courses introducing environmental protection, basics of ecology, ecology etc. These courses

are designed using similar concepts. Further, within the framework of our investigation we analysed the specific content of the courses at Polish and Czech universities and institutions of higher education.

The profile of the courses in both Poland and the Czech Republic is mainly directed towards environmental policy, environmental law, economy/ecology, and environmentally-oriented engineering. In the Czech Republic it is additionally directed towards global environmental problems and input-output-analysis. Less attention is given to the following areas: environmental management instruments and systems (with the exception of input-output-analysis, LCA (life cycle assessment) and environmental audits in the Czech Republic), operative environmental management, environmental informatics and international orientation [15]. Other courses such as environmental ethics or environmental psychology should be more carefully examined. Normally, these aspects of environmental education pay more attention to the core of the subject. In the natural sciences, the focus of the education lies on technical environmental protection with an orientation towards waste, energy, water, soil and air. The range of transferred knowledge about environmentally-oriented topics in the different courses varies sometimes within the programs. In graduate studies, subjects are mainly offered which are closely linked to the specialisation [16]. Considering the diversity of the examined aspects in the national context, it is striking that an international orientation in topics of ecology-oriented economics and business administration is not provided to any great degree.

### 3.5.2 *Strengths and weakness*

According to the diversity of environmental oriented programs, the very diverse and rich range of topics in Germany does not surprise. They range from the relationship between economy and ecology, to aspects of environmentally oriented management in the form of strategic and operational environmental management, including environmental management instruments and systems, environmental policy and law to adjoining areas such as environmental psychology, ethics and environmental technology. According to the respective orientation of the courses, either single aspects are deeply analysed or a more general (partly also focusing) overview about a bundle of possible topics is given.

**Table 6: Strengths and weaknesses**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Diversity of environmentally oriented education in general and in business administration and economics</li> <li>• Many possibilities for specialisations by establishing ecologically-oriented programs in economics and business administration and offering many specialisations in economics and business administration</li> <li>• Integration of the ecology-oriented education in the traditional economic programs by environmentally-oriented compulsory courses and the respective extension of classical courses in business administration</li> </ul>	<ul style="list-style-type: none"> <li>• International dimension is missing in environmentally oriented economics</li> <li>• Only limited approaches to interdisciplinary work with some exceptions</li> </ul>

Source: International Graduate School Zittau

- interdisciplinary approach

We can generally find an basic interdisciplinary approach in all investigated courses. This is partly due to the nature of environmental issues. At least, knowledge from ecology and economy are linked, in many courses additional knowledge from other areas such as political sciences, law or behavioural sciences is provided. In four cases, courses are composed of lectures from different departments. In our investigation, we could not analyse to what degree the contents of the different lectures are linked in detail. To our mind, an even stronger joint approach of different disciplines its necessary.

- international approach

An international orientation of problems of environmentally oriented economics is lacking despite that in the national context environmental issues are dealt with in a diverse and very broad manner. This lacking international orientation is especially problematic because environmental problems do not respect national borders and enterprises increasingly act in an international context. This is very obvious, if a focus on Middle and Eastern Europe is looked for taking into mind the enlargement of the EU to Eastern Europe. The European University Viadrina in Frakfur/Oder deals with international topics, especially focusing on Poland, but it does not focus on environmental management issues. Therefore we can state a deficit in this area, especially in the context of globalising markets and the future EU-enlargement to Eastern Europe.

The analysis showed that the profile of the environmentally-oriented content of studies can be divided into three basic areas:

- 1) environmental protection – specialisations: environmental protection, conservation, environmental chemistry, ecology and protection of water and so on
- 2) environmental engineering – specialisations: environmental technology, monitoring, water and waste treatment and so on
- 3) environmental management – specialisations: environmental management, environmental policy and management, environmental protection and management and so on.

The environmental education in Poland and the Czech Republic is often technically-oriented. In addition, some higher education institutes offer environmentally-oriented courses in several faculties. The same situation exists regarding specialisations, where environmental aspects are mentioned within the framework of different scientific areas. The interest of students in environmentally oriented studies is higher at universities of technology than at universities of economics and business administration. Environmental programs based on a technical education at technical universities are thought to be more relevant in the labour market. Within the framework of these programs, students learn about general ecology and environmentally-oriented technological processes.

The Polish experiences in the area of environmental education show that a theoretical approach towards these topics exists in various universities [17]. This partly reflects the respective scientific literature. Many publications exist in the Polish market, but most are characterised by a superficial theoretical approach in comparison with the literature in Western Europe [18].

While Czech universities mainly offer environmentally-oriented courses in biology and chemistry faculties or departments, environmentally-oriented courses are mainly found in technical faculties and departments at Polish universities.

Beyond this, we can see considerable weaknesses, especially if we look at core areas of operational environmental management such as environmentally-oriented production,

procurement, marketing, logistics and at the international orientation which is only sparsely integrated in the programs.

Therefore the expectations for environmentally-oriented studies are high and only some universities have successfully integrated them into their programs or have started to implement them [16]. But we must state that environmental education has been developing dynamically in Poland and the Czech Republic. Every year, more programs and courses with an environmental orientation are introduced which we observed during our analysis.

