

COMPETENCE - Matching competences in higher education and economy:
From competence catalogue to strategy and curriculum development



Manual 3: Developing Competence Catalogues



European Commission
TEMPUS

Impressum:

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Editors: **Bernadette Frech, Claudia Linditsch (FH JOANNEUM)**

Authors: **Bernadette Frech, Doris Kiendl-Wendner, Claudia Linditsch, Rene Wenzel, Josep Juando, Darko Petkovic, Aleksa Vucetic**

Project managers: **Darko Petkovic** (University of Zenica)
Nina Besirevic (World University Service Austria)

Layout: **Edin Prnjavorac** (World University Service Austria)

Photo: All Photos by **Reen West** except on the page 20,21 by **Xavier Häpe**

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Manual on the Development of Competence Catalogues

From Competence Catalogues to Strategy and Curriculum Development



Manual 3:
Developing Competence Catalogues
Phase 5: Developing a Competence Catalogue
Phase 6: Learning Outcome Evaluation
Case Studies: Good Practice Examples on the
Development of Competence Catalogues

The manuals in this series provide insights into the following topics:

Manual 1: Competence Based Thinking

Manual 2: Matching Competences between Higher Education and the Labour Market

MANUAL 3: DEVELOPING COMPETENCE CATALOGUES

Manual 4: Strategy and Curricula Development

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This is the third manual of the Tempus COMPETENCE project aiming at providing guidance to higher education institutions for teaching those competences which are needed by a tight and dynamic labour market. Manual 1 established a common understanding of the term competence. Manual 2 presented research tools on how to assess competences by involving relevant university stakeholders such as students, alumni, professors, and employers. This manual deals with the development of competence catalogues.

A competence catalogue is a management and student service tool for analysing and improving the match between competences gained at universities and those demanded by the labour market. Firstly, degree programme managers illustrate the subjects taught and the competences to be delivered in a matrix. In the matrix, courses and competences are linked. Secondly, courses are defined in terms of learning content, activities, and evaluation procedures to ensure the successful delivery of the respective competences. Case studies exemplify the implementation of the competence catalogues at two Western Balkan universities.

Thus, this manual provides guidance to degree programme managers and teachers to offer a better transparency of the curriculum to society, to improve the coherence and quality of a curriculum, and to support the employability of graduates by translating competences into learning activities and actions.





Phase 5:
Developing a Competence
Catalogue



Within the frame of the management model of teaching - the aim of which is to help the university respond to society's needs - the main reference point are competences, as was stated in the previous manuals of this project.

As pointed out in Manual 1 competences express the higher educational needs of the reference society. With the usage of competences the needs in terms of know-how can be expressed. From this viewpoint, know-how is based on knowledge. In putting this knowledge into practice an understanding of the current educational situation can be gained and the further activities can be conducted in accordance with this knowledge. In essence, when university graduates act within their field of knowledge and apply a competence, the learned knowledge gets applied and used. And through their performance it can also be seen to what extent they know where they are (context), and also how to behave in that context.

This approach, among various interpretations of knowledge, understanding, know-how, knowing where to be or how to be, is the easiest to visualize know-how, which in itself indicates what a person knows, and the qualities that person has. It is for this reason that the team of the University of Girona has opted for the following interpretation of the concept of "competence": know-how which can be visualised and assessed.

THE COMPETENCE CATALOGUE - WHAT IS IT?

Josep Juando

Phase 5

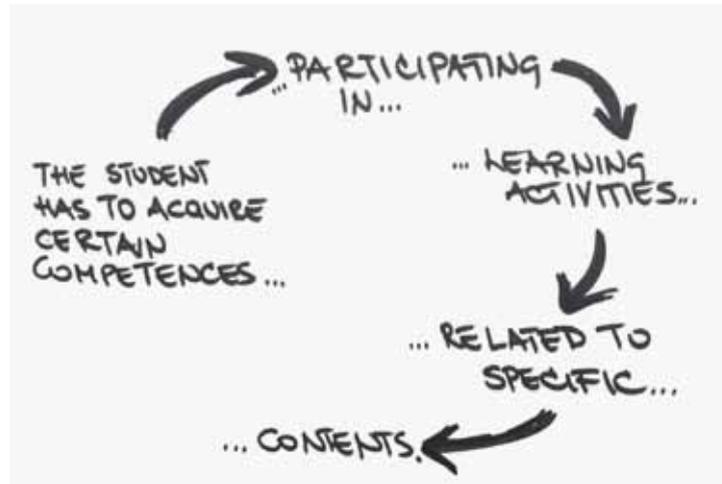
The pedagogical approach suggested leads towards the acquisition of competences, which are understood to be complex and contextualised actions that a society requires university graduates to have and apply.

In short, two fundamental issues should be emphasised:

Competences do not consist of a group of “stuff” that students must learn that is different from the traditional body of knowledge that students learn. The competences are based on and contain this knowledge. (see also Manual 1, page 10)

In general, competences should be directly measurable, and performed in an observable way.

The following graph attempts to illustrate the role of competences in the curriculum:





Two main groups of competences can be identified: the generic competences that are applicable to any field of knowledge and the specific competences that are particular to each field of knowledge. For example:

Generic competences would include:

- To be able to evaluate the sustainability of one's own proposals and actions
- To be able to gather and select information effectively.

Specific competences might include:

- To be able to design control systems and industrial automation (Engineering)
- To be able to evaluate the environmental and landscape quality of an area, while putting the interaction of natural factors and cultural factors in a context (Geography).

