

## **Erasmus - Co-operation between Universities and Enterprises**

### **Developing higher education and the structures of the education through increasing industry-university cooperation**

The targets of the project are:

1. To increase the internationalization of the higher education. This requires international partners within selected fields of science. In this project the international network of universities and universities of applied sciences consists of existing partners in the Metnet cooperation network. The network of universities participating to this project will intermediate international-oriented students at the end of their studies into foreign SMEs where they can carry out their practical training or thesis.
  
2. To increase the industry-university –cooperation. Nowadays the demands of different occupations vary enormously and many occupations require very specific expertise. Higher education with standard solutions cannot produce such education and curricula that respond to the demands of the working life. To improve the equivalence of the working life and the industry-university – cooperation, there needs to be certain individuality at the ending of the education. This means that the students' orientation follows individual paths towards the personal interests of the student as well as the requirements of the working life. This can be done through customer-oriented thesis and practical training of the student in the industry-university –context.
  
3. Enhancing entrepreneurship is a crucial message of the Lisbon Agenda and therefore an important regional development task for the universities as well. Especially since academic entrepreneurs are a minority among entrepreneurs in general. From the perspective of vocational higher education entrepreneurship education is understood as a concept that includes expertise in one's own field, business know-how, entrepreneurial pedagogy, factors in the operational environment and entrepreneurial way of operating within an organization.  
 Self-motivated and active i.e. entrepreneurial person is capable of creating himself/herself a vision of what he/she wants to do in the future.  
 Entrepreneurial person can visualize the options of his/her future and he/she is capable of finding the solutions in order to achieve those goals.  
 Entrepreneurial growth is developing in knowledge, skills and attitude.

The above mentioned target areas utilize variedly the new pedagogical methods associated with constructivism and cognitive learning as well as the patterns of the entrepreneurial pedagogy which encourages goal-oriented behaviour.

## **The target of the project**

The primary target of the project is to develop the equivalence of the higher education and the working life

- by developing the education even more international by taking into use the existing networks of universities and higher education and further developing them
- by increasing the industry-university cooperation
- by attaching the entrepreneurial aspect into the education (entrepreneurship as a career option) by using the European level materials and education models in entrepreneurship (education)
- by attaching new pedagogical group work methods into the education

According to the target the equivalence of the higher education and working life will be improved to better correspond to the demands of the new global markets. The industry-university cooperation will be improved and the students graduating from universities will be more prepared and more skilful when they shift from their studies into the European working life.

## **The participants and the target groups of the project**

The project is European wide and multidisciplinary. Its goal is to produce new learning models that will reshape the structures of the higher education.

The target groups are:

1. Higher education and its staff
2. The students of the higher education

The crucial target group is the teaching staff of the higher education as well as the personnel of the companies that are responsible for the practical training of the students, including also other forms of learning within the companies. The target groups also consist of other personnel, both in the education and in the working life, that develop the industry-university cooperation in their daily profession.

The project will be executed with European universities and higher education institutes. Each higher education institute will implement 2-3 different pilot trainings. These trainings take place at the end stage of the studies. These pilot trainings are meant to enhance each student's independent effort towards individual education in order to better response to the needs of the student and the working life.

The realises of the project are:

- HAMK University of Applied Sciences
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## **Working packages of the project are:**

- 1) International aspect of the education (practical training in European SMEs, exchange of research done in the European SMEs by the students, educational cooperation in European level between higher education institutes)

- 2) Industry-university cooperation training pilots (new methods to increase the cooperation)
- 3) Entrepreneurship as a career option (training pilots e.g. encouraging entrepreneurial behaviour, entrepreneurial learning methods in education)
- 4) Pedagogical methods (training pilots e.g. team/group work, new pedagogical methods associated with constructivism and cognitive learning)
- 5) Qualitative research which will be actualized in the beginning of the project by discussing with app. 20 representatives of the European SMEs in order to clarify the needs and hopes of the SMEs concerning the industry-university cooperation and its patterns.

It is easier to insert flexible and individual education sectors to the end stage of the higher education degree. These education sectors can be e.g. master's thesis, post-graduate degree, specialization education periods or practical training. The model of execution of the project is based on pilot solutions that will be tested and evaluated during the project lifetime and afterwards. The project produces recommendations for the structural development of the higher education concerning the equivalence between higher education and working life in Europe.