**Table 7: Strengths and weaknesses of environmental education in Poland and the Czech Republic**

Strengths	Weaknesses
<i>Poland/Czech Republic</i>	
The profile of education is mainly technically-oriented, but more often sustainable development is taught (mainly at universities of business administration and economics)	Early contacts to potential employers at the universities and institutions of higher education are hardly recognisable
<i>Poland</i>	
Relatively high numbers of environmentally-oriented specialisations, i. e. a wide ranging spectrum of education	Environmental management is only basically dealt with in teaching
A high number of teaching staff, mainly specialised in natural sciences	Environmental education is often very specifically directed within engineering, therefore environmental topics are dealt with in a very biased way
Good prospects for graduates in the labour market in environmental areas due to the recent political situation and the social-economic transformation	Relatively low interest of students (their priorities: marketing, business management, law, informatics, banking, psychology)
	A deepening of theoretical knowledge takes place rather than the application of theory in practical case studies
	Infrequent teaching of application-oriented knowledge and interdisciplinary perspectives
<i>Czech Republic</i>	
Integration of environmentally-oriented courses and specialisations in the study programs of almost all institutions of higher education	Only partial integration of environmental management into the study programs
Relatively high interest of students in compulsory and optional environmentally-oriented courses in economics and business administration due to area-specific environmental problems	Deficits in teaching operative environmental management (environmentally-oriented production, procurement, marketing, organisation)
	Low level of knowledge about environmental control
	Theoretical knowledge is complemented only to a lesser extent by practically oriented case studies and practical projects
	Lacking international cooperation
	Lack of financial means for establishing a specialised library

Source: International Graduate School Zittau

In general, we can state that the range of environmentally-oriented programs and courses, especially at universities of business administration and economics, can be further developed. Above all, an integration of environmental aspects into the compulsory courses of business administration makes sense in order to provide future graduates of business administration with insights into the numerous relationships between ecology and economy and the resulting developments in society. We would recommend further deepening of such aspects considering the increasing tendency to link ecological and economic issues.

In comparison to Western European models of education we state that in EU countries the cooperation between universities, firms and public institutions is better developed than in Poland and the Czech Republic [15]. For that reason, a relatively high need for cooperation, research activities and know-how-transfer between West and East exists.

### **3.6 Conclusions and perspectives**

Our objective in analysing environmental education at German, Polish and Czech institutions of higher education was to find out the extent to which environmental aspects are included in teaching programs. Then we elaborated on the strengths and weaknesses and commonalities and differences in the intensity of the environmentally-oriented programs at these institutions. In our analysis we found that environmental education in Poland and the Czech Republic is to a high degree technically-oriented. But universities are characterised by dynamic developments in this area. Despite these developments, aspects related to business administration, such as selected environmental management instruments (environmental controls, environmental cost accounting) or operative environmental management (environmentally-friendly procurement, production and logistics) are not extensively represented. On the other hand, relatively greater emphasis is placed on the international orientation of environmental education in Polish and Czech universities due to changing economic, social-ecological and other framework conditions in the context of the EU-enlargement to include Central and Eastern Europe. In the context of the above-mentioned investigation about economic studies at German universities, we found 65 universities to be involved. At these universities 88 environmentally-oriented courses are taught which are offered in 104 different programs [19]. We concluded that due to the long-term development of environmental consciousness in Germany, a very differentiated landscape of environmental education has emerged, especially in economics and business administration. The programs offered range from courses about the relationship between economy and ecology, aspects of environmental management in the form of strategic and operative environmental management, environmental management instruments and systems, environmental policy and environmental law to related areas such as environmental psychology and ethics, and environmental technology. An international orientation towards aspects of ecologically-oriented economics is however missing.

On the basis of the strengths and weaknesses in environmental education at Polish, Czech and German universities, opportunities may arise to bundle the existing experiences and knowledge and to complement it by new components. For this reason, at the Chair of General Business Administration, especially controlling and environmental management at the International Graduate School Zittau we developed a curriculum for environmentally-oriented management which is distinguished not only by its interdisciplinarity but also by its focus on Middle and Eastern Europe. The curriculum development was sponsored by a model project of the German Federal Foundation for the Environment (Deutsche Bundesstiftung Umwelt) (see [20] and more extensively: [21]). The content of the studies was designed in such a way that problems from business administration and economics are linked with legal, technical and behavioural aspects. Normally, a German-Polish-Czech comparison is conducted. The

elaboration of the curriculum was supported by an international cooperation network which comprises 7 universities from each country (Germany, Poland, Czech Republic), an Austrian university, and 17 firms and firm associations from Germany, Poland, and the Czech Republic. An objective of the project is to transfer the whole curriculum or modules to interested German, Polish and Czech universities. For that purpose, we have already selected one German and several Polish and Czech pilot universities. After the know-how-transfer these universities will be the basis for knowledge diffusion. Therefore, the project results contribute to the development of environmental knowledge, behaviour and the education of future leaders in politics, the economy and sciences.

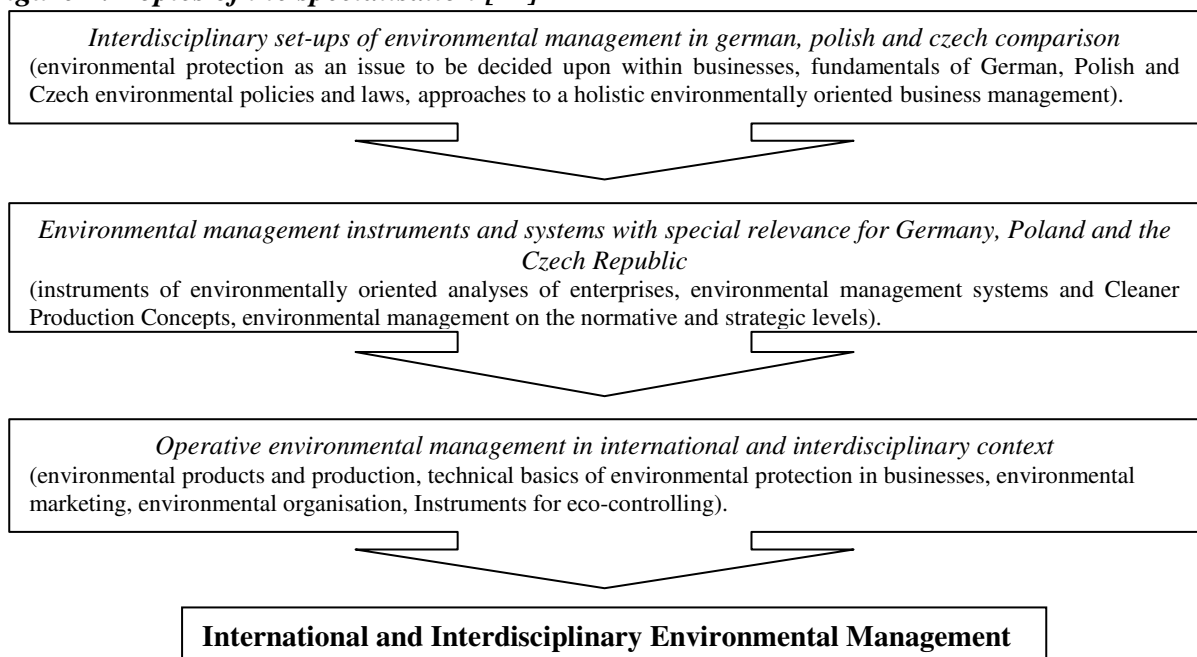
#### **4. Specialisation International and Interdisciplinary Environmental Management**

