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QUALITY OF UNIVERSITY – ENTERPRISES COOPERATION: STUDENTS INTERNSHIP IN SERBIA

Abstract: University – enterprises cooperation is increasingly important issue which covers many different field, activities as well as forms of cooperation on the both sides. Practical activities and practical work are essential element of all fields of education and specially for engineering education having a period of education in the form of industrial placements. In this paper we will provide framework for improvement of students' internship at Serbian Universities especially in engineering field.

Keywords: quality of education, university, enterprise cooperation, students' internship

1. INTRODUCTION

Number of European declarations (Bologna and Bonn), reports of EU commission and national reports (Serbia 2009 Progress Report; [1] Linking the worlds of work and education through Tempus [2]; Revised and Extended National Program for Integration of Republic of Serbia in EU [3]) states importance of university – enterprises cooperation. Universities and enterprises cooperation could be strengthened through: internship and trainee exchange, joint research, LLL.

The general objective is better interaction between universities and enterprises for timely preparation of the university graduates for the labor market.

It is important task to improve model of students' internship in social sciences, humanities, business and management, natural sciences and technologies and to enhance communication channels between Universities and enterprise through which transfer of know-how from universities to enterprises in the particular fields will be achieved.

This paper will present overview of

present stage of students internship in Serbia. The situation of students internship at Serbian Universities will be presented, as well as the model for improvement of students internship.

2. STUDENTS INTERNSHIP IN THE FRAMEWORK OF UNIVERSITY – ENTERPRISES COOPERATION

Number of documents and declarations define necessary steps and measures that will eventually lead us to knowledge-based society and economy. Bologna Process drives towards the employability of university students. Serbian Universities generally accepted Bologna Declaration suggestions but number of problems still exists. In the December 2009, Government of Republic of Serbia published document "Revised and Extended National Program for Integration of Republic of Serbia in EU" [3]. This document states that development of human resources is one of the most important issues. It is also stated that is

necessity for improvement of knowledge and skills and better integration of Universities and economy. It is clear that precondition for faster development of Serbian economy and public sector is improved skills and competences of graduate students. On the other hand EU report from 2009 "Serbia 2009 Progress Report" on page 29 states [1]: *"Little progress can be reported on the reform of the education system in relation to labor market demand. The gap between demand and supply of skilled employees continues to be an obstacle to increasing foreign direct investment and developing new branches of the economy."* According to this report and number of national and regional analysis it is clear that the reform of educational system is necessity and the most important corner stone is assurance of acquisition of practical knowledge and skills.. The reform of students' internship is the crucial for improvement of employability and practical skills. The problem of employability is underlined in all previously mentioned documents. European Commission Directorate-General Education and Culture in 2007 published study "Linking the worlds of work and education through Tempus" that states fact that in countries like Serbia cooperation between academic community and economy is undeveloped [2]. Universities must recognize the need to engage closely with the environment in which their students will find employment (through students practice, usage of companies' physical resources and preparation of students for employment). Unfortunately, cooperation between universities and enterprises in Serbia in area of practical student education can't be characterized as satisfactory. Absence of communication with students, graduate students, employers and Universities and dialogue (with main topic of needed practical knowledge and skills) is also evident. According to Bon declaration cooperation of Universities and enterprises

could be straightened through: internship and trainee exchange, joint research, lifelong learning...

From all above mentioned it is clear that much greater attention must be devoted to the practical training of students, at all levels of study and in all disciplines that recognize its as a indispensable and unavoidable segment of educational process. Taking into the consideration the structure and content of accredited study programs in Serbian universities in general basic and most important area for practical training of students is linked to, above all, the content and method of conducting mandatory professional practices – students' internship (practical placement).

Although students' internship on undergraduate or graduate studies is recognized part of curriculums on accredited programs on significant number of departments on universities in Serbia, it is obvious that it represents certainly the most neglected and the least developed segment of education [4, 5, 6]. Unlike the other curriculum subjects at universities, which have clearly defined adherence to the department and courses, and specified professors and associates who are the carriers of teaching activities, student internships is general "public activity" without clearly defined responsibilities and ways of engaging teaching staff in their realization. Universities in principle do not have clearly defined concept and model of student professional practice – internships', there are no corresponding programs of work, methodology and defined tasks and objectives.