### **The description of the original training pilots**

The purpose of the project is to develop the original training pilots introduced here but also to develop new models of education through which the structures of the higher education can be renewed.

#### (A) International aspect of the education

**ELBEPRO -model.** In this pilot the higher education students are being placed into European intermediate organisations (higher education institutes, technology parks and centres, business centres etc.). These will then place the student into proper SMEs (one or many) during the period of exchange. The time spent in the SMEs has to be more than 70% of the whole learning period. The intermediate organisations will get a minor reimbursement (500 Euros overhead) of each student placed into SMEs to cover the expenses caused by the placement. The student will not get any extra salary from the period spent in the intermediate organization. The project will pay the student a salary of 1000 Euros during the exchange period. The project will also pay the travel expenses and the reasonable accommodation of the student during the exchange period. This model can be utilized in practical training, aligning the post-graduate degree or as a part of the specialization studies.

**TRANSDIPLOMA -model.** In this pilot the student makes his/her master's thesis under the guidance of a European SME or other client. The sending higher education institute appoints another advisor as normally. The European intermediate organizations find a proper SME or other organization that is interested in subcontracting the thesis in the particular field of science. The student will make one trip in the beginning of the process to see the client (after the student and the client have found a common topic for the thesis and gained the background information needed for the work) and the second trip when the

thesis is done in order to show the results of the work to the client. The project will pay the travel expenses of the student as well as a compensation of 1000 Euros of the complete and approved thesis.

(B) Industry-university cooperation training pilots

Before carrying out this section of the project, there will be a qualitative research done in the project that is meant to clarify the needs, hopes and expectations of the working life in order to have the best possible industry-university cooperation model. The research will be done by discussing with app. 20 representatives of the selected European SMEs.

**NATIODIPLOMA -model.** In this pilot the student will do his/her master's thesis in the guidance of national SME or other client organization. The higher education institute appoints another advisor as normally. During the thesis work the student will be placed mainly to the premises of the client organization. The client organization will pay the student app. 500-2000 Euros (according to the agreement) of the completed and approved thesis. The project will cover the travel expenses of the student as well as the reasonable accommodation expenses (if the client organization is situated in another location) up to 1000 Euros per student.

**PROJECT GROUP -model.** In this pilot the group of students will make a research or development project or survey with the guidance of the teacher to the needs of the client outside of the university. The client organization does not pay for the work but it will be committed to guide the students in different phases of the process. The proper learning goals of the field of science or substance of the degree programme concerned will be attached to the process of the group work as well as a proper amount of subjects such as project coordination, team work, customer relation marketing and appearance technical. The project covers the travel expenses and other justified expenses caused by the group project (the maximum being 1000 Euros per project).

**EXPERT -model.** In this pilot the best experts of the tackled field from all European countries will give app. half days' lectures on specific topics. After that the students will make a brief group work (2-3 hours) based on the lecture in the guidance of the expert. The execution of the lecture will be attached to some existing studies and the student will get extra points from participation to the lecture and making of the group work. These extra points will be noticed in the examination of that certain study period. The project will pay the travel expenses of the expert as well as a reasonable lecturer's fee. This model's target is to enhance the high level professional knowledge of the students as well as their holistic understanding of the tackled field.

(C) Entrepreneurship as a career option

The project will develop and execute different kind of training modules to encourage the entrepreneurial behaviour of the students. The project will benchmark different European entrepreneurship education models and methods created e.g. in the Interreg III C project 'Baltic Entrepreneurship Partners

(BEPART)'. These modules are targeted to both the students and the teaching staff to support their teaching work.

The modules and the operational models developed in them will support both the students' and the teaching staff's entrepreneurial behaviour. The modules will focus on new pedagogical methods that support innovativeness, entrepreneurial behaviour, ability to take risks and so on. The modules will be shaped to serve the needs of the higher education and to support the academic entrepreneurship.

**AARHUS-model.** This model is based on the Centre for Entrepreneurship. In the project this model will be carried out in a way that

This model will be accomplished so that the technology parks, laboratories and service Centres of Metnet partners will serve as Centres for Entrepreneurship.

The aims of the model:

- To give the students the ability to develop the operations of an existing company/organisation or to establish their own company
- To develop the entrepreneurial competences of the students and their entrepreneurial behaviour through different kinds of learning situations and projects

The content of the model:

- To demonstrate and to clarify the different forms of entrepreneurship through professional projects. These projects will help the student to understand the entrepreneurial behaviour and the process from a business idea to business operations (acknowledging a business idea, analyzing and utilization of the business idea, understanding the process of establishing a business)
- The model will give the students the ability to analyze different sectors of business operations and the ability to see new business opportunities. The model will also help the student to analyze his/her own entrepreneurial competences (strengths and weaknesses).

