

IMPROVING THE LEARNING FOR THE ENGINEERING PROFESSION BY MEANS OF PRACTICAL

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REZUMAT. Lucrarea prezintă obiectivul general și rezultatele parțiale ale proiectului și anume organizarea de practică pentru a asigura elevilor o șansă de formare crescută și îmbunătățită, în conformitate cu realitatea, și orientare și consiliere pentru cei care doresc să îmbrățișeze o carieră de succes în domeniile prioritare ale ingineriei și de a îmbunătăți prin practică învățarea pentru corelarea cu piața forței de muncă. Durata proiectului: octombrie 2010 - octombrie 2013. Proiectul este cofinanțat de Fondul Social European Programul Operațional Dezvoltarea Resurselor Umane 2007-2013. Partenerii de proiect sunt Universitatea „Politehnica“ din Timișoara, România (UPT), în calitate de coordonator, Universitatea din Pitești, România (UPIT), Institutul de Studii și Proiectări Energetice (ISPE) – București, România, FRAUNHOFER - Gesellschaft zur Förderung der angewandten Forschung din Germania. Proiectul PRACTICOR propune un model inovativ (vizlune) privind practica studenților de la universitățile tehnice (UPT și UPIT), în scopul de a crește performanța și calitatea. Echipa este unitară și omogenă, bazată pe complementaritate, comuniunea de interese și obiective, și își propune să ofere tinerilor absolvenți șansele de acces crescute, care să conducă la dezvoltarea durabilă a societății europene, cum ar fi, de exemplu, cele privind resursele tradiționale și reciclabile de energie, transporturi și tehnologii avansate, în scopul de a proteja mediul și pentru a asigura o evoluție armonioasă în spațiul transnațional al societății, în procesul de dezvoltare durabilă. PRACTICOR este instrumentul prin care elevii sunt ghidați și sfătuiți să-și continue studiile în domeniul ingineriei, iar studenții sunt consiliați și finanțați astfel încât să poată alege cea mai bună direcție potrivită de specializare, în scopul de a obține o diplomă B.Sc. și un grad M. Sc., dublându-și cunoștințele teoretice prin practică și activități legate de aspecte de avangardă și aplicații tehnologice utile societății.

Cuvinte cheie: practică, consiliere în carieră, inginerie, piața forței de muncă în societatea bazată pe cunoaștere.

Abstract. This paper presents the overall objective and partial results of the project namely the organization of practice to ensure their students a chance to increased and enhanced training, in line with reality and guidance and counselling to those who wish to embrace a successful career in priority areas of engineering and to improve through practice, learning correlating with the labour market. Duration of the project: October 2010 – October 2013. The project is co-financed by the European Social Fund Operational Programme Human Resources Development 2007-2013. The project partners are „Politehnica“ University from Timișoara, Romania (UPT), as coordinator, University from Pitești, Romania (UPIT), Institute for Studies and Power Engineering ISPE București, România, FRAUNHOFER – Gesellschaft zur Förderung der angewandten Forschung from Germany, respectively. The PRACTICOR project proposes an innovative model (vision) of practice for the students from technical universities (UPT and UPIT), in order to increase performance and quality. The team is unitary and homogenous, also based on complementarities, communion of interests and goals, which aims at offering the young graduates increased chances of access to foreground fields that lead to sustainable development of the European society, such as, for example, those regarding traditional and recyclable energy resources, advanced transports and technologies, in order to protect the environment and to ensure a harmonious evolution within the transnational space of the society in the process of durable development. PRACTICOR is the instrument by means of which pupils are guided and counselled to continue their studies in the field of engineering, and the students are counselled and financed so they can choose the best suited direction of specialization in order to obtain a B.Sc. degree and a M. Sc. degree, doubling their theoretical knowledge by practice and activities related to aspects of technological avant-garde and useful applications for society.

Keywords: practice, engineering career counselling, labour market in knowledge society .

1. INTRODUCTION

Most engineering tasks require teamwork. For a good development in the engineering profession one should cultivate social skills to facilitate group interactions which are a work team or organization with the purpose of production which have to manage the future engineer.

Professional competence, is necessary for the progress and performance, and the new technological requirements are that every young student of engineering profile of any specialization to be prepared so as to intervene promptly in addressing relevant problems of economic and social reality, having positive effects in terms of reaching professional and social performance.

