



UNIVERSITY OF EAST SARAJEVO
FACULTY OF MECHANICAL
ENGINEERING



4th INTERNATIONAL SCIENTIFIC CONFERENCE



COMETA2018

***„Conference on Mechanical Engineering
Technologies and Applications“***

PROCEEDINGS

27th-30th November
East Sarajevo-Jahorina, RS, B&H

COMET α 2018

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27th - 30th November 2018
Jahorina, Republic of Srpska, B&H



University of East Sarajevo
Faculty of Mechanical Engineering
Conference on Mechanical Engineering Technologies and Applications

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PREFACE

Faculty of Mechanical Engineering East Sarajevo is organizing the 4th International Scientific Conference COMETA 2018 - "Conference on Mechanical Engineering Technologies and Applications". The aim of the conference is to contribute to the implementation of new technologies in production processes by achieving better cooperation between scientific research institutions and companies, and to enable practical application of research results presented in the proceedings.

The main objective of the conference is to bring together eminent domestic and international experts in the field of engineering and the application of new technologies and the development of mechanical systems, and to contribute increasing the competitiveness of the domestic economy through the exchange of experience and knowledge, public presentations of current research and new construction solutions.

The organization of previous conferences COMETA2012, COMETA2014 and COMETA2016, according to the assessments of participants, especially foreign colleagues, were successful.

The efforts were recognized by the Ministry of Science and Technology of the Republic of Srpska, since in May 2018 the COMETA conference was ranked among international scientific conferences of the first category.

The COMETA 2018 conference program consists of the following thematic areas:

- Manufacturing technologies and advanced materials,
- Applied mechanics and mechatronics,
- Machine design and product development,
- Energy and environmental protection,
- Maintenance and technical diagnostic,
- Quality, management and organization.

At this year's COMETA2018 conference, a record number of papers from the country and abroad have been submitted. In total 277 authors from 13 countries participates in the international conference COMETA2018, 112 papers were accepted, including 4 plenary papers. Within the COMETA2018 conference, it is planned to organize two working meetings that will focus on the current topics of the Conference.

With the desire to improve the organizational as well as the scientific effect of the Conferences, and appreciating the contributions made by the scientific community in this way, we want to emphasize that each of your suggestions is more than welcome and will be appreciated in connection with the above.

On behalf of the Organizing and Scientific Committee of the COMETA2018 conference, we would like to express our gratitude to all authors, reviewers, institutions, companies and individuals who contributed to the Conference.

Hoping that the results of our joint work will meet expectations, the organizer of the Conference, Faculty of Mechanical Engineering East Sarajevo, wants you active participation that will contribute to the development of modern ideas and solutions, in the spirit of technical and technological development of the modern world.

We wish you a pleasant stay in Jahorina. Welcome to the COMETA2018 conference.

East Sarajevo, November 21st, 2018.

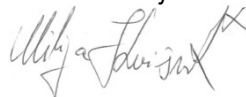
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PROCESS OF IMPROVING THE ENTREPRENEURIAL COMPETENCIES

Slaviša Moljević¹, Ranka Gojković², Snežana Nestić³, Goran Orašanin⁴, Dino
Tihčić⁵

Abstract: Entrepreneurship, through the creation of new jobs, increased innovation and poverty reduction, has been recognized as the main factor in economic and social development. In this paper, special attention is paid to the development of entrepreneurial knowledge, skills and attitudes through entrepreneurial education. There is an increasing awareness that entrepreneurial skills, knowledge and attitudes can be learned, leading to a more visible development of the entrepreneurial mindset and entrepreneurial culture in individuals and society as a whole. The paper presents the process of improvement of entrepreneurial competences among students of engineering disciplines. The process of improvement represents the approaches developed within Erasmus + REBUS projects.