The analysis has shown, that there was no qualified offer from other universities and institutions in higher education which we could use directly to realise the following topics for our study profile in Zittau:

1. Internationality (adaptation of specific demands of German, Polish and Czech markets).
2. Interdisciplinary (especially the inclusion of environmental technology, but also intersecting with environmental ethics or environmental data processing).
3. Practical (a semester-long internship in a foreign countries, case studies and project work).

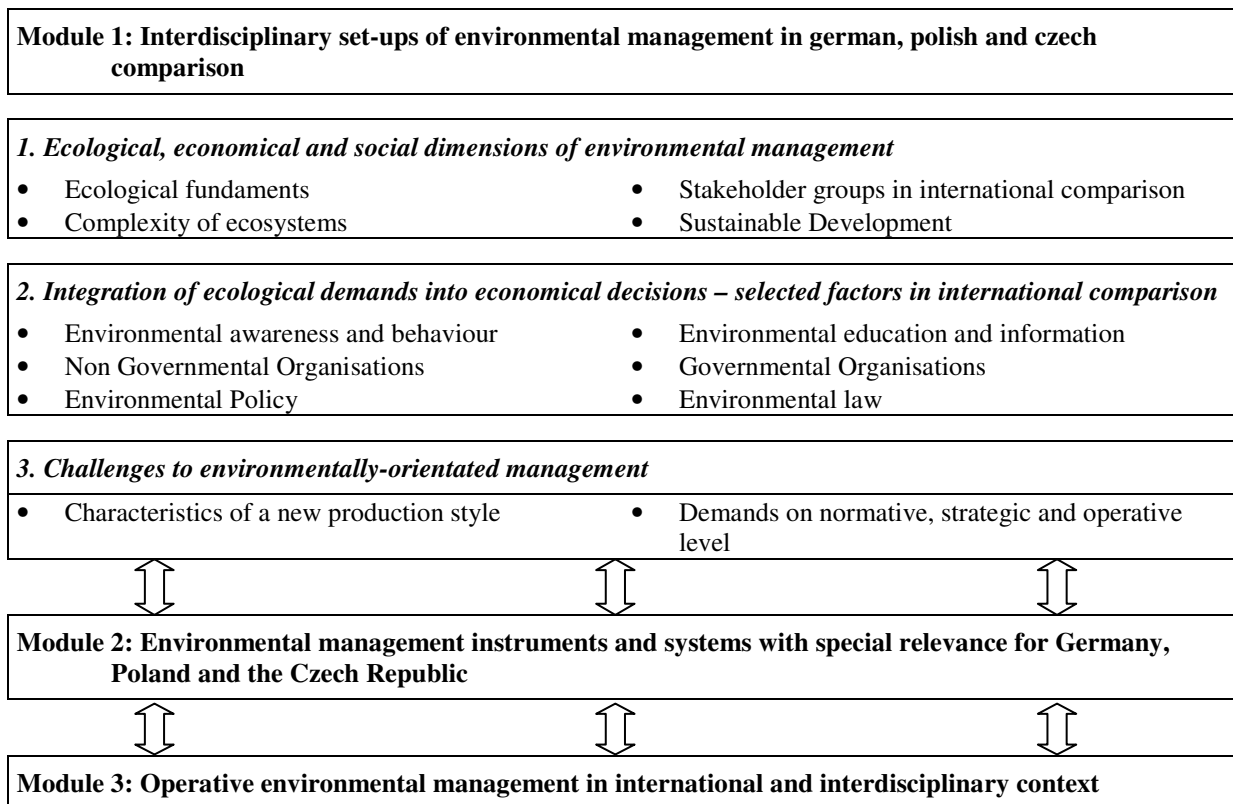
To realise and to develop this new profile, it was necessary and absolutely indispensable, to organise and to implement a network from representatives out of the field of science and enterprises. So we started with a kick of workshop in Zittau, first with nearly 20 representative partners from Germany, Poland and the Czech Republic. During the project working phase the network does increase to about 80 different partners, the key team consists about 40 international representatives. The first important goal was, to define the main stream for the new curricula with the content like it is described above. So we decided, to work in three major modules, which are represented in *figure 4*.