A future engineer who is granted a major role by members of the group in which it manifests professionally and who by interpersonal relationships fulfils a clear role in human resource structure will be provided with a series of attributes as shown below [1]:

- cognitive experience;
- communication skills;
- judgement power and understanding the transmitted message;
- resolute capacity, creativity in thinking and action;
- availability to knowledge;
- availability for cooperation and interpersonal communication within the group;
- self-confidence and to another;
- attitude to overcome the obstacles to attaining the proposed profit;
- flexible style of approach to the task and interaction with its partners to achieve the common goal of the group;
- honesty, responsibility and empathy in interpersonal relationships;
- need for cognition, affection and social valuation for relationships, development, acceptance and integration in the work group;
- satisfaction with participation and individual and group success skills and interpersonal skills .

To provide initial training anchoring with the labour market demands preparation of engineering as a whole must take the following steps [2]:

- saying (didactic activity that is done in classes);
- show (work carried out under laboratory hours);
- doing (putting the students to perform, to practice the skills that is done within hours of practical training);
- transfer (providing logistics and resources to implement the new abilities gained in solving specific production tasks - step resulted in practice in a job at the employer);
- feedback (ensure awareness and reflective dimension of learning - is an ongoing process rather than a step and takes place through self-evaluation and evaluation of student activity and behavior from peers and the coach / guardian of the level achieved for gained skill);
- peer learning (the participants support each other in developing skills – by solving a common task – again a continuous process integrated in all other stages. To strengthen my skills is a co-drive with a "master" phase in which for example may have involved another student who graduated step four).

In the curricula of the „Politehnica“ University of Timișoara requires, at all levels, starting from the first year of study, a practice training for all students

towards developing as a graduated engineer and must be compulsory carried out, even the number of hours / semester is in not in a sufficient amount quoted. So not once the practical work is a formal or even not accomplished under real terms. There is a black gap between society (economic investors and young students becoming engineers) and expectations.

So we started a project the need for social skills training in the engineering profession. This project proposes an innovative model of practice addressed to students from technical universities to increase their performance and quality of training (bachelor and master students), as well the opening versus multi-national and interdisciplinary perspectives. Getting into contact with real economic units starting the practice already from bachelor position represents a real chance for the students.

2. METODOLOGY

Bologna strategy is beginning to implement the national and European system of higher education and should be supported. Basically in Romania are reducing the learning period in the first cycle degree (four years) than the old system of diplomats engineers (5 years) should be compensated through careful use of the time of preparation, particularly related to specific practical and necessary areas of society, especially productive.

Our goal is that business people and companies to want to hire our graduates.

European Youth Pact focuses on facilitating access of youth on the labour market, combating youth unemployment and increases the quality of education. The PRACTICOR project co-financed by the European Social Fund through the Human Resources Development Operational Programme 2007-2013 aims establishment of transnational networks regarding the educational guidance, counselling career and practice, coupled with labour market in knowledge society.

The PRACTICOR project gives the opportunity to develop skills training and supported the acquisition of skills to help graduates and helps students to find a job and begin a successful career after graduation.

On completion of the project in 2013 students must be better prepared not only theoretically but also practically, and their prospects for employment upon graduation to increase significantly.

The notion of practice applied directly related to economic units will complement the information that the student received as a graduate, completing his studies.

Practice partner companies have selected a group of employees to participate in a tutor-training

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practice to put in dialogue with the teachers of universities and practitioners together to prepare students. This course completes with a certification of the competence recognized by the Ministry of Labour and Ministry of Education

Companies was agree to have a say in our students' practical training, and project facilities are part of the team with us. So companies conducting practice under the guidance of tutors trained specifically in the project, assisting students trained during practice for the acquisition of specific job skills. These skills will facilitate the integration to the working place of graduates trained in the PRACTICOR project. Other support activities relate to counselling and career guidance through visits to companies, presentations, panel discussions with representatives of the business world, workshops, simulations (job interviews, job fairs). All project activities are in compliance with the terms of the law no. 258/19 July 2007 on the practice of pupils and students [3].

