



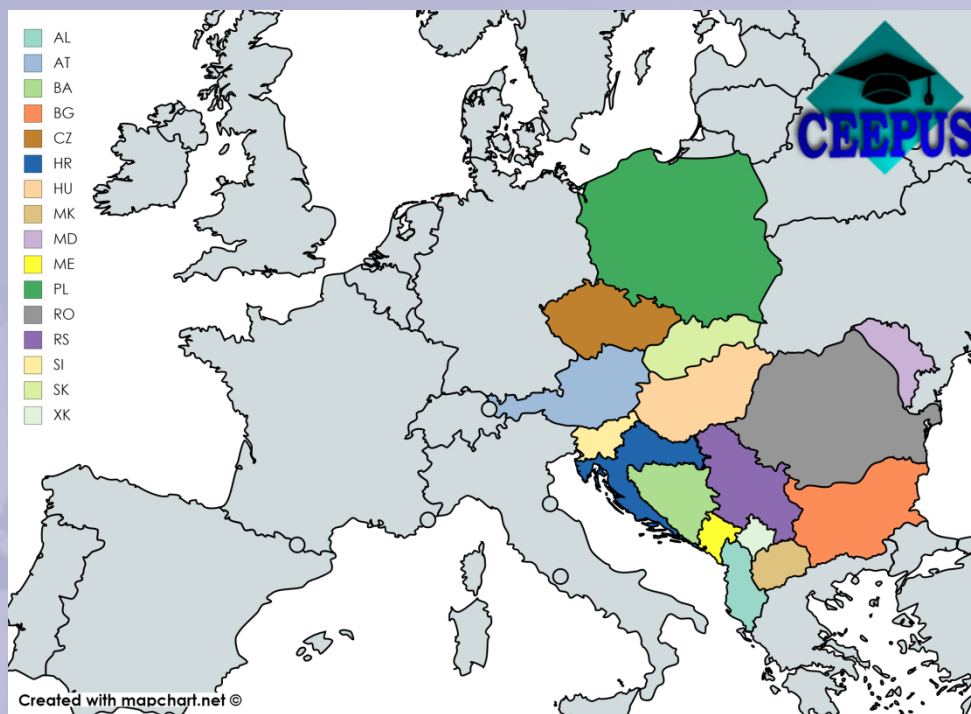
Impact of University Networking on Students' Mobility and Motivation

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Observations and research on the students' mobility and motivation in the region on Central and Eastern Europe based on the case study of a CEEPUS (Central European Exchange Program for University Studies) network.

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CEEPUS NETWORK CIII-BG-1103-03-1819: Modelling, Simulation and Computer-aided Design in Engineering and Management

- Started in 2016/2017 with 12 partners from 8 countries
- Currently in third year
- Funded for 2019/2020
- 32 partners HEIs from 15 countries
- Web site: <https://ceepusmodcad.ubt-uni.net>

Identification of students interests and requirements for increasing motivation – paper outline

1. Evaluation of students' motivation at the start of the network
2. Results from the study on students' motivation
3. Intensive study programs in the CEEPUS network
4. Joint programs in the CEEPUS network
 - A. Joint Flexible course on Modelling, simulation and Computer-aided design in Engineering and Management
 - B. Joint program “Thèse en cotutelle” on Modelling, simulation and Computer-aided design in Engineering and Management
5. CEEPUS Leadership Academia for Students
6. Impact on students' motivation and further challenges

1. Evaluation of students' motivation at the start of the new CEEPUS network

The focus was given to the students and their motivation to participate in network activities.

At the Kick-off meeting in Technical University-Sofia, Bulgaria, in October 2016, all partner institutions sent representatives.

A study on students' interests was launched.

Step 1. All teachers filled a form with courses, tools and tutorials that they offer, in 5 categories:

- **Mathematical and/or theoretical method, he/she can teach**
- **Software Tools and/or Hardware equipment and/or Measurement instrumentation**
- **Vision on the future development in some scientific area**
- **Social, environmental and Ethical aspects of scientific research nowadays**
- **Other topics.**

The network collected a knowledge base with 116 topics.