From this concept of teaching a list of competences that the university believes that every student should have acquired at the end needs to be developed. Hence, Master degree programmes have for its students an own list of competences, consisting of a set of generic competences and a set of specific ones. The generic competences are the same for different graduate degree courses at a particular university. The specific competences are greater in number than the generic ones, since they will define the actual content and knowledge specific to each graduate of a certain Master degree programme.

A list of generic and specific competences tailored to a certain university programme shall represent the learning goals. The list can be read in different ways:

- It is the profile of the degree programme and of the future graduate;
- It reflects the commitment that the university makes to the society, what it proposes as the result of its teaching;
- It is the guide for all teaching activities within the programme;
- It is the starting and end point of the teaching-learning process. Academic courses, subjects and learning activities will be planned with a focus on the competences and learning outcomes which will be assessed in terms of competences, i.e., the extent to which each student has acquired the proposed competences.



The list of competences must include the generic competences students need to acquire, and the specific ones. Together they will make up the competence profile of the future graduates. Explicitly, the set of competences should contain all knowledge specific to the programme. Furthermore, graduates need to be able to put the acquired competences into action. Thus, approaching teaching based on competences means going beyond knowledge; it means acquiring both the necessary knowledge and the ability to use that knowledge in a specific context.

That is why each university needs to invest some initial time in drawing up the list of competences. When the competences get formulated and identified, the knowledge which comes with the acquisition of the competences needs to respond to the needs of the society.

Implicitly, the list of competences contains the assessment criteria. Every competence needs to be formulated in assessable terms. University professors who plan working on competences in the classroom have a tool which makes the assessment of competences easier. To act otherwise would run the risk of formulating competences that “float” above the curriculum like mere decoration.

Delivering competences to learning goals starts with a list of competences. Attaining these learning goals is a challenge for students. Consequently, the professors need to transport these competences through their lectures. The main objective is to enable students to acquire the competences that the university intends to deliver through the curriculum.

Translating competences into learning activities is a complex and yet simple process. It is complex because there are many steps involved. Still, it is simple, as long as the process is conducted in a proper way. Transporting competences into classrooms is carried out in two levels: overall programme design and individual subject design, of which each in turn contains several steps.

The overall programme design consists of formulating the competences and then analysing each competence with the aim of breaking it down into different levels of complexity or into components. On the next page there is one example of a generic and one example of a specific competence being broken down into components:

Example 1: Breakdown of the generic competence “teamwork” into levels of complexity:

Complexity Level 1: Working in teams and assessing the processes that are established and the roles which evolve with the help of an external guide.

Complexity Level 2: Working in teams (including multidisciplinary teams) and assessing the processes that are established and the roles that evolve, independently, and exercising those roles (including leadership), while incorporating modifications resulting from shared reflection.

Complexity Level 3: Teamwork leadership (including teams that are multidisciplinary and/or in international environments) and assessing the processes that are established and the roles that evolve, while incorporating modifications resulting from shared reflection.



Example 2: Breakdown of the specific competence “designing and regulating areas of learning in contexts of diversity which address gender equality, equity and respect for human rights that conform with the values of citizenship education” into levels of complexity

Component 1: Analysing the basic principles of healthy development and behaviour.

Component 2: Identifying disorders, deficiencies and difficulties that hinder the welfare of children and their satisfactory physical and psychological development.

Component 3: Using resources to promote the educational integration of students with special educational needs.

Component 4: Recognizing and analysing specific educational needs and personal, social and cultural diversity.

Component 5: Using games as a teaching resource for learning general knowledge and citizenship values, and as a strategy for addressing diversity.

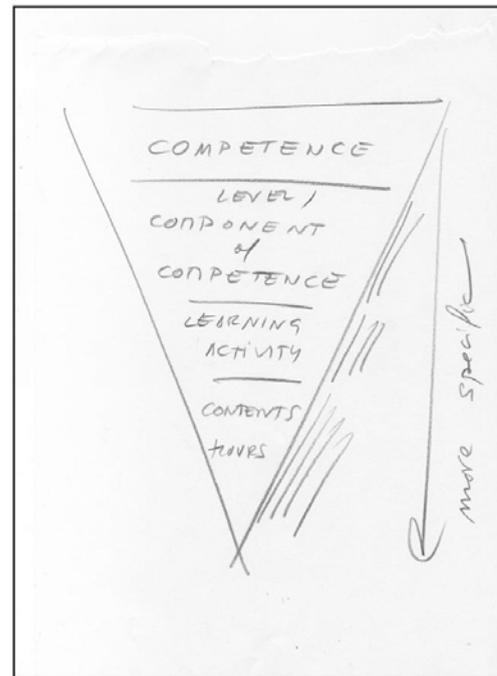
Subsequently, a decision must be taken on which specific subject areas of a curriculum will deal with each component of each competence. An interesting option at this time - which makes a curriculum more integrated and transversal - is to link each competence to more than one subject area and to different times during the curriculum. A grid such as the one in the illustration below can be used for this purpose:

Degree: _____

Competences related to the degree	C1	C2	C3	C4	C5		CN
Subjects of the degree ↓ →							
A1	X		X			X	
A2		X	X		X		
A3		X		X			
	X		X		X		X
AN		X		X		X	