**Figure 4: Topics of the specialisation [22]**



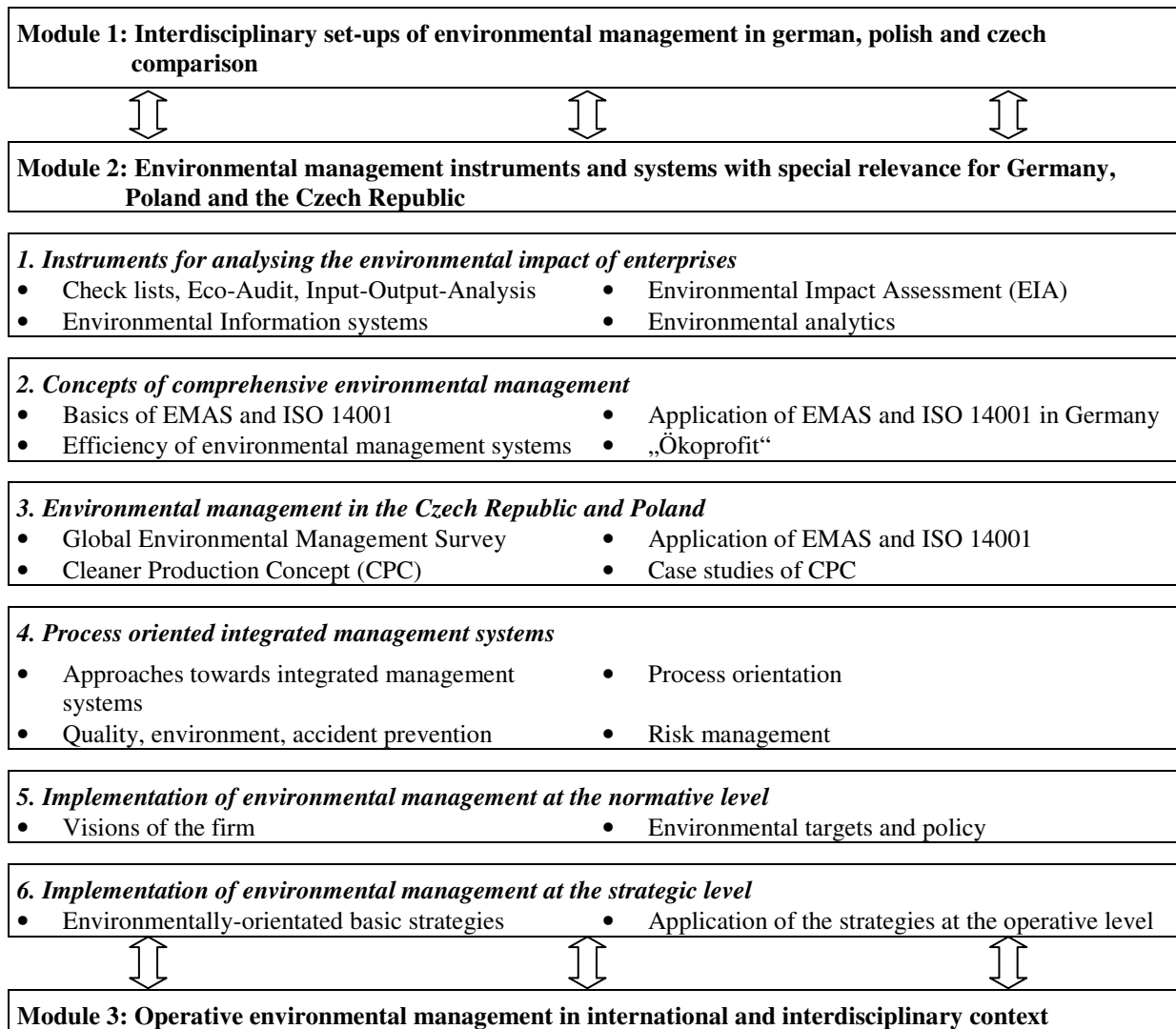
The *first module* transfers basic knowledge about the environment from an ecosystem perspective. It demonstrates the feedback relationships between economy and ecology and the role of strategic stakeholders from the enterprise's point of view in terms of sustainable development. The first textbook presents framework conditions such as environmental policy and law crossing the country borders and specific organisational and decision structures, comparing the countries and presenting them in detail (between Germany, Poland and the Czech Republic). The first textbook presents the framework conditions for the opportunities for increasing and improving the environmental impact of firms which are shown in the second and third textbook.

**Figure 5: Contents of the first module**



The *second module* presents instruments for analysing the environmental impacts of enterprises. It shows their role regarding (holistic) environmental management systems and their concrete implementation in the daily work of selected German, Polish and Czech enterprises. This module especially deals with the environmental management systems EMAS and ISO 14001 and their integration into quality and risk management. These environmental management system are presented comparing their implementation in the three countries. This comparison is supplemented by presenting the Cleaner production concept which is mainly applied in Poland and the Czech Republic. This basic knowledge about comprehensive environmental management is based upon the knowledge about the framework conditions for environmentally-oriented decisions in enterprises which were presented in the first module. This module shows their implementation in enterprises and their intergration into decision structures in the firms and prepares for the product and process level which is dealt with in the third module.

**Figure 6: Contents of the second module**



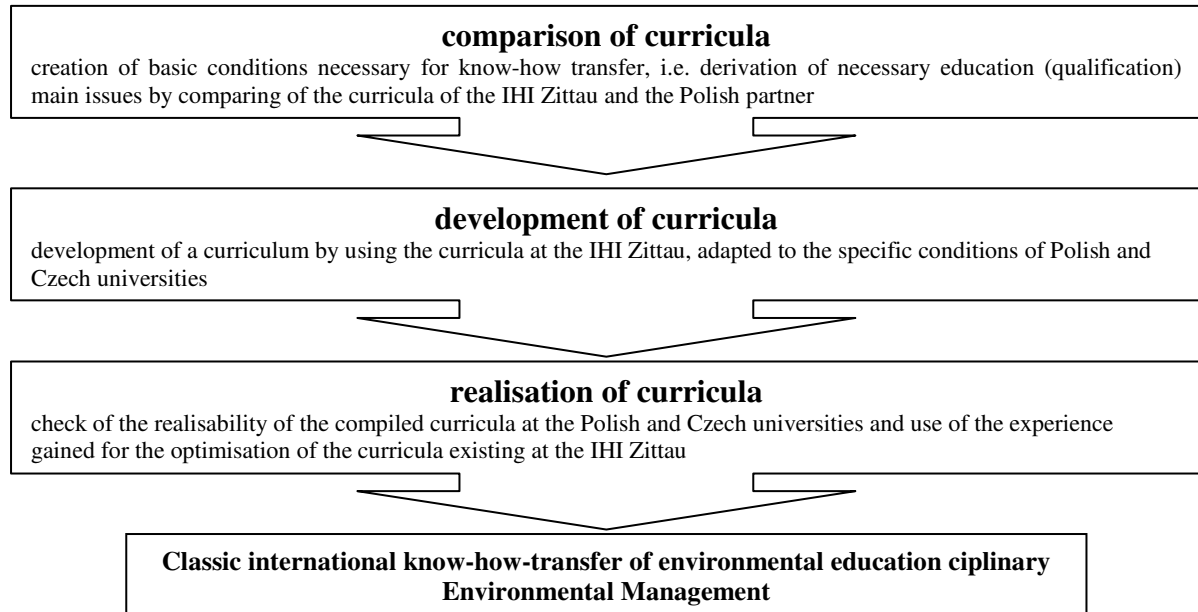
The *third module* focus on process and product oriented environmental protection. We preferred this orientation to end-of-pipe solutions because it intends to build up closed energy and material cycles, e.g. by using regenerative energy. Thus, these modules contain environmental orientation in the form of product design, procurement and logistics, production and organisation of the firm, innovation, human resource development and marketing. Management of energy, air, water and waste water, waste and material cycles are also included as well as LCA, environmental cost accounting and controlling. Therefore, this part comprises all taught knowledge and capabilities in the two former parts in a very practical manner at the operational level. This part also summarises them in terms of a firm vision of sustainability and the respective decisions in the firm.