The repartition of topics proposed by teachers in different categories is:

- **Mathematical and/or theoretical method - 50**
- **Software Tools and/or Hardware equipment and/or Measurement instrumentation - 33**
- **Vision on the future development in some scientific area - 15**
- **Social, environmental and Ethical aspects of scientific research nowadays - 9**
- **Other topics - 4.**

Observations on the topics proposed by teachers

- 7-8 topics proposed per teacher.
 - Small percentage of overlapping topics between teachers.
 - Topics rather complete each other than overlap.
 - Large scale of knowledge in the network.
 - Very strong Mathematical knowledge.
 - Diverse and strong software and instrumentation knowledge.
 - All teachers seem to have a **vision for future development**.
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- 60% of the teachers propose **global impact vision** of the subjects or propose **leadership models to the students**.
 - **Need to strengthen this aspect in the Consortium**

Step 2.

Students from partner institutions were invited to select **10 topics** each, at least one by categories.

Initially **21** students from **8** countries (Albania, Austria, B&H, Bulgaria, Croatia, Hungary, Slovenia and Kosovo) filled the Survey.

2. Results from the study on students' motivation and continuation

2 topics with highest score are:

The topic **“MATLAB (Optimization Toolbox)”** in category „Software Tools and/or Hardware equipment and/or Measurement instrumentation” 13 students, 62% from responders.

The topic **“Innovation and new technology”** in the category “Vision on the future development in some scientific area”, 12 students, 57% of responders.

Results from the study on students' motivation and continuation (1)

- Students have curiosity and interest to study the topics and tools proposed.
- Only one additional topic was added by a student.

Recommendation:

- Topics with more than 6 selections - for intensive study programs, like Summer schools organized in the network or International weeks.
- Topics with 1,2 selections for individual mobilities.

Results from the study on students' motivation and continuation (1)

- Main deficit identified - small number of offers in the category “Social, environmental and Ethical aspects of scientific research nowadays”.
- Round table and CEEPUS Leadership academia for students to focus further on students motivation.
- Later the Knowledge base has grown to 160 topics
- Number of students-responders from new partners doubled.

3. Intensive study programs in the CEEPUS network

The results helped **planning** events, mobilities and intensive study programs in the network.

Ex. Planning the 11 days intensive study program of

CEEPUS Summer School on “Modeling, simulation and Computer-aided design in Engineering and management” in University of Ljubljana in September 2017.

Other intensive study program:

- **Summer Academia in the University for Business and Technology, Pristina, Kosovo**, organized annually in July, with contributions in the „Modeling and Simulation Summer Academia“.
- **International Week organized annually by the University of Economics in Katowice (UEiK), Poland.**
 - Erasmus+ and CEEPUS granted teachers and students.
 - Students receive grades for the course that they have followed and they obtain 3 ECTS credits. Diploma supplement or certificates .
 - For the local students the courses are considered as regular optional courses and the grades enter in their diploma.

- The number of teachers and students from the CEEPUS network involved in the International week in UEiK **doubled** and the satisfaction from teachers, students and local organizers is clearly expressed.
- Motivated by the positive polish example a partner decided to involve CEEPUS mobilities in **5th International week at the Faculty of Education, PALACKÝ UNIVERSITY, OLOMOUC**, Czech republic in September 2019.

4. Joint programs in the CEEPUS network

- A. Joint **Flexible course** on Modelling, simulation and Computer-aided design in Engineering and Management
- B. Joint program **“Thèse en cotutelle”** on Modelling, simulation and Computer-aided design in Engineering and Management

A. Joint Flexible course on Modelling, simulation and Computer-aided design in Engineering and Management

Innovative product in the network.

