11 Tailored University Student Practice contributes to Regional Development

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11.1 Keywords

Outcome Based Education – Technical skills – Competence – Professional pathways – Performance-based assessments – Employability.

11.2 Introduction

The regional development depends on many facts, but the quality and availability of personnel is one of the most important factors. Presently, entrepreneurs select the personnel, based on the development strategy of their company, and in correspondence to the local offer. It is more and more obvious that they focus on the most relevant segment – the professional youngest one, coming from the region, in order to reduce costs and count on continuity and progress. The development of technology contributed to the fact that more and more the necessity of educated professionals rises; they are invited for interviews and then also selected. The best chances are given to those students and/or graduates who have technical but also entrepreneurial knowledge, as well as specific practical training, best in connection with the future position. Experience gained during practical training internships, courses and special bridge connections between universities and enterprises contribute to develop a personnel market, in adequate concern to its real economic necessities.
Never the less, engineering is a key driver of human development. Engineering societies must provide valuable resources and support to both engineers and engineering students.
Thus the role of engineers for regional development is focused in the paper, based on the experience of the authors in running offer for carrier planning. At the Politehnica University of Timisoara (UPT) already several programs and support for complex development of students, including practical competences, are running and challenging the future tendency. Between desire and possibilities a gap is open, but not only because the lack of financing or professional orientation of undergraduate students, before starting engineering. Degrees in the different fields of engineering and engineering technology are accredited to ensure that the programs provide students with a top engineering education. The structuring of the curricula, with focus

on practical work, as well as new, more attractive teachings methods, such as learning by doing.
Being better prepared for the real life, the students can dream about a carrier, and start build it up, by accumulating special skills, and not coming into the situation not to get any job offer, or accepting whatever the market is offering, far from the expectation.
It is known that the labour market (in general but also in the joint regions in particular) is poorly accessed by young people, even highly educated. In EU countries, the youth unemployment rate reached 18.4 % by 2016, October
https://www.statista.com/statistics/266228/youth-unemployment-rate-in-eu-countries
(Figure 1), much more over general unemployment figures (Figure 2) and experts believe that this issue would lead to the failure of an entire generation if no rapid and active measures will be taken.
The importance to educate and offer to the youth, staring from childhood up to university and postdoctoral training, of best opportunities of study and evolution (in spirit and profession) is the only solution. The professional development must be connected to the personal possibilities and accorded to the social and economic needs of the society.
The investment in people' education, especially for young persons, must prevail; even the results are not accounted immediately, and cannot be associated to an absolute value. The real value is incommensurable, with long effect (in both directions, when the support is not offered).

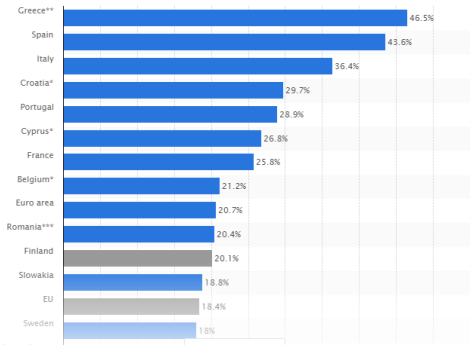

Figure 1. Youth unemployment rate in EU member states as of October 2016, (seasonally adjusted)
https://www.statista.com/statistics/266228/youth-unemployment-rate-in-eu-countries/

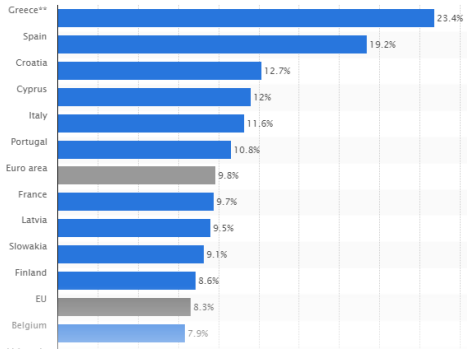

Figure 2. Unemployment rate in member states of the European Union in 10. 2016
https://www.statista.com/statistics/266228/youth-unemployment-rate-in-eu-countries/

Regional development depends a lot on the quality of the employees, especially young ones, as they represent the link between present and future, anywhere. The paper is focussing on: (i) importance of the training of the undergraduate teachers from vocational schools, (ii) importance of the curricula oriented offer of universities, and (iii) development of additional skills for students, in order to become more flexible and prepared for integration on the market, from the very beginning, in the field of their education as engineer. A measurement of performance of EU cohesion policy projects is indicated, which will be followed by the proposed frameworks for assessing the implications of network structure and what effect of performance of the partnership were achieved.The research and conclusions are based on structural funds financed programs, in relation to international partnerships aiming approaches in public policy implementation within the EU cohesion policy.