**ROSTOCK-model.** Rostock model ROXI-programme consists of 4 training days that include e.g. the following:

- Introduction of the participants with the help of a picture collage (professional background, present situation and future visions)
- Development and illustration of the business idea (theme during the whole model)
- Description of entrepreneurial competences and success stories (the experiences of the experienced entrepreneur) and reflecting the student's own entrepreneurial competences (Johari window) combined with the external analysis (fellow students)
- Stimulation of the production process through action learning method
- Stimulation of the rival company and developing student's own business idea
- Supporting creative thinking

**HAMK-model.** In HAMK-model pre-incubators are used as a learning environment. It is typical that the students use flexible action learning method as a learning method. The action learning method takes into account individuality and the versatility of the business ideas. The entrepreneurial competences of the students are being analyzed with the help of Thomas Personal Profile Analysis method.

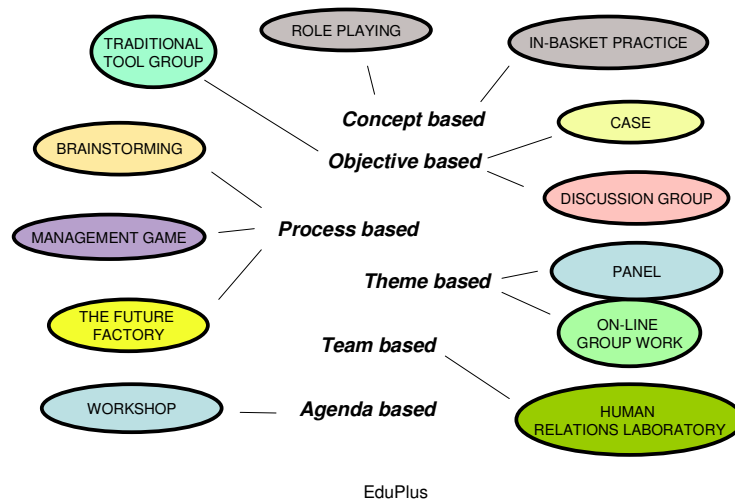
Starttihautomo cooperative has been established to support the minor business operations of the students. With the help of the cooperative the students can do minor services in their field of substance without losing their status as a student.

HAMK with its cooperation partners carry out the successful SENSE business idea competition. The competition supports well the pre-incubator studies.

#### (D) Pedagogical methods

In its pilot modules the project tests different kinds of group work methods. These are called as pedagogic pilot modules.

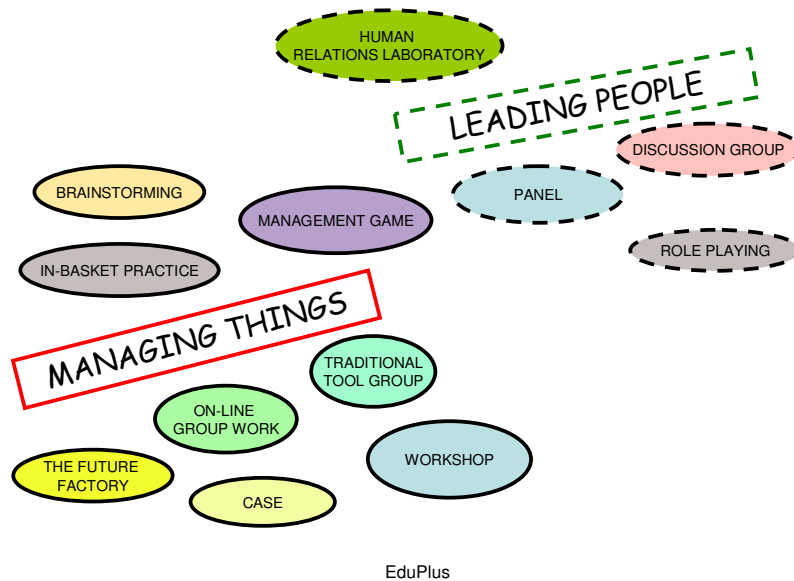
#### Palette and basis of Group Working Methods (GWMs)



**Figure 1.** Group working methods (based on the lecture of Lauri Tenhunen in Rostock 2006)

Pedagogical pilots, together with the original pilots, form a matrix. The modules selected to the matrix will be tested within the project lifetime. The meaning of the pedagogical pilots is not only to enhance learning but also to teach the students to lead their work communities.