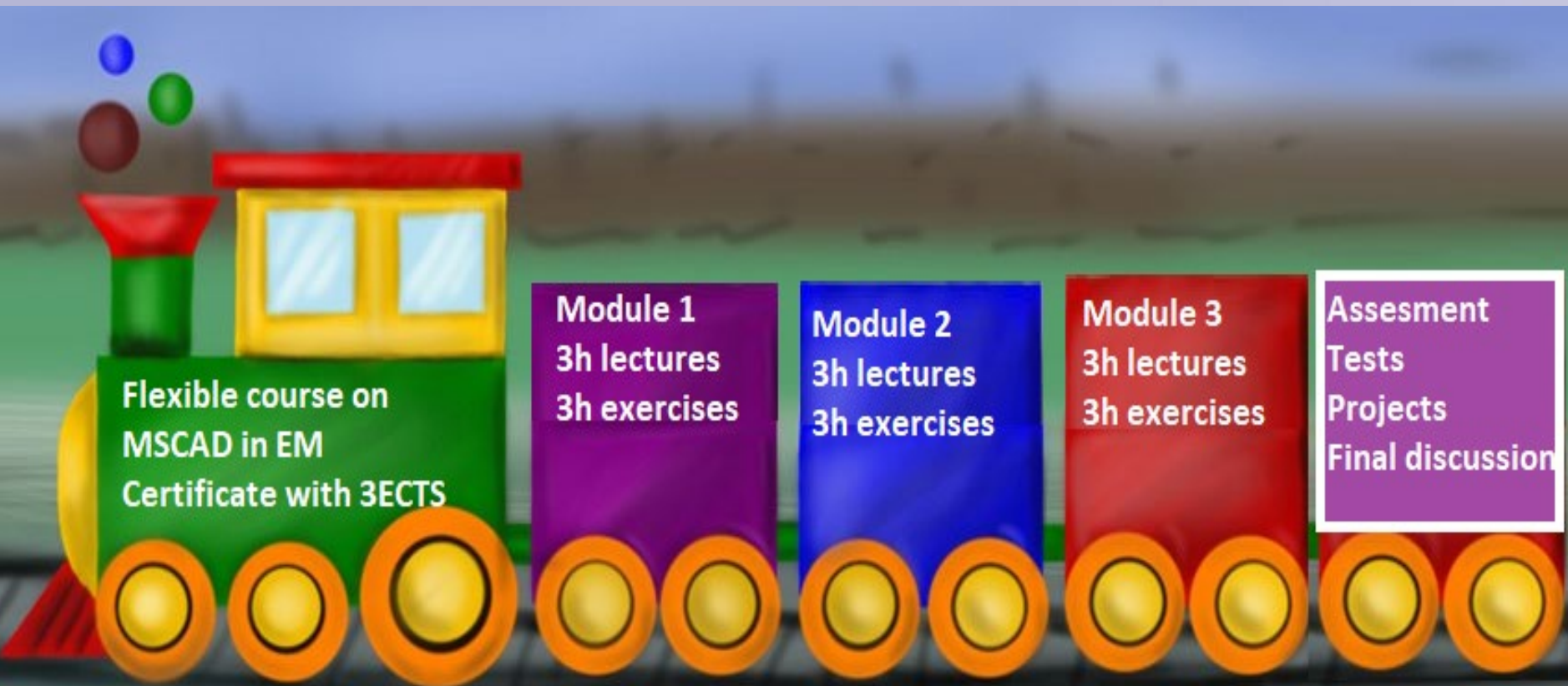
Way to organize the rich interdisciplinary knowledge in the network and to offer it to students from different universities.

20 hours, 3 ECTS given by the host institution or/and by the network. Each professor proposes 6 hours: 3 hrs lectures and 3 hrs exercises and the last 2 hours for students' evaluation.

3 professors from the network go together in partner's institution, they give together the course.

Local and CEEPUS incoming students receive certificates with 3 ECTS for the concrete configuration of the course.

Structure of the Flexible course



- A Pool with modules from the different teachers in the network is formed. Based on the existing Knowledge-base
- Each teacher first proposes one module, then later 3 modules
- Modules are organized as follows:

ModuleX_TeacherX-indices, indice =1,2,3.

- Indices of the modules might focus on students with different background – electronics, management, mechanics, architecture or students at different levels – B, M, D or advanced students (who have already learned a Module from the teacher).