11.3 Future Trends & Tasks – Solution for the present Situation

"Many students will get tired and bored if they only are taught theory. An internship can be a good change for those students. Internship and projects done in cooperation with companies are important for students. Students come know the culture of the companies and can establish good relations to the companies. It can help them to find jobs, and many students find inspiration for their final projects. Internships and students projects are also important for companies. They get opportunity to influence the students (and teaching curricula as well), and it can help them to find the right employers" [Adapted from Source: Jorgen Hansen, (Denmark's Technical University, Copenhagen) chapter 2 "An international project / internship course" pp 51 - 64 in "PROJECT WORK AND INTERNSHIP THEORY AND PRACTICE- PRAXIS conference, October 2013].

Understanding and learning science and technology related subjects would be better if students were stimulated to experience reality instead of reading in a book, looking at a blackboard or listening to the teacher recite theory, in other words learning by doing.
The students need to be given the opportunity to see what knowledge can be used for, both during classes but also on the labour market (by internships, PRACTICE). This will make education more meaningful and will motivate them to learn and to work hard with their education and career [Adapted from Source: European Commission, CORDIS, Final Report Summary - GAPP (Gender Awareness Participation Process: Differences in the choices of science careers) Italy; Horizons in Physics Education (http://hopenetwork.eu/))].

Progress based on necessity is needed, but first the skills of students, future employees, must be developed. The skills must act additionally to the theoretical ones, and make a difference, by contributing to a better
There are many qualities and skills needed to become an effective engineer and to have a successful career. Engineering is dynamic so it needs people who can work across disciplines, with others, and continually adapt to new challenges http://tryengineering.org/ask-expert/what-skills-do-i-need-develop-become-effective-engineer

Good technical skills are of course also essential. In preparation for an engineering career students should focus on developing a variety of skills, including: technical competence, communications skills, leadership skills, and not last teamwork. In order to become an effective engineer one does not need to master each of these qualities and skills. The successful engineer is well-rounded, with knowledge of the key skills and an ability to apply them when needed
http://tryengineering.org/ask-expert/what-skills-do-i-need-develop-become-effective-engineer

The main real motivation for developing special programs in order to retrofit the Romanian university curricula and training (including tutorial practical work) for younger generation is based on the reality and necessity, meaning the following facts, as the authors indentified them, form major obstacles:

- Less undergraduate students choose engineering training as a future possibility of a carrier development
- Teachers in vocational schools are not having contact with latest state of art in modern, attractive teaching, and especially in novel science developments
- Lack of real models of success available for young generation
- No entrepreneurial information offered during study neither for undergraduate nor for bachelor or master students
- No connections between curricula offered in different universities, and exchanges of students are only possible by interpretation and special agreements
- No clear practical training, even credits are offered, a curricula exists, in most of universities;
- Great need of skilled engineers in basic sectors, such as Energy, Transportation, Advanced Technology, Environmental protection, etc.
- Trends for new high tech technologies implementation exist (or mainly is expressed by companies and industrial sectors), but no real clear offer from universities is spread out
- Great offer from the Sectoral program;
- Education is not sufficient financed in Romania, even national budged legislation is indicating a percentage of 6% from the GDP;
- Lack of interconnections between curricula in undergraduate and higher educational system is not worked out through solutions (for the teachers, for the students, for the stakeholders, strategy planners, etc.)
- Practical training in underground classes is missing or not available.
- All young people hope to “learn” in universities, regardless the lack of employment, and no matter of what the expectations are.
- No connections state of art of technique and state of art in teaching, in many cases
- Need for teachers to be trained as well, including modern teaching, less theory and interdisciplinary approaches and practical examples;
- No clear practical training curricula
- Practical work is not considered “a matter of importance” as all the rest (for ex. Mathematics, Physics, Chemistry, Technology, etc.)
- Great need of skilled ‘personnel’ not always with high education background
- Less language skills and contact to high ranked information from state of art knowledge is usual, Romania being on last position concerning literature availability (reading) according latest statistics;