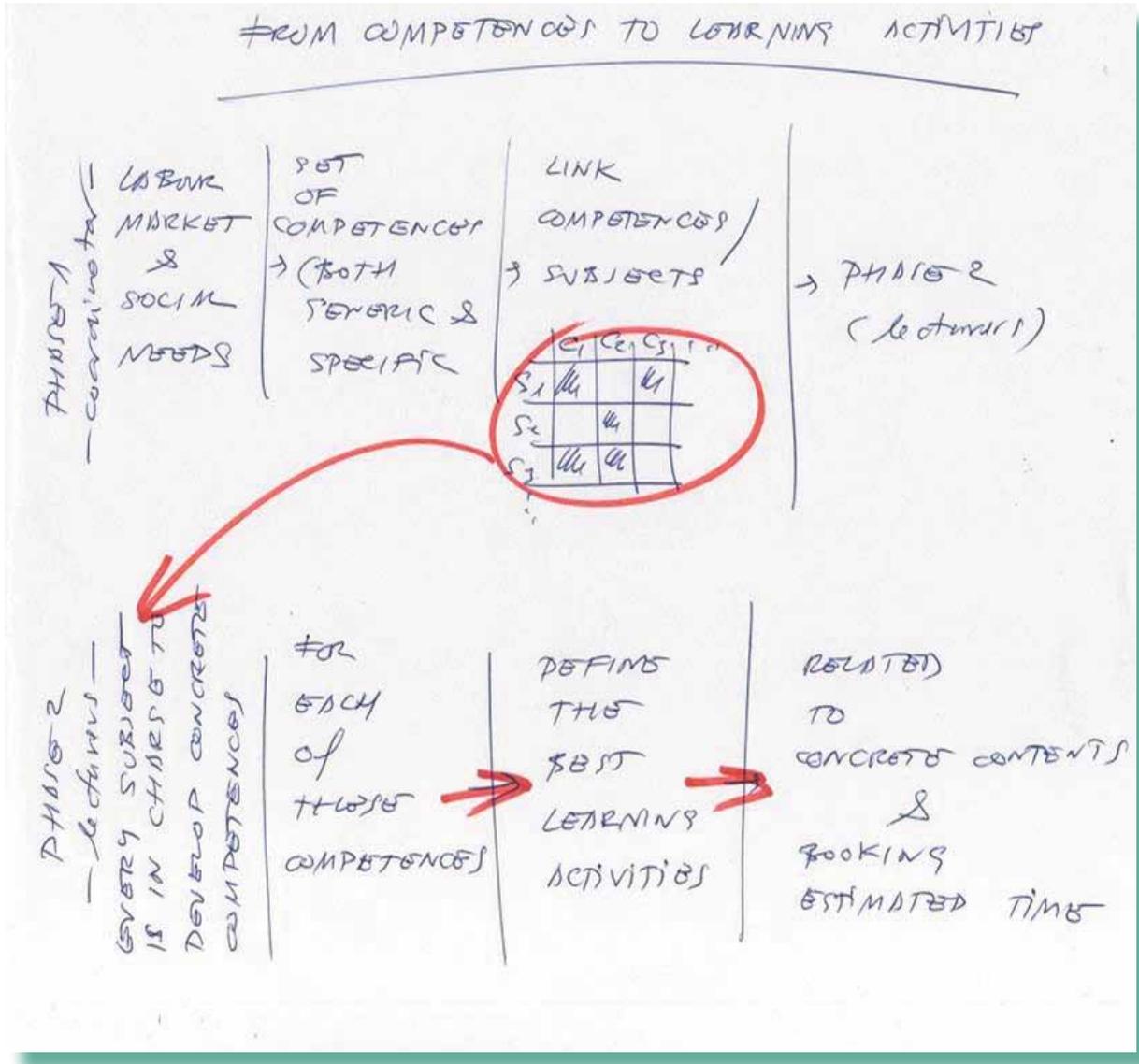
The planning process for each subject can be initiated. First, each subject has assigned to it the work required to achieve a certain competence. Second, it is the job of each university professor to devise learning activities which are based on the specific contents of the course. The teaching strategies and didactics need to be applied in such a way that every activity which is done with the students - whether it is an expository class, a practical, a reading assignment or any other type of exercise - is geared towards one of the competences that has to be developed. Further a collaboration among professors of a degree programme is essential to guarantee the acquisition of the competences and to improve the coherence of the overall programme.