Key words: Improvement, Entrepreneurship, Teamworking, Intercultural Communication

1 INTRODUCTION

European business sector pays an ever more increasing attention to competences such as sense of initiative and entrepreneurship. In 2006, the European Union proposed 8 key competences for lifelong learning, one of which is "a sense of initiative and entrepreneurship".[1]

The development of entrepreneurial capacities of European citizens and organizations is one of the key objectives of the EU and its member states. Western Balkans countries and Russia in general have a high level of resistance to private initiatives, business and entrepreneurship. [2]

The Erasmus + REBUS project is established with aim to enable strong support to address a challenge of bringing entrepreneurship into HEIs and establishing the

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interface between higher education and practical business context based on cooperation network of EU and Western Balkan countries. [3]

The project aims at developing, testing, validating and mainstreaming holistic and needs driven open learning modules to promote entrepreneurship competences of engineering graduates at the interface of academic education and learning in practice business contexts.

Based on different theoretical approaches to entrepreneurship, it is possible to identify a number of entrepreneurial competencies, that is, knowledge, skills, attitudes, abilities related to entrepreneurship and entrepreneurial behaviour. An entrepreneur has the capability to identify, analyse and use business opportunities, to hire the necessary business assets and to launch business ventures based on identified market opportunities. [4]

The REBUS project promotes the development of various training modules for entrepreneurship and their integration into existing or new curricula at higher education institutions. The project also promotes the creation and adoption of a system and the validation, implementation and evaluation of the training module and the competency validation system. [3]

Entrepreneurship education for college students has an important role in order to grow new entrepreneurs. [5] There is an increasing awareness that entrepreneurial skills, knowledge and attitudes can be learned, leading to a more visible development of the entrepreneurial mindset and entrepreneurial culture in individuals and society as a whole.

The University of East Sarajevo has implemented many activities aimed at raising the awareness of students about the importance of entrepreneurship. The paper presents the process of implementing Rebus's approach to entrepreneurial learning and the approach to assessing entrepreneurial competencies at the University of East Sarajevo.

2 IMPROVING ENTREPRENEURIAL COMPETENCIES OF STUDENTS AT THE UNIVERSITY OF EAST SARAJEVO

Through the implementation of the REBUS project at the Faculty of Mechanical Engineering, the adaptation and improvement were made to curricula. Training for the 35 students in the field of entrepreneurship was realized.

The realization of the training of students is in line with the recommendations of the Rebus project in the following way:

- F2F (face to face)
- e-learning and
- learning projects

Through training, students were introduced to the basics of entrepreneurship and were trained for the independent development of business plans.

Students registered through project platform called Mahara (<http://mahara.learningrebus.net>). This platform supports the REBUS blended learning approach which provides the acquisition and validation of entrepreneurship competences. [6]

Each student created his own profile and was able to connect with other students through the system.

In addition, professors engaged in the project (trainers), trained by the EU partner, have created their own presentations that were put on the platform. Each registered student had access to all these presentations and their learning was enabled

through the Mahara system.

12 students were selected for 11 day training on entrepreneurship at the University of Duisburg-Essen. Students of the University of East Sarajevo attended training together with students from the Volga State University of Technology and the Universum College Pristina. The training was realized through multicultural teamwork realized in a way that each team had at least 2 members from each university. The aim of the training was to improve entrepreneurial competences, teamwork and intercultural communication.

3 VALIDATION OF COMPETENCIES

Validation of competencies was carried out using the LEVEL 5 competency validation system.

Students performed self-assessment of their own competencies before and after education and training conducted within the REBUS project.

Based on the outcomes of the evaluation instrument developed in this project, the coaching teacher can use feedback and dialogue to work with students, on an individual as well as group level basis, to determine which aspects they should be working on in order to become more competent.