**Figure 7: Contents of the third module**



To develop this modules representatives from 8 Czech, 7 Polish, 1 Austrian and 8 German universities as well as 16 business unions from this countries were responsible. Based of the described analysis a continuously know-how-transfer between the cooperating institutions and firms was realised. Therefore we organised the following work procedures (*figure 5*).

**Figure 8: Work procedures [22]**



The three modules are published as 500 pages textbooks. In addition, the textbooks are complemented by an interactive multimedia learning tool in form of a CD accompanying each textbook. Starting from an uniform communication platform (see *figure 9*), students can open and use the following topics as modules:

- Structured case studies;
- Multiple-choice-questions for deepening the knowledge;
- Interviews with representatives of firms, environmental authorities, selected environmental NGOs and foundations;
- Films in the fom of firm visits and visits of technical installations and equipment;
- Further-going information or links;
- a glossary defining important terms and
- Information about the co-operation network of the project “International and interdisciplinary environmental management in future markets “ (short CVs and pictures of authors).

**Figure 9: Contents of the third module**



## 5. Virtual tools in university education [22]

The above presented teaching modules are also suited for Polish and Czech universities due to their consequent orientation towards Middle and Eastern European countries, and also for German universities. A transfer of the teaching programmes to other universities in order to obtain the highest possible efficiency in the education was realized.

New media can support the classical knowledge transfer and thus make it more effective. In this chapter we present the necessary organisational concept and possible contents and forms of teaching. The virtual knowledge transfer has to be organised in the following way: at each site (e. g. IHI Zittau, Polish university, Czech university) a local seminar room (e.g. a multimedia cabinet) exists. The students are brought together via internet in a virtual seminar room at the same time. The virtual seminar room is a communication platform for teachers and students of all three universities. This could be for instance an internet surface. Here students listen together to lectures, take part in seminars and working groups and can access further information e.g. about the curriculum, the teachers or literature. Virtual teaching can consist of three parts (*see figure 10*):

### Real time modules:

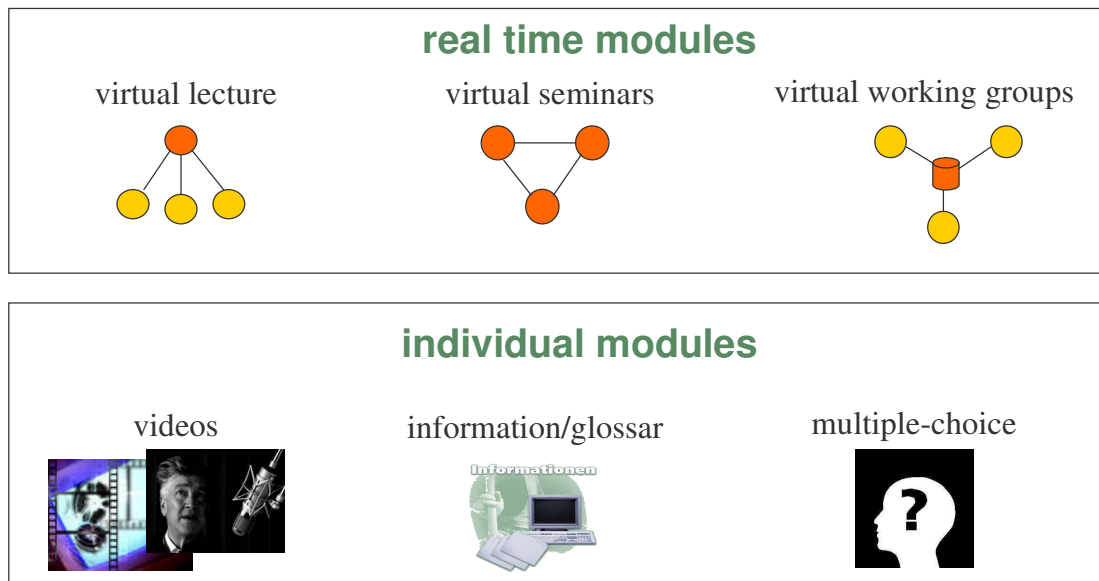
- Virtual lecture: a teacher holds a lecture which can be transmitted to different sites at the same time. Ideally, an unlimited number of participants can take part, in an extreme case the lecture can be watched as a video later on – if the lecture is archived. The focus of this part is clearly on consumption not on interaction.
- Virtual seminar: Here, the focus is on interaction i.e. exchanging contributions in the form of audio and video data between different sites which co-operate in the seminar.