- Nothing else is taught except ‘normal’ curricula, regardless for special capacities developments (such as languages, entrepreneurial features, communication and presentation skills, expressions, outfit, etc.)
- It is thus understandable why the expected outcome based education is only a dream and not a realization. But steps for further start are generated, mainly based on the financial support of the structural funds. Even Romania had a great opportunity, it did not succeeded in attracting and thus it is located on the last position between the member states.
- Despite investment in training in high value-added sectors, skills shortages persist. There are mismatches in the type of studies offered. In addition, learning mobility and career guidance measures as well as soft skills needed for the labour market, such as entrepreneurship and digital skills, are insufficiently developed. Participation in adult education is the lowest in the EU (1.5 % in 2014 compared with an EU average of 11 %). There are plans to better link curricula with the needs of employers, connect education and labour market databases and improve the functioning of the centres for the evaluation and validation of competences. [SWD (2016) 91 final COMMISSION STAFF WORKING DOCUMENT Country Report Romania 2016, page 59]

11.4 Technical Skills for Teachers

The technical skills of students are highly depending on those of the undergraduate pupils (enrolled in lower secondary education), that start the university training, in often cases without having benefit of any professional counselling or orientation and without any examination at the admission. A major fact is that in the present era of technique the progress is registering a very rapid development and mostly all teachers, do not have the possibility to be informed, especially because lack of offer, and also lack of money to support individually the reshaping and updating of the level of knowledge. The features that are state of art consist mainly of the following real aspects:

- No practical work, no consistent connections with the market problems and no orientation versus a fruitful carrier are offered to present students, especially engineers, even the high necessity on the market needs;
- No bridges between industry and educational offer are active, or only few links are pioneering starters;
- Lack of interest from the civil society to develop a young more educated generation of engineers, even it is supporting the financing of the studies, over more than 12 up to 15 (and over) years.

Thus a project CONCORD (National Network Training courses for teachers of Pre-University Education Vocational and Technical, POSDRU/87/1.3/S/61397, http://www.proiectconcord.ro/) was launched aiming directly to support , under the financial support of the EUROPEAN SOCIAL FUND, Sectoral Operational Programme Human Resources Development 2007 – 2013, Priority Axis 1 "Education and training in support for growth and development of the knowledge society", Key Area of Intervention 1.3 "Developing human resources in education and training". CONCORD project's overall objective consists of developing professional skills and technical up dated vocational and technical education, within a complex system of "blended learning", which includes: study on line and face to face, assisted by trainers; individual home works completed by on-line learning in an interactive

environment (e-learning MOODLE platform). The EU needs creativity and competitiveness and this is based especially on innovative science education. Thus the teachers were formed more versus applicability of knowledge, in technology, engineering, mathematic, physics, environmental issues, chemistry, etc. and they also must be trained for being able to raise the attractiveness of science education and scientific carriers and boost the interest of young people to support technically the development of a democratic, knowledge-based society. The project developed 11 professional training programs, including two types of programs in accordance to the Minister Order No. 4611/2005, with a maximum of 340 hours and 105 credit points (certified by national attested body): Environmental training program (Management and Communication and Information and Communication Techniques) and Thematic programs of type long way, on 4 domains and 11 sub domains, consisting of:

- two subjects from basic training;
- two subjects of specialized training.

Table 1 gives an overview of the offer, and Table 2 some main results, attesting the large interest of the teachers to be trained. Another main result is the initiating of a new project on the topic HRD – MENTOR.

Table 1: Offer of the CONCORD project for the educational training of teachers

NO	Programs/Course modules	No of courses
1	PROMANAGEMENT/Management & Communication	8
2	PROMANAGEMENT/TIC for starters (initiation)	1
3	PROMANAGEMENT/TIC for advanced persons	1
Thematic offer 1 "Core subjects" with the following areas		22
4	PROELECTRIC I	6
5	PROMECANIC I	6
6	PROMEDIU I	6
7	PROIT I	6
Thematic offer 1 "Fundamental Disciplines" with the following areas		33
8	PROELECTRIC II	9
9	PROMECANIC II	9
10	PROMEDIU II	9
11	PROIT II	6