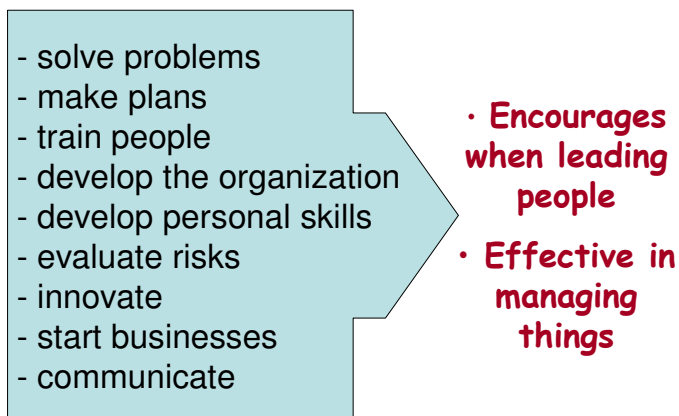
From the perspective of learning to lead, the group working methods can be divided into two sections: 'leading people' and 'managing things'.



**Figure 2.** Group working methods in the process of learning to lead (based on the lecture of Lauri Tenhunen in Rostock 2006)

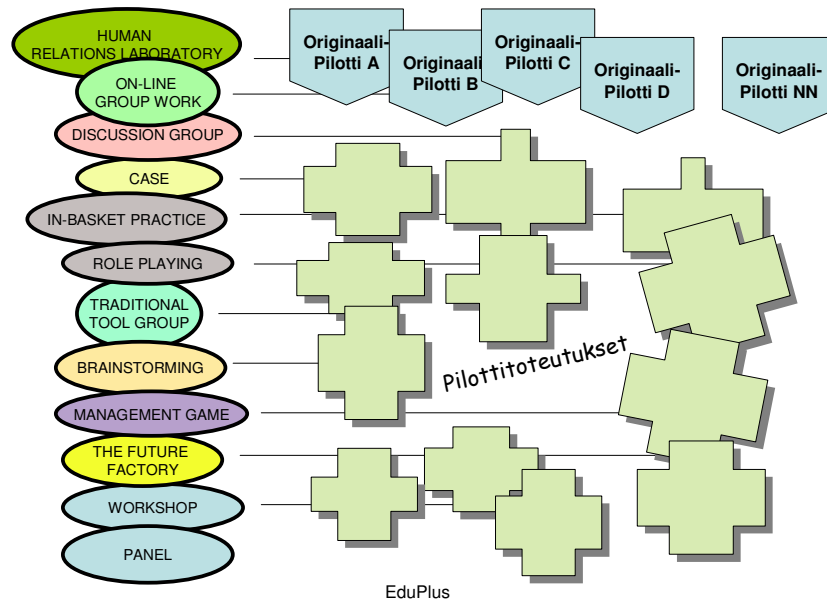
With the help of the group working methods the commitment, the real team work, the opportunity to change the organization, good communication and high motivation within the group are created.

### A Modern Leader would use GWMs to



**Figure 3.** The applications and advantages of the group working methods (based on the lecture of Lauri Tenhunen in Rostock 2006)

Pilots and group working methods form a matrix. The parts of the matrix will be executed in the project as they apply altogether app. 20 different pilots in which there will be app. 200 students.



**Figure 4.** Pilot and group working methods matrix.

### Concrete results and result indicators of the project

The crucial result during the project is the better readiness for the needs and tasks of the working life of the students participating in the project activities.

Concrete results and quantitative indicators are

- The number of teaching staff participating the pilots
- The number of students participating the pilots
- The number of degrees, parts of degree or other amount of studies of the target group
- The number of the intermediate organizations participating the pilots
- The number of the client organizations participating the pilots

Qualitative indicators are

- Improvement in the level of knowhow and the improvement of the abilities
- The advantage of the operations to the participants and the impacts of the operations
- The gratification of the participants
- The advantage and added value of the networks and partnerships (national and international)
- The forming of the regional, local and sectoral cooperation networks
- The functionality, the advantage and added value of the models and innovations



- The stabilization of the development operations
- The effective industry-university cooperation
- The effective, flexible, project and substance oriented modular based solutions in higher education
- The educational applications that support individual solutions

In the evaluations of the results of the pilots one pays attention to the developed operational models and their functionality, feasibility and equivalence with the working life as well as enhancing internationalization and entrepreneurship. In addition there will be an evaluation of the improvement of the professional know how of the participants, stabilization and impact of the development operations on the previous operations and targets of the organization.