- Virtual teams: Here, students in theme specific groups co-operate by interacting, communicating and coordinating based upon internet media.

Individual modules:

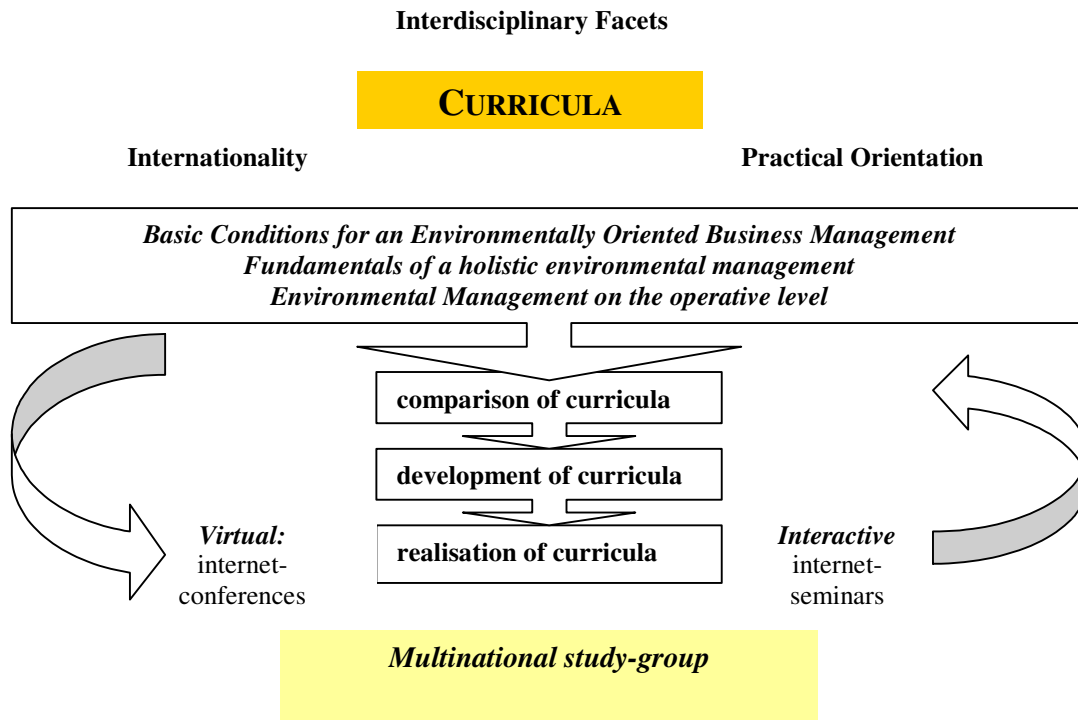
- Interviews with representatives of firms, environmental authorities, selected environmental NGOs and foundations;
- a glossary defining important terms and further going information;
- Multiple-choice-questions for deepening the knowledge.

**Figure 10: Structure of virtual tools**



Since 4 years, interactive seminars between International Graduate School Zittau and two other universities in Germany are executed, consisting of multinational study groups, as each participating university encourages exchange students to take part in the programme. So the chair of General Business Administration has a lot of know-how and experiences to transfer them and to start new cooperation. The idea of the realisation on further know-how-transfer based on a virtual and interactive platform is shown in the following work procedures:

**Figure 11: Structure of virtual tools**



## References

- [1] Euroregion Nisa (Ed.) (2000): Euroregion Neisse-Nisa-Nysa, CD-ROM, Liberec.
- [2] Meadows, D./Meadows, D. (1973): Die Grenzen des Wachstums. Bericht des Club of Rome zur Lage der Menschheit, Hamburg.
- [3] World Commission on Environment and Development (Ed.) (1987): Our Common Future, Oxford.
- [4] UNEP (Ed.) (1992): Agenda 21, available: <http://www.unep.org/Documents/Default.asp?DocumentID=52> (Stand: 08.07.2003).
- [5] UNESCO/International Association of Universities (Ed.) (1993): Copernicus-Charter, available: [http://www.unesco.org/iau/tfsd\\_copernicus.html](http://www.unesco.org/iau/tfsd_copernicus.html) (Stand: 08.07.2003).
- [6] Kuckartz, U./Grunenberg, H. (2002): Umweltbewusstsein in Deutschland 2002, available: <http://www.umweltbewusstsein.de> (Stand: 08.07.2003).
- [7] <http://www.hhl.de/kumwelt/> (Stand: 08.07.2003).
- [8] Nowicki, M. (2000): Umweltschutz in der Polnischen Industrie im Wandel, Umweltwirtschaftsforum, Heft 1/2000, S. 11-15.
- [9] Stippowitz, A. (1998): Lokale Agenda 21 – Implikationen für die Umweltbildung, in: Stippowitz, A./Seeber, G./Marz, F. (Ed.): Umweltbildung in Theorie und Praxis, Landau.
- [10] Birkmann, J./Gleisenstein, J. (1997): Nachhaltigkeit – Herausforderung für die Hochschule, in: Birkmann, J. et al. (Ed.): Nachhaltigkeit und Hochschulentwicklung, Projekte auf dem Weg der Agenda 21, Dortmund.