Table 2: Results (main indicators achieved versus target) of the CONCORD project

No	Indicators	Target value (Nb of teachers)	Realized value (Nb of teachers)
1	228 Number of teaching staff trained	600	811
2	231 Number of participants ESF - Women	300	520
3	232 Number of ESF participants in rural	20	42
4	Rate in education and training prepared staff of certified (%)	80 %	92,1 %
5	236 Number of certified participants in training	480	1438

11.5 Educational Offer trough practical Training and Interships of Students

Over the last decades, environmental protection and climate change have been key subjects discussed in politics and the media. Hardly a day goes by without news about environmental protection or climate change, while another problem – the world's overpopulation – is only too willingly concealed. The world population is currently increasing by around 80 million people per year. This means an increase of more than 200,000 people per day, or 2.6 per second.

Thus, as result, quality control of all environmental natural ecosystems must be continuous developed and applied, according general rules, worldwide, transportation must be developed all kind of modern technologies must be implemented in industrial production sector, in the energy sector, including renewable energy sources and economical solutions that fit together economy, development & needs of the society.
Only the young specialist can be future active participants in these mentioned areas, and they must be trained for this scope, from the university offer and curricula as well, including very good contacts to real economy, professional knowledge and practical work & training.
A real success in the area of completing the technical development of students oriented versus economic and social needs in the frame of engineering and not only might be considered the PRACTICOR project (PRACTICOR: Transnational educational grid for the orientation, counseling and practical work supporting the carrier, in accordance with the labor market, in the knowledge society, www.practicor.ro), in the frame of the EUROPEAN SOCIAL FUND Sectoral Operational Programme Human Resources Development 2007 – 2013, Priority Axis 2 "Linking lifelong learning and labour market", Key area of intervention 2.1, "The transition from school to active life". It was continued by PRACTICOR EURO REGIO (Regional and Euro-regional partnership for the transition to the labour market through career counselling and internships at employers - PRACTICOR ® EURO-REGIO, www.practicor.ro/euro-regio).
The PRACTICOR ® model (Figure 3), for which UPT holds a registered trademark [Brand of Politehnica University of Timisoara, Romania, NB M2013/005320, 25.07.2013], is described, based on a network formed by enterprises, teachers and students. Also some new ideas of learning by doing, in the frame of an Experimentarium are addressed. By this way a smart tendency for offering to the students' best chances for an engineering carrier based on practical skills is developed, enhancing the labour market in the region as well. The authors propose to enlarge the model, by structuring a network also between the enterprises, and strengthen their power to support the practical development and experience of students. Development of success engineers must not be carried only by universities and state.

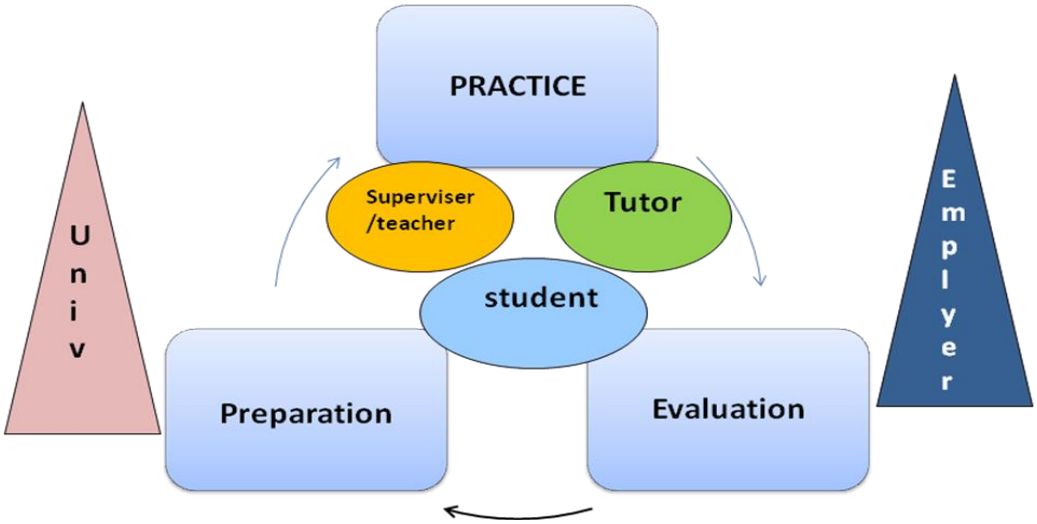

Figure 3. PRACTCOR trade mark, as registered for UPT [Brand of Politehnica University of Timisoara, Romania, NB M2013/005320, 25.07.2013]