Privatization and transformation of enterprises have led to the interruption in organizing of students' internship in traditional way, while a new model of internship organizing has not been established. At this time, enterprises in Serbia have a dilemma and confusion on the issue of cooperation with universities in order to organize internships for

students which are their potential employees. On one side there is awareness of the need and usefulness of such cooperation and on the other a whole range of unresolved issues related to the model, concept, form, content and way of organizing and conducting of professional student practice in form of internships. Positions of the participants are not clearly defined and delimited where the enterprises are in a situation that they need to bring decisions on all matters related to student internships completely independent and uncoordinated.

Students usually have clearly built awareness of needs for additional professional training and practical education. Their requests to universities and the results of conducted benchmarking and opinion polls shows that this is the most common and most important remark that they have regarding the content and structure of the reformed and accredited study programs and curriculums.

The preliminary analysis which is made on described problem show that the improvement of practical professional training of students could be realized with coordinated actions in the following directions:

1) The significant improvement in ways of organizing and performing the mandatory students' internship which should become one of the important elements in education and not only formal activity. This includes certain changes at the universities that are related to clearly defining of the tasks, obligations and responsibilities related to planning, organization, management and control of the realization of students' internship.

2) Analyzing of models for organizing and realization of student internships in EU countries through a co-operation with EU universities that are members of the consortium for the implementation of the project. Considering that in Western European countries, the concept of student internships is much better organized and

planned, and that cooperation between universities and enterprises in this area have a great tradition, one of the objectives of the project is detail analysis of current concepts and models of professional student practice - internships, organizing in the EU and transfer of all positive experiences and ideas in order to define the final outcome of a model that matches the specific demands of the environment in Serbia.

3) There is necessity to improve University infrastructure and resources for SI. The role, organizational capacities and professional capabilities of Career centers should be straightened. It is also important to improve, train and educate academic supervisors and mentors for the realization of the students practice. It is also important to improvement of resources on universities that should enable that preparation for professional practice for needs of specific companies could be performed at the universities themselves or in enterprises but with significant use of universities equipment and other resources (in order to provide preparation for placement and to pass occupational safety procedures).

4) Popularization of organization of student internships in enterprises and institutions in Serbia which should contribute to widening of potential internships providers base. Preliminary research and surveys show that there is significant interest, but that concrete initiatives must be generated by the universities in the form of organized promotion of the concept and spreading of information's to all potential partners about the possibilities and the opportunity which this form of cooperation could enable.

5) Practical work with students which should verify the defined ideas, models and methodology of work. During the realization of the project students' internship, on both undergraduate and graduate studies, will be organized. The

pilot internships and their results will be subject to detailed analysis and will serve to define certain modifications and amendments of the proposed models and methodology for realization. This will be a base for improvement of other forms of University – enterprises cooperation by training, education and promotion of innovation, technology transfer and cooperative education.

Suggested issues are the most significant problems that should be solved in order to define and implement the high quality students' internship programs on the Serbian Universities.

3. STUDENTS INTERNSHIP IN ENGINEERING FIELD

For the purpose of this paper we will analyze a potential requests and demands for students internship in engineering field. On the other hand we will present the present stage of students' internship on the University of Kragujevac. Table 1 presents situation on all Faculties at University of Kragujevac according to student' internship in different levels of studies (bachelor and master) as well as number of credits.

Table 1. Credits for students' internship at Faculties of University of Kragujevac

	INSTITUTION	ECTS (Bsc)	ECTS (Msc)
1.	Faculty of Mechanical Engineering, Kragujevac	6	6
2.	Faculty of Economics	/	/
3.	Faculty of Natural Sciences and Mathematics in Kragujevac	6-16	6-16
4.	Faculty of Law	/	/
5.	Medical Faculty	/	/
6.	The Faculty of Philology and Arts in Kragujevac	/	/
7.	Technical Faculty, Cacak	3-4-5	3-4-5
8.	Faculty of Agronomy, Cacak	3	3
9.	Faculty of Mechanical Engineering, Kraljevo	6	6
10.	Teachers Training Faculty in Užice	5-6-7-10-11	6
11.	Faculty of Education in Jagodina	15-21	

Table 2. Credits for students' internship for engineering sciences ASIIN recommendations [7]

Bachelor, mechanical engineering, more practice-oriented (on the example of the 6th semester)	ECTS	ECTS
	%	CP
Advanced engineering applications Machine engineering, production technology, energy management, etc. (incl. laboratory, industrial placement)	min. 19	min. 22

On the table 2 the recommendation of ASIIN for students internship in engineering fields are presented [7]. According to the ASIIN (www.asiin.de) it covers [7]:

- Practical Education (industrial placements),
- Pre-study or basic industrial

placement is the familiarisation with the industry from a technical perspective prior to studies in a Bachelor's Degree Programme. and

- In a technical laboratory the technical and methodical knowledge gained at university

level is to be applied to, extended and deepened in an industrial environment within the framework of typical engineering activities.