- [11] UBA (Ed.) (1992): Studienführer Umweltschutz, 5th Ed., Berlin.
- [12] Studienführer: Z Matura i Bez Matury 1998/99, Informator o szkołach wyższych i policealnych na rok akademicki 1998/99, Verlag TELBIT, Warszawa.
- [13] Skuhrová, S./Kořínek, Z. (1998): Jak na Vysokou Školu, Fortuna, Praha.
- [14] Dlouhý, J./Dlouhá, J. (1996): Přehled výuky problematiky životního prostředí na vysokých školách v České republice, Kleinwächter, Frydek-Místek.
- [15] Sucharda, J./Kramer, M. (2000): Umweltbildung an tschechischen Hochschulen, unveröffentlichter Teilbericht der empirischen Analyse, Universitäre Umweltbildung in Deutschland, Polen und Tschechien, IHI Zittau.
- [16] Juskiewicz, A. (1997): Kształcenie specjalistów ochrony środowiska na studiach uniwersyteckich, in: Problemy ekologiczne, Nr. 3/97.
- [17] Kantowicz, E./Lonc, E. (1999): Professional perspectives for graduates of environmental studies in Poland, in: 5th Conference on Environmental Education Zurich, AUDES.
- [18] Górka, K. (1996): Umweltökonomik in der Lehre; an der Konferenz zum Thema: Wirtschaft, Raum, Umwelt, Lublin.
- [19] Rheinländer, K./Kramer, M. (2000): Integration auf dem Weg – Umweltorientierte Studieninhalte in den Wirtschaftswissenschaften an deutschen Hochschulen, in: Ökologisches Wirtschaften, Heft 6/2000, S. 8-9.
- [20] Kramer, M./Brauweiler, J. (2000): Strukturen und Aspekte eines Modellansatzes Internationales und interdisziplinäres Umweltmanagement in Zukunftsmärkten, in: Hauber, R./Schwöbel, H.-P. (Ed.): Umweltschutz in der verwaltungswissenschaftlichen Ausbildung, Schriftenreihe der Fachhochschule des Bundes für öffentliche Verwaltung 35, Brühl/Rheinland.
- [21] <http://www.ihl-zittau.de/bwl/projekte/projekte.html> (Stand: 08.07.2003).
- [22] Brauweiler, J./Urbaniec, M. (2002): Environmental education and international know-how-transfer between universities - results from a pilot project in co-operation with German, Polish and Czech universities, in: Proceedings on CD-ROM: Conference Engineering Education in Sustainable Development, TU Delft (ed.), DELFT, 2002, pp. 381-384.
- [23] Urbaniec, M./Krivanek, T./Brauweiler, J./Kramer, M. (2003): The state of environmental education in Polish and Czech universities, in: Int. J. Environment and Sustainable Development, Vol. 2, No. 1, pp. 100-119.
- [24] Rheinländer, K./Kramer, M.: Green Curricula? An analysis of environmentally oriented curricula in economics and business administration at German institutions of higher education, in: Environment and Sustainable Development, appears at the end of 2003.

**Appendix 1: Schematische Übersicht über das Gesamtkonzept der Studienrichtung „Internationales Umweltmanagement“**

<p><b>Internationales Umweltmanagement - Band I</b> <i>Interdisziplinäre Rahmenbedingungen einer umweltorientierten Unternehmensführung im deutsch-polnisch-tschechischen Vergleich</i></p>	<p><b>Internationales Umweltmanagement - Band II</b> <i>Umweltmanagementinstrumente und -systeme mit besonderer Relevanz für Deutschland, Polen und die Tschechische Republik</i></p>	<p><b>Internationales Umweltmanagement - Band III</b> <i>Operatives Umweltmanagement im internationalen und interdisziplinären Kontext</i></p>
<p><b>Ökologische, ökonomische und soziale Dimension der umweltorientierten Unternehmensführung</b></p> <ul style="list-style-type: none"> <li>- Umweltsystemwissenschaftliche Grundlagen (Unternehmensumfeld/Modelleinsatz/Umweltmedien: Atmosphäre, Boden, Wasser, Biosphäre/Eingriffe in Geoökosysteme)</li> <li>- Komplexität des ökologischen und ökonomischen Handelns</li> <li>- Unternehmensziel und ökologische Herausforderung (Umwelt als Engpassfaktor/Herausforderung einer nachhaltigen Entwicklung)</li> <li>- Rolle strategischer Anspruchsgruppen für eine Unternehmensführung im Sinne einer nachhaltigen Entwicklung</li> </ul> <p><b>Integration der ökologischen Ansprüche in betriebliche Entscheidungsprozesse im internationalen und europäischen Vergleich, insbesondere im Vergleich zwischen Deutschland, Polen und der Tschechischen Republik</b></p> <ul style="list-style-type: none"> <li>- Umweltbewusstsein und -verhalten</li> <li>- Umweltbildung und -information</li> <li>- Einfluss von Nichtregierungsorganisationen auf unternehmerische Entscheidungen</li> <li>- Staatliche Organisationsstrukturen des Umweltschutzes</li> <li>- Relevanz der Umweltpolitik für die Wirtschaft (umweltpolitische Zielstellungen, Prinzipien und Instrumente)</li> <li>- Relevanz des Umweltrechts für die Wirtschaft (Umweltvölkerrecht, allgemeines Umweltrecht, spezielles Umweltrecht (Immissionsschutzrecht, Gewässerschutzrecht, Kreislaufwirtschafts- und Abfallrecht, Naturschutzrecht, Bodenschutzrecht, Gefahrstoffrecht, Umweltinformationsrecht, UVP, Öko-Audit-VO)</li> </ul>	<p><b>Instrumente zur Analyse der Umweltwirkungen von Unternehmen</b></p> <ul style="list-style-type: none"> <li>- Checklisten und Input-Output-Analyse</li> <li>- Umsetzung betrieblicher Umwelt-Audits</li> <li>- Umweltverträglichkeitsprüfung</li> <li>- Umweltinformationssysteme im internationalen Maßstab</li> <li>- Betriebliche Umweltinformationssysteme</li> <li>- Umweltanalytik</li> </ul> <p><b>Konzepte eines ganzheitlichen Umweltmanagements</b></p> <ul style="list-style-type: none"> <li>- Kennzeichen von Umweltmanagementsystemen</li> <li>- Anforderungen von EMAS-VO und ISO 14001</li> <li>- Effizienzwirkungen von Umweltmanagementsystemen</li> </ul> <p><b>Umweltmanagement in Polen und der Tschechischen Republik</b></p> <ul style="list-style-type: none"> <li>- Global Environmental Survey (GEMS)</li> <li>- Anwendungsstand von EMAS und ISO 14001</li> <li>- Cleaner-Production-Concept</li> </ul> <p><b>Weitere Aspekte von Managementsystemen</b></p> <ul style="list-style-type: none"> <li>- Integration von Managementsystemen (Qualitäts- und Arbeitssicherheitsmanagement)</li> <li>- Risikomanagement</li> </ul> <p><b>Integration von umweltorientierten Anforderungen auf normativer Ebene</b></p> <ul style="list-style-type: none"> <li>- Eigenschaften und Funktionen von Zielsetzungen</li> <li>- Herkunft und Elemente von Zielen</li> <li>- Zielformulierung</li> <li>- Operationalisierung von Umweltzielen in Unternehmen</li> </ul>	<p><b>Umweltfreundliche Produktgestaltung</b></p> <ul style="list-style-type: none"> <li>- Produktgestalt als (Umwelt-)Instrument</li> <li>- Umweltwirkungen der Produktgestalt</li> <li>- Erzeugnis- und Fertigungsprogramm</li> </ul> <p><b>Umweltorientierte Beschaffung und Logistik</b></p> <ul style="list-style-type: none"> <li>- Auswahl und Bewertung von Lieferanten und Produkten</li> <li>- Standortwahl, Lagerung, Transport, Verpackung, Entsorgungslogistik</li> </ul> <p><b>Umweltorientierte Produktions- und Kreislaufwirtschaft</b></p> <ul style="list-style-type: none"> <li>- Produktionsintegrierter Umweltschutz</li> <li>- Investitions- und Ersatzentscheidungen</li> <li>- Basistechnologien im Umweltbereich und ihre Bewertung</li> <li>- Reduktionswirtschaft</li> </ul> <p><b>Stand der Technik und Innovationspotenziale im internationalen Vergleich</b></p> <ul style="list-style-type: none"> <li>- BAT (Best Available Techniques), Rechtsakte und Prozessinnovation</li> </ul> <p><b>Betriebliches Energiemanagement</b></p> <ul style="list-style-type: none"> <li>- Energieversorgungsmanagement</li> <li>- Energieanwendungsmanagement</li> </ul> <p><b>Luftreinhaltung im Unternehmen</b></p> <ul style="list-style-type: none"> <li>- Bildung und Wirkung von Luftschadstoffen (Verbrennungsprozesse)</li> <li>- Emissionsminderung/Abluftreinigung</li> </ul> <p><b>Betriebliches Wassermanagement</b></p> <ul style="list-style-type: none"> <li>- Integrierte vs. End-of-Pipe-Technologien</li> <li>- Wasseraufbereitung/Abwasserreinigung</li> </ul>