- **The potential of the network with 32 partner institutions is to have from 96 to several hundreds of modules.**
- **Large number of options for the Flexible course.**
- **First pilot course in Summer Academia in UBT, Pristina in July 2019**

B. Joint program “Thèse en cotutelle” on Modelling, simulation and Computer-aided design in Engineering and Management

6 partners develop the Joint program:

- **Technical University-Sofia, Faculty of Telecommunications, Sofia, Bulgaria (since 2016)**
- **Faculty of Information Studies, Novo Mesto, Slovenia (since 2016)**
- **Institute for Information and Communication Technologies in Bulgarian Academy of Sciences, Sofia, Bulgaria (since 2016)**
- **University for Business and Technology, Pristina, Kosovo (since 2016)**
- **Technical University-Sofia, Faculty of Automatics, Sofia, Bulgaria (since 2018)**
- **University of Economics in Katowice, Katowice, Poland (since 2019)**

4 Courses developed (20 hours, 5 ECTS):

- “Advanced Computer-aided design tools in telecommunications”, assoc. prof. Dr. Galia Marinova, Faculty of Telecommunications in TUS, Sofia Bulgaria
- “Quantitative and qualitative modeling”, assoc. prof. Dr. Blaz Rodic in FIS, Novo Mesto, Slovenia
- “Advanced optimization methods in the management”, assoc. prof. Dr. Vasil Guliashki in the Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Sofia, Bulgaria
- “Advanced modeling methods in economics”. developed by prof. Dr. Edmond Hajrizi in UBT, Pristina, Kosovo

2 courses currently developed

- **“Modelling and Simulation in Automatic Control”,** assoc. prof. Dr. Teofana Puleva from Faculty of Automatics, TUS, Sofia, Bulgaria
- **“Virtual leadership in research projects”,** by prof. Dr. Malgorzata Pankowska from University of Economics in Katowice, Katowice, Poland

Probation with the first doctoral student from University “Alexander Moisiu”, Durres, Albania, enrolled in TUS in March 2018

Later a co-supervisor was nominated from VUT, Vienna, Austria and UBT, Pristina, Kosovo.

During the first year the doctoral student passed 3 exams in joint commissions

CEEPUS mobilities were awarded to her to study courses in UBT, Pristina, TUS, Sofia and FIS, Novo Mesto Slovenia.

She was also supported to prepare and submit papers with her supervisors, on 2 conferences in Bulgaria and in Hungary.

CEEPUS Leadership Academia for Students

Motivated by the results of the survey, the network organized it in University of Maribor, Slovenia, in June 2018.

The main goal was to make students express themselves.

They were grouped in teams (one local Slovenian student and one foreign incoming student) and developed projects.

List of projects

- Web site development for the CEEPUS Leadership Academy in Free Web site developer (ex:Wix).
- What motivates/demotivates me to become engineer and/or manager?
- Impact of international exchange, programs like Erasmus and CEEPUS on students motivation to study engineering and management
- What I want to study in Engineering and/or Management?
- What are the expectations and the inspiration to study Engineering and Management? What's the case for young women?
- How studying Engineering and/or Management will help me to influence social, ecological and political development?
- The importance for Engineering and Management Studies for my country and for Europe.

The teams had consultations with the lecturers in the Academia.

Then they presented the projects to an audience of students and lecturers in the Academia.

Each project was followed by a discussion.



The start of the CEEPUS Leadership Academia for students in Maribor

Observations at CEEPUS Leadership Academia

Very strong interest from students to express themselves, to be creative, to comment the educational process.

Students are strongly influenced by inspiring and successful lecturers, they are willing to meet such lecturers, to discuss with them and to follow their example.

Students want to communicate with the lecturer, they have what to say.

Observations at CEEPUS Leadership Academia

The first preliminary presentation on the projects developed by students has shown **a bit boring content**.

They included mainly what they were thinking that teachers want them to say.

The teachers consulting the students **pushed them to go deeper**, to implement critical thinking, to analyze what is wrong, what is failing, why motivation was sometimes missing, why some of them are very difficult to participate in mobilities or why some of them are too superficial in their studies.