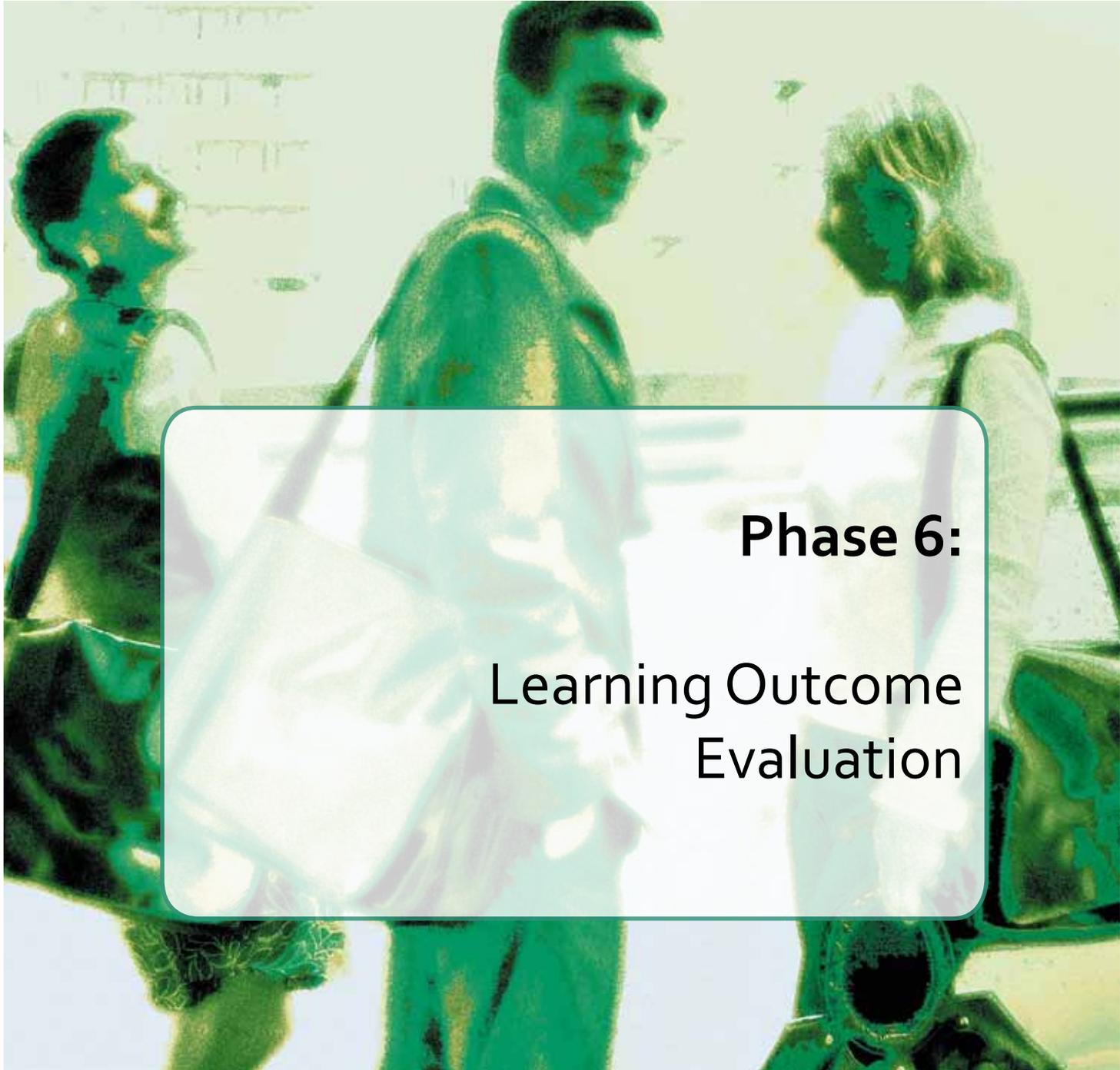
A teaching management computer programme can help to organize and visualize the processes and outcomes that can eventually be expressed in terms of subjects and competences. The following diagram illustrates the process of transporting the competences into the classroom, ending specifically with the content and the time spent on it.



FLOWCHART ABOUT THE DEVELOPMENT OF A COMPETENCE CATALOGUE

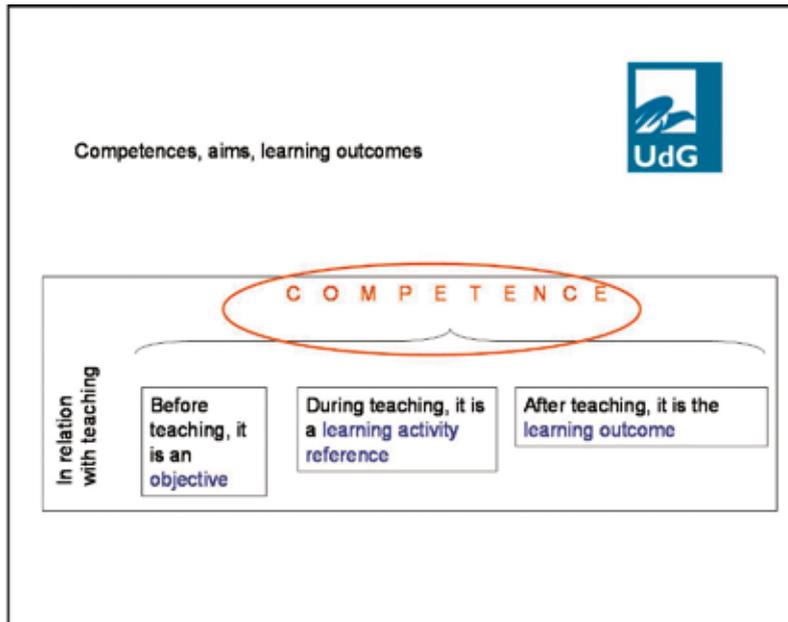
Phase 5





Phase 6:

**Learning Outcome
Evaluation**



In the presented competence based teaching model, the goal of learning consists of the acquisition of generic and specific competences. Competences are also the main reference point for the assessment. In other words, it is aimed that students acquire competences and that these are subsequently assessed by the teachers according to the degree of attainment. One of the objectives of a good competence based teaching model must be that it is simple to use and that it fosters coherence. Learning outcomes are simply the levels of competence acquired by students.

Competence is a permanent reference in education. Before the process of teaching and learning begins, the definition of the competences is the goal. During the process, competences are the reference point for each learning activity and the assessment. After the process, the learning outcome is the extent to which the competence is acquired.