<p><b>Internationales Umweltmanagement - Band I</b>  <i>Interdisziplinäre Rahmenbedingungen einer umweltorientierten Unternehmensführung im deutsch-polnisch-tschechischen Vergleich</i></p>	<p><b>Internationales Umweltmanagement - Band II</b>  <i>Umweltmanagementinstrumente und -systeme mit besonderer Relevanz für Deutschland, Polen und die Tschechische Republik</i></p>	<p><b>Internationales Umweltmanagement - Band III</b>  <i>Operatives Umweltmanagement im internationalen und interdisziplinären Kontext</i></p>
<p><b>Anforderungen an eine umweltorientierte Unternehmensführung</b></p> <ul style="list-style-type: none"> <li>- Umweltschutz als unternehmerische Herausforderung</li> <li>- Kooperativer Umweltschutz</li> <li>- Offensiver umweltorientierter Wirtschaftsstil</li> <li>- Normative, strategische und operative Dimension</li> </ul>	<p><b>Integration von umweltorientierten Anforderungen auf strategischer Ebene</b></p> <ul style="list-style-type: none"> <li>- Voraussetzungen für umweltorientierte Strategien</li> <li>- Unternehmerische Strategiekonzeptionen</li> <li>- Ansatzpunkte der Strategieumsetzung auf operativer Ebene</li> </ul>	<p><b>Betriebliches Stoffstrom- und Abfallmanagement</b></p> <ul style="list-style-type: none"> <li>- Integrierte vs. End-of-Pipe-Technologien</li> <li>- Abfallmengen und -zusammensetzung</li> <li>- Abfallvermeidung, -verwertung und Abfallbeseitigung</li> </ul> <p><b>Boden- und Flächeninanspruchnahme</b></p> <ul style="list-style-type: none"> <li>- Umweltgutachten</li> <li>- Altlasten und verdächtige Standorte</li> <li>- Sicherungs- und Vorsorgemaßnahmen</li> <li>- Altlastensanierungsmaßnahmen</li> </ul> <p><b>Umweltbilanzierung</b></p> <ul style="list-style-type: none"> <li>- Umweltbilanzen in Theorie und Praxis</li> <li>- Stoff- und Energiebilanzierung</li> </ul> <p><b>Umweltkostenrechnung</b></p> <ul style="list-style-type: none"> <li>- Umweltkostenkonzept</li> <li>- Materialkostenreduktion</li> <li>- Plankostenrechnung</li> </ul> <p><b>Umweltcontrolling/Umweltkennzahlensysteme</b></p> <ul style="list-style-type: none"> <li>- Funktionen/Organisation/Systeme</li> </ul> <p><b>Organisation des betrieblichen Umweltschutzes</b></p> <ul style="list-style-type: none"> <li>- Ziele, Aufgaben, Strategien</li> <li>- Fremdorganisation/Selbstorganisation</li> </ul> <p><b>Ökologisch orientierte Personalarbeit</b></p> <ul style="list-style-type: none"> <li>- Personalplanung, -beschaffung, -entwicklung und -führung</li> </ul> <p><b>Ökologieorientiertes Marketing</b></p> <ul style="list-style-type: none"> <li>- Schlüsselfaktoren und Planungsaspekte</li> <li>- Öko-Marketing-Mix</li> </ul>

Quelle: Eigene Darstellung.