At the end of the project the results of the pilots will be described clearly so that the results can be used after the project in the planning of similar executions and when developing the curricula of the higher education.

### **Work groups and their targets**

A sufficient number of branch work groups will be established in the project. The branch work groups will carry out the parts of the pilot and group working methods matrix through their contacts between different European intermediate organizations, national business life organizations and other cooperation partners.

HAMK UAS will act as a coordinator of the project taking care of the project management.

Each branch working group

- Aims at finding the most suitable pilots for their line of business from the pilot and group working methods matrix, apply them during the project and describing the results of each pilot
- Organizes the operations of the pilot from the part of practical training, thesis work and credit customs within their higher education institutions
- Follows the instructions given by the financier and the coordinator about the management and finance of the project
- Forwards the verifications, money orders etc. in time and clearly itemized to the project coordination

### **Dissemination of the results and best practices**

The project uses mainstreaming to disseminate its results and best practices. The mainstreaming in this context means disseminating the best practices of the project within and outside of the project. The mainstreaming requires a sufficient amount of resources, the support from the management, knowhow of the staff, good networking, accountability and monitoring of the operations.

The mainstreaming in the project will be done both horizontal and vertical:

Horizontal = Disseminating the best practices to similar organizations

Vertical = Disseminating the best practices to business organizations, associations, European cooperation partners as well as national policies

During the project a mainstreaming plan will be made that will be carried out throughout the project and in which the methods of mainstreaming will be describes and timetabled in more detail:

1. One way communication (disseminating project brochures, internal communication within and between the organizations participating in the project)
2. Active and interactive dissemination of the project results (A process where the participants create and distribute information of the novelties to each other in order to achieve a common understanding of the future possibilities of the applied pilots).
3. The implementation of the results and the best practices in new targets will be done by describing the results clearly, good informing and targeting presentations in the European higher education institutions
4. The project aims through an interactive process at shaping the customs and implanting the best results and operational models into a permanent use in the higher education institutes not participating to the project.

### **Long term impacts of the project**

In the long term the project reshapes the existing structures of the education within the European higher education institutes to better serve the needs of the working life nationally and internationally.

The readiness for the working life of the students will be improved when utilizing the results and best practices within and after the project lifetime.

### **List of Metnet partners**

ATI Kueste GmbH (Germany)  
 ATI Westmecklenburg GmbH (Germany)  
 Belarusian National Technical University (Belarus)  
 Braunschweig Technical University (Germany)  
 Budapest University of Technology and Economics (Hungary)  
 City University (UK)  
 Czech Technical University in Prague (Czech Republic)  
 EEIGM, Ecole Europeenne d'Ingenieurs en Genie det Materiaux (France)  
 Faculdade de Ciencias e Tecnologia da Universidade de Coimbra (Portugal)  
 Häme Development Centre Ltd (Finland)

HAMK University of Applied Sciences (Finland)  
Helsinki University of Technology (Finland)  
HIE-RO Institute at the University of Rostock (Germany)  
Innosteel Factory Oy (Finland)  
Institut Jean Lamour (France)  
Kiev National University of Civil Engineering and Architecture (Ukraine)  
Koneteknologiakeskus Turku Oy (Finland)  
Labein Tecnalia (Spain)  
Lappeenranta University of Technology (Finland)  
Luleå University of Technology (Sweden)  
Nancy University (France)  
Orenburg State University (Russia)  
Physical-Technical Institute of the National Academy of Sciences of Belarus (Belarus)  
Poznan University of Technology (Poland)  
Rautaruukki Oyj (Finland)  
Riconversider Srl (Italy)  
Saint-Petersburg State University of Architecture and Civil Engineering (Russia)  
Seinäjoki University of Applied Sciences (Finland)  
Swedish TelePedagogic Knowledge Centre (Sweden)  
Technical University of Civil Engineering – Bucharest (Romania)  
Technical University of Cluj-Napoca (Romania)  
Technology Centre TechVilla Oy (Finland)  
The Steel Construction Institute (UK)  
University of Aarhus (Denmark)