Students of the University of East Sarajevo performed self-assessment for three groups of competencies:

- **Entrepreneurship**

Entrepreneurship refers to a learner's competence to turn ideas into action. It includes a number of sub-competences such as creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve the objectives. The learner is competent to apply different entrepreneurial skills and strategies in order to develop, organize, and manage an encounter he/she wants to achieve, be it private, professional or a contribution to civic society. The learner is able to discover opportunities, to realize innovation, to exploit and use resources and to identify and bear risks. They know to judge and plan entrepreneurial activities in regard to the given economic conditions, and how to act and react in different professional/ business situations. The learner is able to assess and evaluate risks, to convince others of their vision and to work both individually and in a team. They are able to communicate in a goal-oriented way and to delegate tasks to others. The learner is ready to take over risks and responsibility and appreciates development and innovation. They value pro-active behaviour, collaboration and independence and comply to ethical standards for doing business. They are determined to take the necessary steps to achieve their vision.

- **Teamworking**

The learner is competent in interacting with others involved in the activities of the organisation and to collaborate to reach a common goal. The learner respects specific backgrounds, competences and skills of team/group members and has the ability to act as a team member. This involves communication skills like assertiveness, clarity and active listening, awareness of diversity in teams and potentials of teamwork. They have an attitude of appreciation for teamwork as efficient way of collaborating and source of creativity and are determined to contribute to the success of the entire team. They are aware of the roles and capabilities in the team and act accordingly. They put any kind of action that turns ideas into facts, taking risks, organising activities.

- **Intercultural Communication**

Intercultural communication is the competence to respectfully, effectively and constructively communicate with people from different cultural backgrounds. The learner

has knowledge about cultural diversity and how this is reflected in communication. They are competent in interacting with others and to establish a relation of trust and respect. They are able to adapt to different communication needs that result from different cultural backgrounds. They have a positive attitude towards diversity and interaction with people from other cultures and are determined to avoid misunderstandings and resulting frustration. The learner is aware of his own cultural identity and knows how it affects their communication. [7]

Entrepreneurial competencies include the knowledge, skills and attitudes needed to realize their own business. (Figure 1)

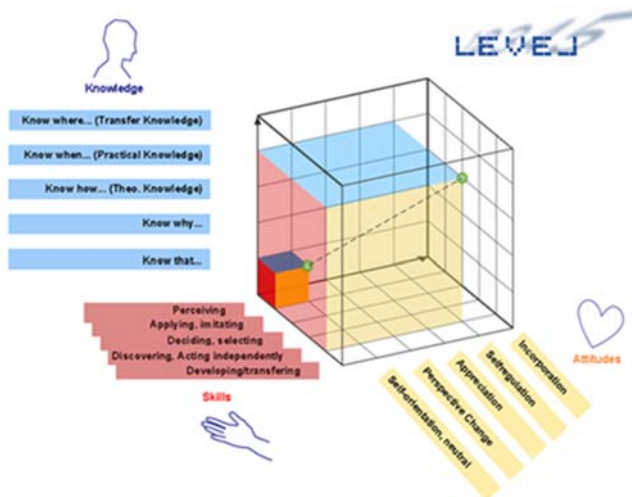


Figure 1. Assessment of competences [7]

Students evaluated knowledge, skills and attitudes with grades from 1 to 5. Levels of self-assessment are shown in Table 1. [7]

	KNOWLEDGE	SKILLS	ATTITUDES
L	Level Titles	Level Titles	Level Titles
5	Know where else...(Transfer knowledge)	Developing / Constructing Transferring	Incorporation (Internalizing)
4	Know when...(Practical knowledge)	Discovering / Acting independently	Affective self-regulation
3	Know how...(Theoretical knowledge)	Deciding / Selecting	Appreciation
2	Know why...(Factual knowledge)	Applying / Imitating	Perspective taking
1	Know-that...(Basic knowledge)	Perceiving / Listening	Self orientation (Neutral)

4 RESULTS OF SELF - ASSESSMENT

Students performed self-assessment of their own competencies before and after education and training. After the self-assessment, the results showed significant progress and improvement of student competencies.