Learning outcome evaluation forms a central part in a competence based learning model. The assessment of the extent to which competences have been delivered to a student is based on four premises:



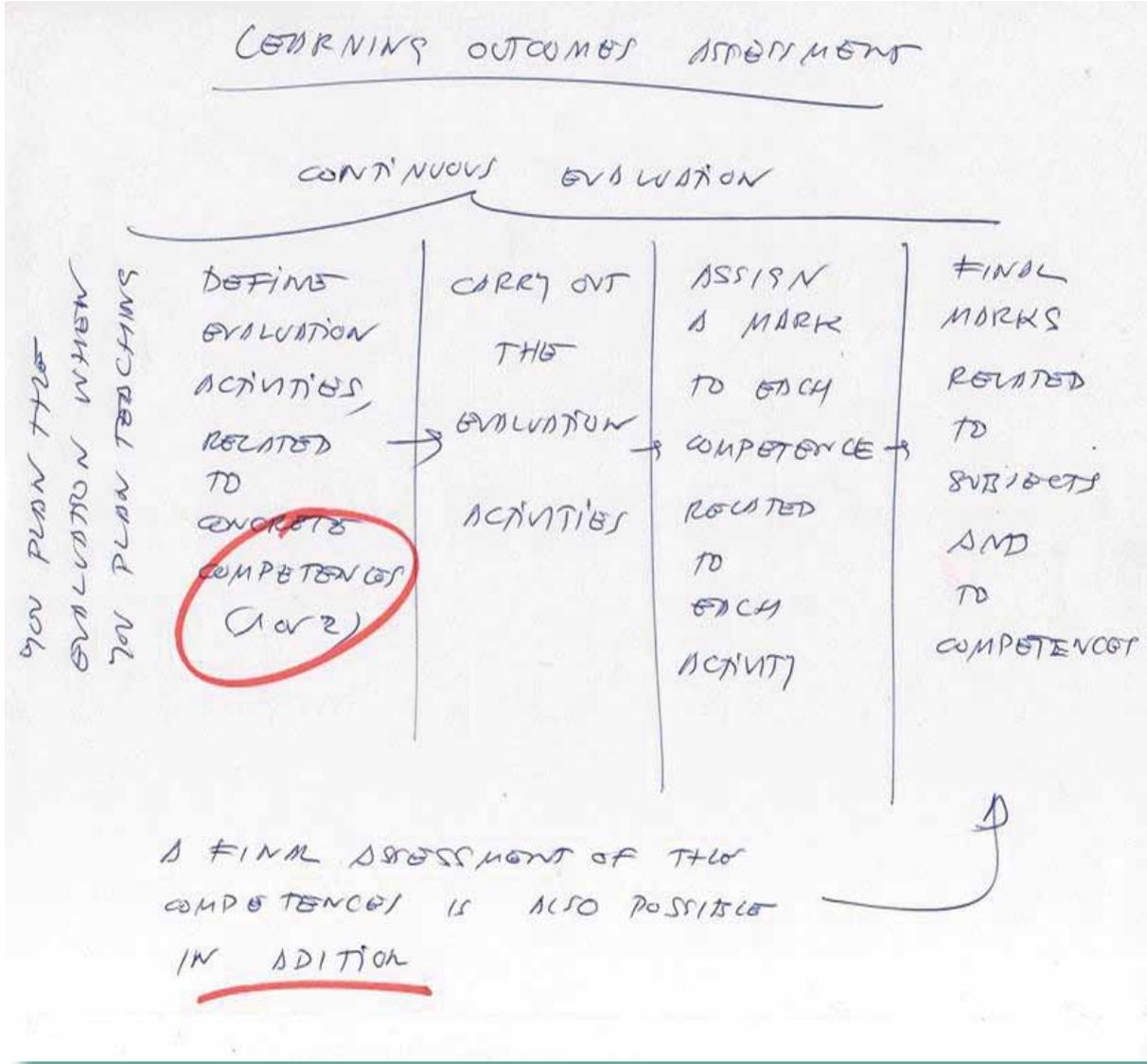
- 1. Assessment must be planned.** At the same time the teaching plan gets developed, the assessment must be planned.
- 2. Any learning activity can also be an assessment activity.** Teachers consider the best learning activities which can be offered to students in order to support them in the development of competences. Having decided which activities to use, some of them can be chosen to be assessment activities as well. In this way, it is ensured that a clear link between assessment and competence is established, while also being consistent with the concept of continuous evaluation.
- 3. Specific assessment activities can also be included.** If the planned assessment deems insufficient, then an activity especially designed for assessment can be introduced in order to minimize the occurred doubts.
- 4. In addition to any continuous assessment, a final assessment of acquisition of the competences can be planned.** At the end of each term it may be desirable to verify whether the competences have been delivered successfully to students in a way that they are able to use them in practice. This type of assessment is a powerful tool for assessing the quality of the teaching-learning process.