One proposed and succeeded to turn into a success an innovative tutorial model of practice addressed to students from technical universities in order to increase their performance and quality of training (bachelor and master students), and open their skills and minds for them multinational and interdisciplinary perspectives. Getting into contact with real economic units, starting already from bachelor position, represents a real chance for the students. The practical work directly related to economic units is fully completing the information that the student receives as a graduate, developing specific, practice oriented capabilities and knowledge. The curricula of a main Romanian university (UPT-Politehnica University Timisoara, www.upt.ro) requires, at all levels, a practice training compulsory carried out (starting 2013/2014): 2 months in total for a bachelor and 7 weeks for the master student. As main future objective of the present UPT strategy one focuses upon the fact that the practical work must not be formal and not accomplished under unrealistic terms, and must answer social needs and correspond to the expectations and background of the students, in correlation with the economic needs in the companies/market.

The success and importance of the project and the fact that the idea was totally agreed by the students, generating finally an acceptance of the abbreviation as a standard state of art in technical universities, determined the author to apply for a patent holder of the name and new opportunities of continuation, on higher level. PRACTICOR® EURO-REGIO: Regional and euro-regional transition to the labor market through career counseling and internships to the employer was planned.

A future engineer, who is granted a major role by the members of the group in which he will act and contribute professionally and who, by interpersonal relationships, fulfils a clear role in human resource structure, must be developed through higher education doubled by practical work, focusing as main features, mainly some of the following attributes:

- Cognitive experience both in up-dated techniques and economics, marketing and dissemination;
- Communication skills and power of self-understanding and evaluation of own capacities and needs and qualities & defaults;
- Judgment power and understanding the transmitted message;
- Resolute capacity, creativity in thinking and action;

- Availability to knowledge and understanding of technical information (literature, brochures, etc) and designs (drawings, schemes);
- Availability for cooperation and interpersonal communication within the group;
- Self-confidence and confidence versus another;
- Attitude to overcome the obstacles to attaining the proposed profit;
- Flexible style of approach to the task and interaction with 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;
- Professional skills doubled by interpersonal skills.

In this spirit contracts with several main companies to host students for their practice have been accomplished. Thus, business people and companies that intend to hire our graduates were active and personally interested involved in the training system, generally in the educational system, as they will represent the future employers of our present young engineers, and quality and a lot of other information and features development of the young generation are expected.

"From the point of view of the evaluation of the students, the medium degree in which the defined skills have been acquired is satisfactory. About the comparison between students who have realized their projects with local and international companies, it can be concluded that the behavior of the two groups is similar. The major differences are found when evaluating skills related to the communication in second language, those related to work in an international context and the ability to travel" [Miguel Fernandez, Samuel Ver Hoeye, (University od Oviedo, Spain) chapter 7 "Enterprise oriented Praxis internships" pp 139-153 in "PROJECT WORK AND INTERNSHIP THEORY AND PRACTICE- PRAXIS October 2013].

The general aim of the mentioned cooperative project consists of the establishment of a transnational active network regarding the educational guidance for the future engineers (represented by students and undergraduate middle and superior school students), counselling and practice for offering a better carrier and change to develop and integrate into the society of the future young high educated workers (students of all level), coupled with the present necessities of the labour market, in the knowledge society in development. This project proposed an innovative model of practice offered to students from technical universities, in order to increase their performance and quality training under the coordination of a tutor representing the economic system and a tutorial support from the university training & teaching staff. Reviving the notion of practice applied and directly related to economic units, under the technical guidance of tutors and educational staff, will complement the theoretical information that the student receives as graduate or master and completes fully his basic studies. The tutors representing the economic society are formed as well through the project founding, in order to receive both scholastic and educational skills, being fully able to coordinate practical work for students, at demand, in accordance to the planned strategy and present trend of development in their own companies (state owned or private ones).