We can conclude that amount, validation as well as quality of organization of students' internship in engineering field is not satisfactory at Serbian Universities.

In order to improve quality of students internship in Serbia it is necessary to make: Definition of models of students' internship in selected fields based on the experiences of the EU Universities, Preparations for proceeding with students' internship according to the enhanced models, Implementation of pilot students' internship in the selected fields, Enhancing university-enterprises communication channels. This process of improvement of students internship should cover following steps:

1) Detailed analysis of the available concepts and models in organizing of professional student practices in the EU. The final outcome of these activities should be a critical analysis of the potential forms and models of organization of the students' internship. It is also very important to include students from Universities in Serbia, graduate students employed in enterprises and Union of employers in order to define what exact practical knowledge and skills are needed for specific fields of studies.

It is necessary to prepare, adopt and define models for implementation to all Serbian universities and departments which have mandatory internship as part of existing accredited curricula. Developed models will ensure recognition of various disciplines specifics, possibilities and the special requirements and needs of students, enterprises and universities in Serbia.

2) Preparations for proceeding with students' internship according to the enhanced models will cover several steps and activities. It is very important to define

specific guidelines for SI supervisors. Strengthening of university potential for implementation of new demands and improvement of various aspects related to internships. On university basis infrastructure and role of Career Development Centers (CDC) will be additionally upgraded as they should take necessary actions for the presentation of the concept, organization and implementation of the students internship.

3) Implementing pilot students' internship in the selected fields, in accordance with the defined models and prepared plans and programs. In order to realize successful SI it is necessary to develop and list topics and programs data base. Programs and topics are individualized programs of SI for students in specific study fields. Monitoring and evaluation of SI will be permanent and after the finished cycle appropriate reports will be prepared by universities, examined and confirmed to define the directions for correcting and improving of the model in order to be adopted and implemented for the next cycle.

4) Enhancing university-enterprises communication channels presents strategic orientation for Serbian society in order to achieve number of objectives: development of knowledge based society and economy, increase of economic growth, and increase of quality of human resources and employability.

Previously mentioned steps should ensure increased quality of students' internship in Serbia in all scientific and education fields.

4. CONCLUSION

Coming from spotted problems and shown needs for significant improvement of practical student education in Serbia, through improvement of quality of students' internship.

In this paper we defined the most

important issues in organization of students internship in Serbia, we also presented the structure of ECTS credits accompanied to the students' internship at Faculties of University of Kragujevac (the similar situation is on all Serbia Universities) as well as some of the recommendation by ASIIN concerning students' internship in engineering field. The main idea is to improve existing models of students' internship in Serbia covering a industrial placement, pre-study or basic industrial placement as well as

work in technical laboratory. We also presented a steps that is necessary to tak that will finally improve the quality of students internship in Serbia.

Improved concept of organized internships should present significant contribution to improvement of student applicative knowledge and skills and their employment opportunities.

Cooperation of Universities and enterprises has many different tracks and according to Bon declaration students' internship is one of the important ones.

REFERENCES:

- [1] Serbia 2009 Progress Report, Retrived on March 3, 2011, http://ec.europa.eu/enlargement/pdf/key_documents/2009/sr_rapport_2009_en.pdf
- [2] Linking the worlds of work and education through Tempus, European Commission Directorate-General Education and Culture, Retrived on March 3, 2011, from http://ec.europa.eu/dgs/education_culture
- [3] Revised and Extended National Program for Integration of Republic of Serbia in EU, Retrived on March 3, 2011, from http://www.wbif.eu/attached_documents/9963/3294/National_EU_Integration_Programme_Serbia.pdf
- [4] Dragoescu, A. and Stefanovic, S., 2010. Quality improvement of ESP in mechanical engineering. *International Journal for Quality Research*, 4(3), pp. 221-225.
- [5] Kalinic, Z. and Arsovski, S., 2009. Mobile learning: Quality standards, requirements and constrains. *International Journal for Quality Research*, 3(1), pp. 7-16.
- [6] Calavrezo, O. and Sari, F., 2009. From unemployment to work: An econometric analysis with spatial constraints. *International Journal for Quality Research*, 3(1), pp. 85-112.
- [7] Guide to accreditations with ASIIN, Retrived on April 4, 2011, from <http://www.asiin.de>