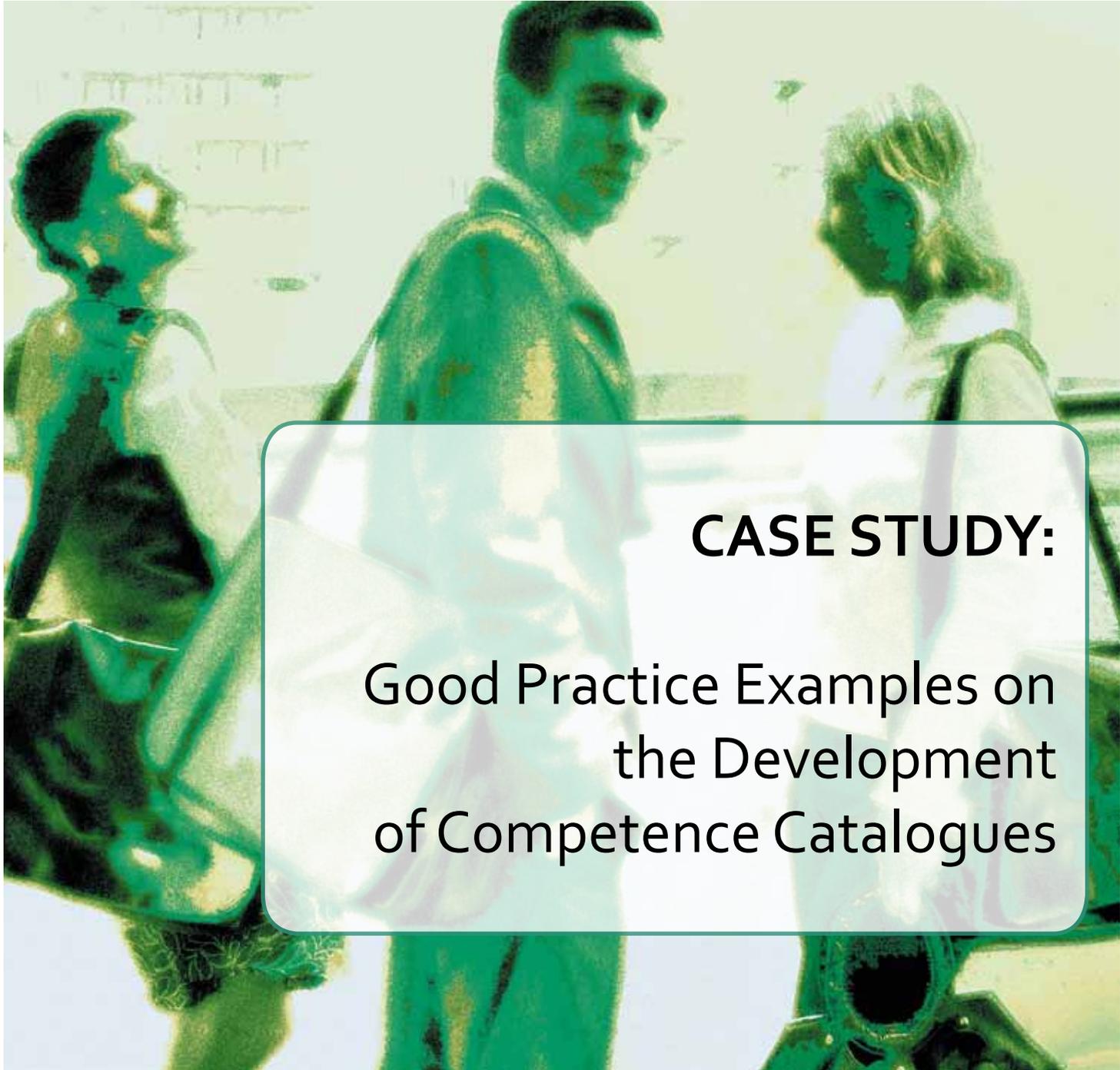
On the basis that a competence based curriculum is built in which each learning and assessment activity is linked to specific competences, an automatic computer management tool can assist in providing indicators regarding subjects and competences (i.e., grades for each subject and grades for each competence).

It needs to be pointed out how important the grades for competences (learning outcomes related to each competence) will be when the time comes to granting the European Diploma Supplement. This expression of results is how the university returns information to society. By beginning the planning process of the curriculum, the university accepts a commitment to society in the sense that its graduates will acquire certain competences. Once students graduate, it is only right to illustrate the extent to which this commitment has been fulfilled.

FLOWCHART ABOUT THE LEARNING OUTCOME EVALUATION

Phase 6





CASE STUDY:

Good Practice Examples on
the Development
of Competence Catalogues

In the frame of the Tempus COMPETENCE project a survey was undertaken to assess the gap between labour-market needs and educational offers. The objective was to detect the relevance and proficiency of alumni regarding specific and generic competences delivered by an educational programme. Therefore, both graduates and employers from eight selected study programmes in Bosnia and Herzegovina, Macedonia, Montenegro, and Serbia have been interviewed to collect data about competences that graduates have gathered during their studies. Further data about the competences demanded and required by the industries addressed in the respective degree programmes got collected. The results of the survey form the basis for the competence matrix as it shows which competences need to be addressed in the curricula.

The questionnaire was filled out by 368 alumni and employers. Table 1 shows the distribution of the respondents (alumni and employers) per degree programme.

		Alumni	Employers
Macedonia	Ind.Eng.&Management (IEM)	25	14
	Postgraduate IEM	18	17
Montenegro	Hotel Management	15	16
	Tourism	16	23
Serbia	Ceramic Engineering	16	10
	Psychology	35	32
Bosnia and Herzegovina	Economics	30	30
	Mechanical Engineering	41	30
Total		196	172

The data of the competence survey illustrates the importance of competence-based curricula development in institutions of higher education. As the competence requirements for graduates are dynamic, effective feedback systems from the industry and alumni are indispensable for adjusting curricula and to better meet the needs of society and industry. The results show that the eight participating degree programmes are performing relatively well in teaching competences that are demanded by the industry. Almost every alumnus is telling that during their study time they have acquired specific as well as generic competences to fulfil the tasks in their jobs. Still, the usefulness of generic competences seems to be more prevalent than of specific competences in the alumni and employer survey. The majority of the responding alumni feels competent in all of the generic competences. Similarly, in the employer survey generic competences are perceived positive, however they are rated slightly lower than in the alumni survey.

Analysis suggests that internships, work placements and extra-curricular activities were useful for graduates of six out of eight degree programmes. Thus, data suggest that the project partner institutions are performing well, but also that there is space for improvement to reach the objective of offering excellence in teaching for their students. The competence matrix is a tool to implement the evaluation results of this survey.