In the specific project activities it was made an important number of scientific papers developed by the students their tutors and coordinators in the frame of the technological practice accomplished within the PRACTICOR project. It was made a selection of the papers by a competition and all selected papers are published in 3 volumes proceedings. The editing of these Proceedings was Assoc. Prof. PhD. Eng. Georgeta Emilia Mocuța and Prof. Habil PhD. Eng. Ioana Ionel from "Politehnica" University of Timișoara, Romania and the scientific reviewers was: Prof. PhD. Eng. Dumitru Țucu, Prof. PhD. Eng. Ilare Bordeasu, Lecturer PhD. Eng. Ioan Pădurean, from "Politehnica" University Of Timișoara, Prof. PhD. Eng. Gheorghe Șerban, Assoc. Prof. PhD. Eng. Rizea Alin Danie, Assoc. Prof. PhD. Eng. Alin Mazăre, Assoc. Prof. PhD. Eng. Anghel Daniel Constantin from University of Pitești.

3. RESULTS

At the beginning of the project it was funded arranging a space for management counseling activities



Fig. 1. PRACTICOR room at UPT.



Fig. 2. PRACTICOR office.



Fig. 3. PRACTICOR meeting room.

and organized practice activities in the project at Politehnica University of Timișoara (Fig 1).

Here is also the archive the supporting documents of practice (Fig. 2) and a meeting room (Fig. 3).

In this space the activities will run according to continue culminated in the preparation in the practices and procedures for after the project PRACTICOR is ended.

Figure 4 presents the comparison between the target number of members in PRACTICOR project for all period of three year and the present results realised after two and half year. First is number of selected a group of employees of practice partner company to participate in a tutor-training in a course completes with a certification of the competence recognized by the Ministry of Labour and Ministry of Education. So companies conducting practice under the guidance of tutors trained specifically in the project. They assisting students trained during practice for the acquisition of specific job skills. These skills will facilitate the integration to the working place of graduates trained in the PRACTICOR project. Target is 70 tutorial experts and by real interest of companies do to end 135 persons who are certified in this competence [4].

For the undergraduate students the initial it is propose 600 and until 2.5 year is realised 566. For the practice of students the target for three year it is 1995 and until 205 year is realised 1776.

The company's offer is with his specific field and the options of the students are selected after the evaluated of a questionnaire and after an interview between tutors professors and interest of students. An average of this situation is presented in Figure 5.

Contracts with several main companies to host students for their practice have been accomplished - more than 40, including a company from Germany.

4. CONCLUSIONS

The project will finish by october, 2013, and will have to be further implemented for at least 2 years, as a model for a better educational offer by the Romanian universities.

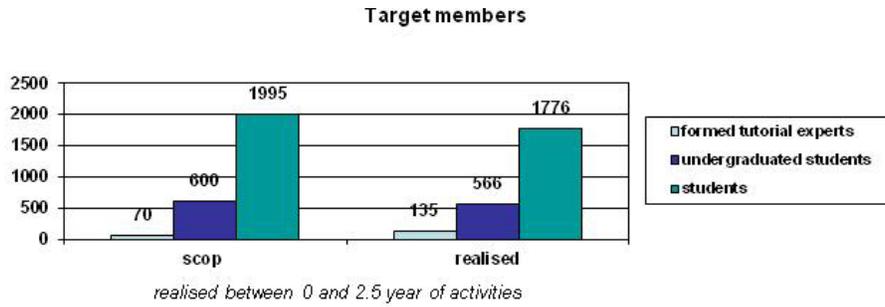


Fig. 4. Comparison between the target number of members in PRACTICOR project for all period of three year and the present results realised after two and half year.

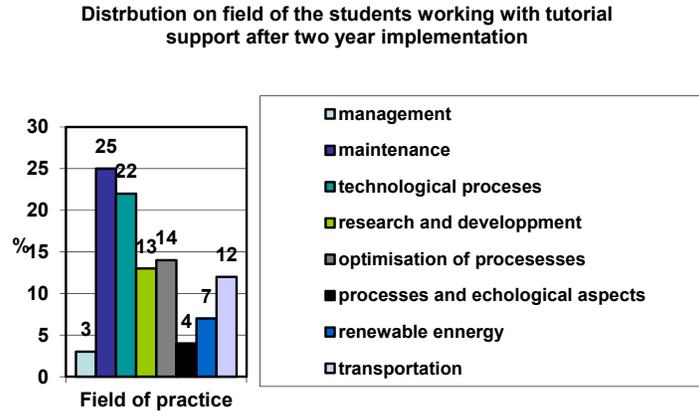


Fig. 5. Field of working in PRACTICOR activities.

It is a proof that „Politehnica“ University of Timișoara and University of Pitești are considering practical work as a necessity, not complementary but basic education, that must achieve for the benefit of the student, future employee, hiring company and finally for the society in its sustainable development.

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