Practice and internships are considered to be the key link between specialist and the social needs of the economic environment. Currently there is a great demand for professionals trained to support sustainable development tendencies of the European Community, especially in energy, transport and modern technologies, including agriculture domains. These ever-increasing necessary trends is resulting from basic needs, arisen both from companies of all kind as well from industrial units,

and must result from a training strategy of the universities. Presently, the Law Practice (No. 258/2007) correlated with the Education Law are setting conditions and ongoing regulation for the practice and counselling, which did not exactly become true, especially the lack of funds, and the lack of connections to employers. As result in most universities, practical work (practice) is organized on non standard level, without opening towards applicable and modern needs of the economic society, without a strategic concept or financial support, thus the practice is turned into a personal responsibility taken either by students themselves (if they have any discernment) or by teaching staff that are their guidance, officially. PRACTICOR model is assuring best conditions of application and implementation of the Law Practice for pupils and students by students and university students in the national system (bachelor) and practical ways to support them. Not only will enable fulfilment of all items and their application, but will also provide a framework financial technical and innovative support that, once formed, will continue in this regard. The student will have the opportunity to make professional contacts with companies and potential employers operating in the market in the priority areas in which to prepare and can embrace practical training through real issues related to economic and technical needs of companies, but and community being in sustainable development.
Figure 4 is giving the data concerning the structure of the fields/themes requested by the students, in accordance to the offer from the enterprises/entrepreneurs/agencies, economic units/. The Percentage of students, beneficiary of professional orientation & practice (internships) in real economic units, with tutorial support is based on total of (4132 +815) students.

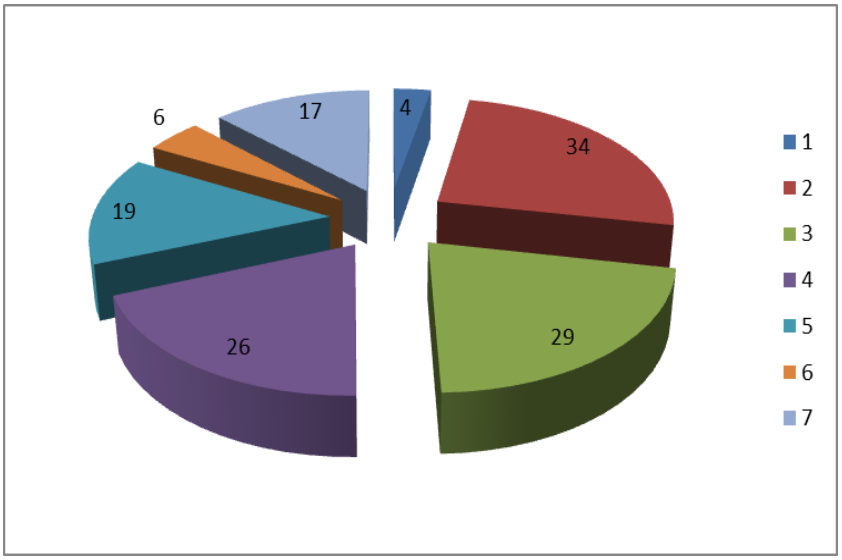

Figure 4.: Percentage of students, beneficiary of professional orientation & PRACTICE (internships) in real economic units, with tutorial support (total 4132 +815 students),
1- Management, 2 - Maintenance, 3 - Technological Processes, 4 - Research and Development, 5 - Optimization of processes, 6 - Quality of processes and ecological aspects, 7- Renewable Sources, energy quality and systems

Contracts and activities within several main companies hosting students for their practice have been accomplished (more than 72, including a company from Germany, one University from Hungary). The companies were involved not only in practical supervising of the students, during PRACTICE, but also in the training

system (being tutors with certification), generally in the educational system (giving ideas to shape the curricula, themes for the final dissertation, etc.).
ELI-NP (Engineering Maintenance for ELI-NP - Extreme Light Infrastructure - Nuclear Physics) is another project that financed special skills development for students, in order to prepare, from now on, already the future specialist to work in this outstanding infrastructure.
Extreme Light Infrastructure (ELI) is the only European and International Centre for high-level research on ultra-high intensity laser, laser-matter interaction and secondary sources with unparalleled possibilities. Its pulse peak power and briefness will go beyond the current state-of-the-art by several orders of magnitude. Because of its unique properties, this multidisciplinary facility provides magnificent new opportunities to study the fundamental processes unfolded during light-matter interaction. ELI creates a platform, where Extreme Light applications for the benefit of society will be dynamically promoted [http://www.eli-np.ro/about-eli.php]. Laser-based Nuclear Physics pillar will be built in Magurele (near Bucharest/Romania) and focuses on laser-based nuclear physics. While atomic processes are well suited to the visible or near visible laser radiation, as a third pillar ELI-NP will generate radiation and particle beams with much higher energies, brilliances suited to studies of nuclear and fundamental processes. It is for sure that very talented students must be attracted even from their university studies; and this was the basic idea of the ELI POSDRU (Intermediate Body for the Regional Operational Programme Human Resources Development project.