The full survey report can be found on the project's website under Downloads:
<http://www.link-competences.org/index.php#downloads>



CASE STUDY: HOW TO IMPLEMENT THE COMPETENCE STUDY AT THE UNIVERSITY OF ZENICA

Darko Petkovic

Case Study

Rapid technology changes and the development of European markets raised a number of requirements to the educational systems of each member of the European Union, as well as to systems in countries wishing to join the European family, including partner countries in the project COMPETENCE. Within the first requirements of the European Union is a systematic evaluation of education and training in each country and its comparison to other the educational systems, based on a common European framework of reference.

The issue of competences of graduates at the universities of South-Eastern Europe (SEE) was never explicitly dealt with as such. The question remains whether the competences are expressed as the acquired knowledge and skills, or they were just the result of coincidence or of designed and implemented curricula at universities. A number of analysis show that higher education in universities of SEE region has a solid tradition. Competences consistent with the general model had a universal character in the academic world.

At the time of realization of the Tempus project COMPETENCE, which is jointly managed by the University of Zenica and WUS Austria, major changes occurred in the educational process of higher education institutions in SEE partners in the project: Bosnia and Herzegovina, Macedonia, Montenegro, and Serbia. Changes made by the Bologna process require in many ways a proactive response of already established universities in Western Europe too: FH JOANNEUM, KaHo Sint-Lieven and University of Girona (Austria, Belgium and Spain).

The importance of competences is more than ever emphasised. In this sense, more or less all universities in Europe are in the initial phase of setting up and developing models to define, monitor, achieve, or redefine the management of competences. If the first decade of the Bologna Process since 2000 was a decade of establishment and development of quality management systems in higher education, it is certain that the next decades will be dedicated to research and systematic establishment of monitoring and evaluation of competences. In this sense, the Tempus project has undoubtedly enormous significance for all project partners, and certainly beyond the educational systems in each of the participating countries.

CASE STUDY: HOW TO IMPLEMENT THE COMPETENCE STUDY AT THE UNIVERSITY OF ZENICA

Darko Petkovic

Case Study

In the second project year we encountered very important challenges for further work. Behind us is a very comprehensively elaborated material of the colleagues from FH JOANNEUM, Graz, on more than 270 pages that included an active approach to research competences in 8 alumni programs with the University of Zenica, Novi Sad, Podgorica and Skopje, and employers in respective countries. These results provide numerous opportunities for further analysis and improvement which these universities can use in their work (for example, to identify specific instances of overlapping competences, a lack of a number of generic competences, etc.). It is indicated also in the conclusions of the study that hardly enough attention has previously been paid to the issue of acquiring and building competences. Connections with the university environment have always been present and now they are more necessary than ever. The first result of the project is the already started systematic consideration of the organization and monitoring of competences in 8 faculties. The outcome should be spread in the next stage to other faculties from each university (teachers and students beyond the observed study departments, other alumni, employers and others from a wide range of stakeholders).

Issues of competence, at the time of realization of this project, have been initially covered by the documents that are extremely important for the educational system of each country, such as national qualification frameworks. In this sense, there was a document entitled "Basic Qualifications Framework in Bosnia and Herzegovina (B&H)", which is based on the educational tradition and the present state of education in B&H, and the needs of economic development, individual and of society as a whole, taking into account the guidelines of the European Qualifications framework and the relevant European and international regulations. The core of the European Qualifications Framework is composed of eight common reference levels that classify knowledge, skills and competences as learning outcomes achieved. These eight generic levels of qualifications framework are encompassing all levels and types of education and work, as a mean of recognizing, understanding and comparing qualifications within the countries of the European Union.



CASE STUDY: HOW TO IMPLEMENT THE COMPETENCE STUDY AT THE UNIVERSITY OF ZENICA

Darko Petkovic

Case Study

The framework for higher education in B&H is based on the qualifications framework of the European Higher Education Area. It provides generic descriptors of learning outcomes for the three cycles of higher education, and in the current reform projects its elaboration is supposed. In this regard, and in the subsequent phases of the Tempus project COMEPTENCE, it is extremely important to continue the systematic research and editing elements that are essential for the full validity of this project. In order to get unified views, it is important to give some widely accepted definitions of terms that will be more likely than others to appear during continuation of work on the project, which is part of a general European Qualification Framework:

- **Qualification** means the formal name for the result of a process of assessment and validation, which is obtained when a competent body determines that an individual has achieved learning outcomes to the standards laid down.
- **Learning outcomes** are statements of what learning pupil / student / person knows, understands and can perform, based on the completion of the learning process, defined by knowledge, skill and competence.
- **Knowledge** means the result of the adoption of information through the learning process. Knowledge is a set of facts, principles, theories and practices related to area of work or study. In the context of the European Qualifications Framework for lifelong learning knowledge is described as theoretical and / or factual.
- **Skills** are the ability to apply knowledge and use the principle of “know how” to perform a specific task and to solve the problem. In the context of the European Qualifications Framework, skills are defined as cognitive (involving the use of logical, intuitive and creative thinking), practical (including physical skill and use of methods, materials, devices and instruments) and social skills (communication and cooperation skills, emotional intelligence and other).



- **Competence** means the ability to apply knowledge, skills and personal, social and methodological skills in the workplace or during learning, as well as in personal and professional development. In the context of the European Qualifications Framework competences are described as responsibility and independence.

It is necessary to continue to build a system of evaluation and recognition of competences that will develop higher education institutions in accordance with their organizational and other needs. The first priority must be the better relationship of the academic and the business world through a more intense form of involvement in the work of university stakeholders forum, the forum / association of alumni, employers and other stakeholders. Further, the competences should become an integral part of the thinking of every teacher in the creation of new or re-engineering of existing curricula.