The results of the first and second self-assessment of entrepreneurial competencies are shown in Figure 2. The biggest improvement has been achieved in the field of attitudes.

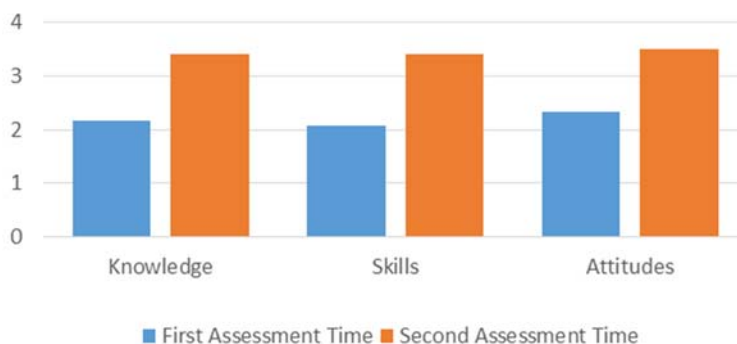


Figure 2. *Entrepreneurship*

Figure 3 shows the competencies of students in the field of teamworking. Improvements are also evident in this field.

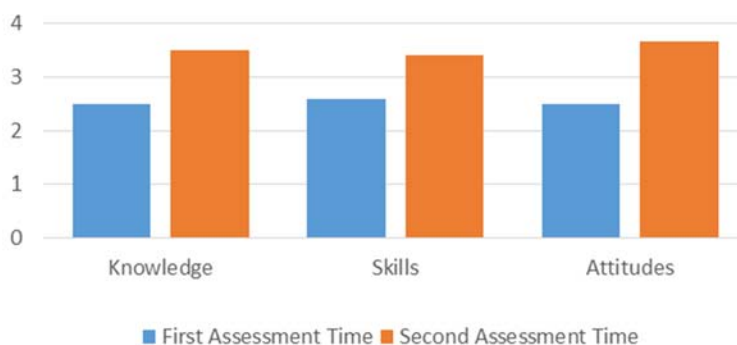


Figure 3. *Teamworking*

The level of knowledge, skills and attitudes regarding intercultural competences is shown in Figure 4.

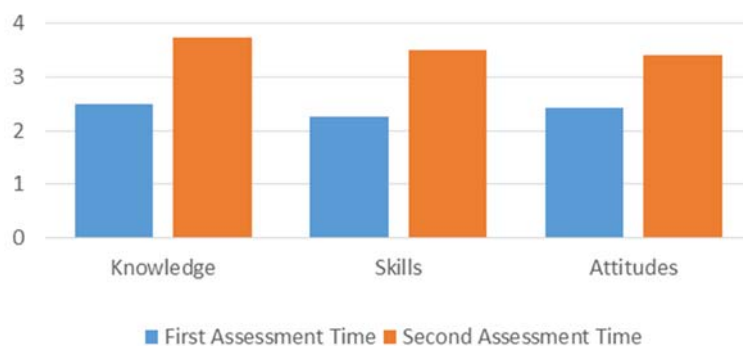


Figure 4. *Intercultural Communication*

Percentage of improving knowledge, skills and attitudes of students before and after the training has increased by 31% to 64%. The largest improvements were

achieved in the field of entrepreneurial skills by 64%.

5 CONCLUSION

Students need knowledge, skills and attitudes that are flexible and relevant to demands of today's industry. To enter and make progress in the world of work and to keep abreast of changes in job descriptions, students need to also develop entrepreneurial competencies to increase their employability. The approach developed within the Rebus project has shown significant progress in improving these competencies among students. An intercultural training held at the University of Duisburg - Essen has had a significant impact on the improvement of entrepreneurial competencies. Intercultural training has gained prominence in recent years due to the fact that the need for communication skills in the context of international encounters has become more widely acknowledged. More than a work-related skill, intercultural communication can be envisioned as a life skill which allows one to function effectively in his or her day-to-day activities. [8]

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