Observations at CEEPUS Leadership Academia

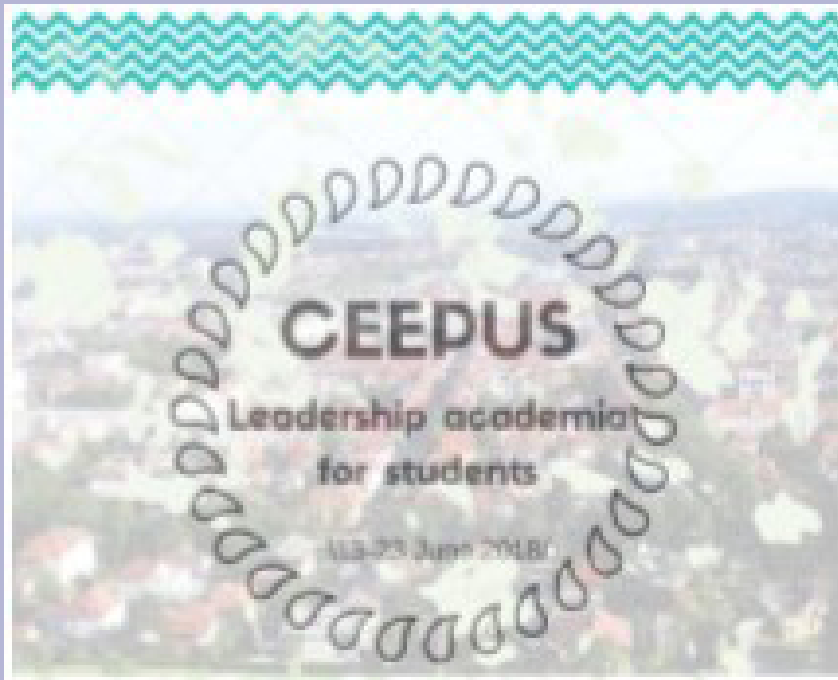
The final content of the students' projects was **much more mature, more franc and informative, more critical and much more interesting** for the audience.

At the end of the CEEPUS Leadership Academia the Students produced a **Poster of the academia** and presented it on the IWSSIP'2018 conference which took place in Maribor at that time.

They **disseminated** their work to the participants of the conference from different countries and continents.

Students **need to be encouraged and supported** in expressing their position in a way to be heard, they need to be supported to be active citizens.

Poster realized by students



What you do in CEEPUS?

- Work on projects
- Develop presentation skills
- Understand leadership and management
- Meet with people from different

What impressed us?

- See new places and cultures
- How students from Maribor develop their projects
- Leadership styles

As students taking part in CEEPUS it is interesting to meet new culture and to create new friends while at the same time we have the possibility to develop our skills and generate new ideas.



Poster presented at the “25th Int. conference on systems, signals and image processing IWSSIP’2018” in Maribor

6. Impact on students' motivation and further challenges

Students need and want to talk to their teachers and colleagues on academic topics.

Students have motivation to study but they want to be an active agent in the academic process.

They search inspiration in their teachers and they need the space to create.

Students like both to cooperate and to compete.

Impact on students' motivation

A report from the Academia was elaborated.

It was sent to all teachers in the network and also to administrators in the partner institutions in the network.

These results are used for better defining intensive study programs (Summer schools, Elective courses, International weeks, etc.).

During the 3 years of the network the number of students taking part in the activities of the network **doubled** and the number of requests from students, on incoming events in the network, increased considerably.

In parallel, students participating in the CEEPUS network increased the grades in their regular studies, because it helped them to be better organized and competitive.

Challenges

CEEPUS region is composed from countries with dramatic recent conflicts;

Communication is still hard between their representatives, both teachers and students.

In some countries, institutions are not facilitating the CEEPUS exchange.

Countries, like Austria and Slovenia, which have a very well organized CEEPUS exchange system, **face difficulties in inspiring their students to realize mobilities.**

The network is making efforts to overcome all these challenges with determination and patience, in order to achieve more **uniformity and to prove that partners from all 15 countries in the network can find satisfaction, gain and interest in this cooperation.**

ACKNOWLEDGEMENT

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thank you!