An objective problem of higher education organizations is how to monitor and improve the competence of students, graduates and their staff. How to evaluate competences, for example by making exams in 30-60 courses / modules and how to prevent the formation of the matrix „gaps“ that can result from “lack or absence of” some specific or generic competences that “should objectively be achieved”? How to solve a very pragmatic question: Enumerating all the competences that someone gets when passing for example 40 exams and gains on each 3-4 specific and 3-4 generic competences? How to place these “hundreds of competences” in the Diploma Supplement, which has only 3-4 pages? Who will administer the high level of new assignments which will appear in every university?

These are the many questions and doubts to which the next project phase should provide answers to. Surely, already mentioned, made and discussed analysis of cases (with

CASE STUDY: HOW TO IMPLEMENT THE COMPETENCE STUDY AT THE UNIVERSITY OF ZENICA

Darko Petkovic

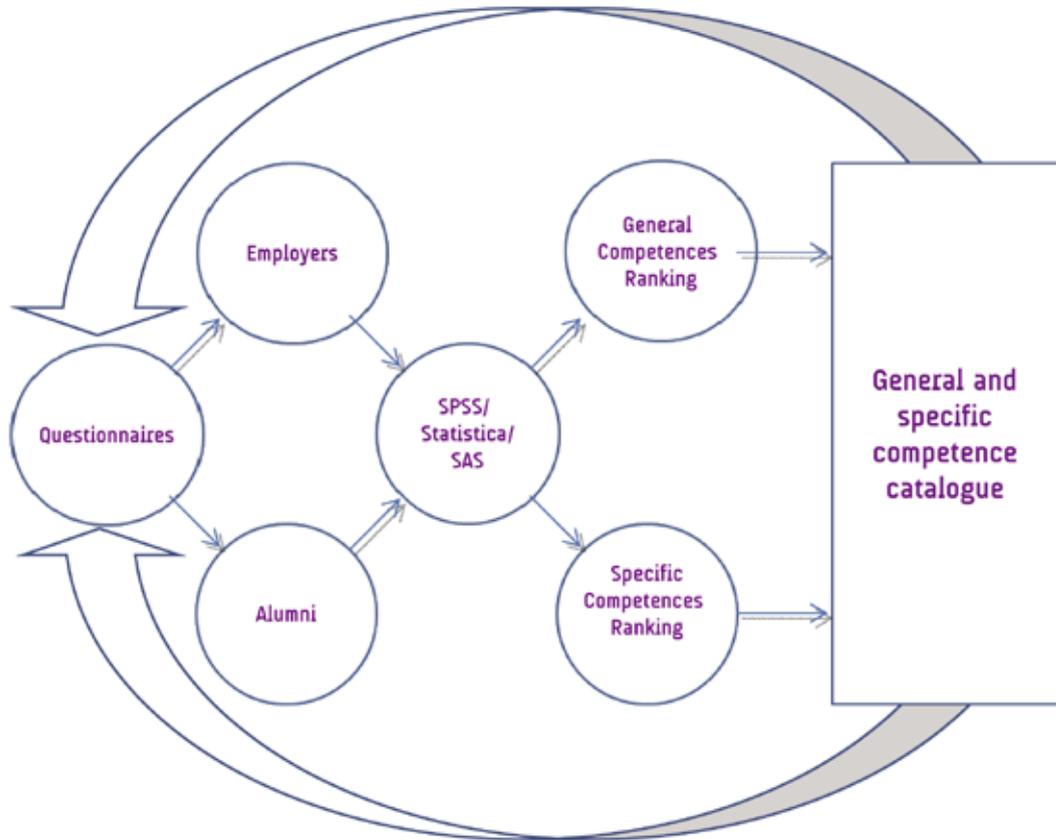
Case Study

FH JOANNEUM Graz), with 8 academic departments, is a good template to create catalogues of competences for each study department. It is necessary to ensure that competences are actual in accordance with time, to suit the needs of the market and are in accordance with international standards. Furthermore it is essential to build mechanisms for quality assurance, which include instruments and systems to define internal and external evaluation. These should eliminate unacceptable differences in general quality, now present in various universities.



After the survey was conducted on SEE universities, it was necessary to process the data from the employer and alumni questionnaires with a statistical software such as SPSS, STATISTICA or SAS. The statistical data generated information about the extent to which general and specific competences have been delivered in our degree programmes. It became evident which kind of general and specific competences students lack, although they should possess them. Further the data analysis gave information about what kind of general and specific student competences are not so important for their professional development and career. Obtained statistical data helped degree programme chairs to rank competences by their significance for every profession. Besides, it was necessary to list a group of behavioral indicators for each competence, defined as concrete knowledge, skills and abilities for every profession. The establishment of this list was a continuous process, in which each general and specific competence was assessed regarding its labour market relevance. It deemed of high relevance to introduce these feedback control circles of all previous activities in this process for a sound development of our competence catalogue. In the course of time, significance of certain general competences may change. Some new general and specific competences might become increasingly important while other loose in relevance leading to changes in the operative competence catalog. These actions are strongly dependent on the pace of development within the economy sector and on the pace of development of the higher education systems.

The competence catalogue developed at the University of Montenegro can be graphically presented in the following manner:





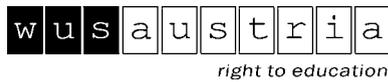
University of Zenica (BA)



University of Girona (ES)



WUS Austria (AT)



University of Novi Sad (RS)



FH JOANNEUM
University of Applied Sciences (AT)



University of Montenegro (ME)



Catholic University College Ghent (BE)



University Ss. Cyril and Methodius (MK)





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