11.6 Examples from Questionnaires (243 respondents), Lessons learned

Responses to the question “What is your impression about the tutor, you worked with, during the practice stage in the economic unit?” - addressed to the student participating in the program.

- The tutor (female tutor) was open, calm and willing to help and explain everything new and difficult to understand. I think that was involved in our training from the practice and learned many new things.
- During practice we had faced wonderful experiences with great people. I believe that my guardian has done his job exactly as it should, was involved, was open with us, he explained and not least, listened to our questions.
- From the beginning, the tutor taught us the basics that we need to know about the area in which I did practice. It was friendly, answered all our questions.
- The tutor was a competent proven good teaching because I understood what he taught us, motivated us and was involved in our activities. At the end of anecdotal and helped with filling specifications.
- My tutor is a funny guy, sociable, yet serious. If I had any queries I could ask him and we responded in small details. I asked myself something and stood next to me, explaining to me until I understood. It has been a pleasure to have him as guardian.
- My tutor is a person who knows how to organize and manage a team. He is a person who knows his duties; knows how to understand us, how to explain and cover our leakages, while being still a friendly person. E used appropriate language, according to the working environment.
- In terms of personal and social qualities I consider her a very good professional, very responsible, balancing thinking and actions and even

looking like she enjoyed the work that I realised. It is a very organized person, hardworking and has great pleasure of working with us, young people.

- The involvement of the tutor was excellent because patience gained in so many years of work and experience has helped him to deal with us and giving us a lot of information and knowledge. The language used was adequate explanations that were fixed and we can use in the future. Proven organizational skills during practice motivated me to practice solving theme.
- My tutor is a special person, a tutor with many qualities, especially in terms of the degree of involvement in this internship. He is a generous man, kind, very open communication with a very natural language, with extensive experience and a very rich baggage of knowledge in the field where we worked. He is a tutor who deserves all our praise, always motivating us to solve and achieve thematic work practice.

Special thoughts were also expressed by the students, meaningful in terms of **what they really were impressed of**:

- "In any field work you have to do things ‘as by book',
- "Going to school, watch out for hours and learn that you do; you'll see later how good it will be for you",
- "Do what you love and take advantage of student years because you will not meet with them",
- "No matter what profession you choose, you must be aware that you do throughout life",
- "Work where you like and do what you love",
- "You must put your heart into everything you do; just so that you succeed in life",
- "If you do what you like you will be the best".

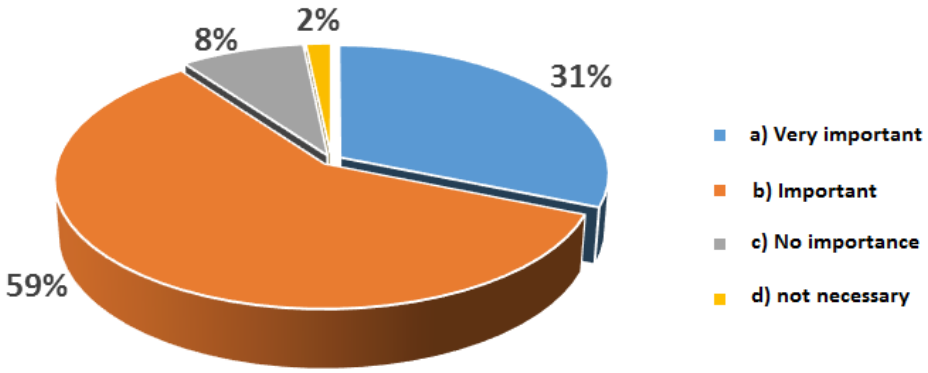

Figure 5.: Answers for questions: How important do you consider that the student practice activities for your professional preparation are?

The practice activities were rated by students as important and very important in a proportion of 90%, which shows that students become aware of the crucial importance of the practice activity in their professional preparation during university (Figure 5).

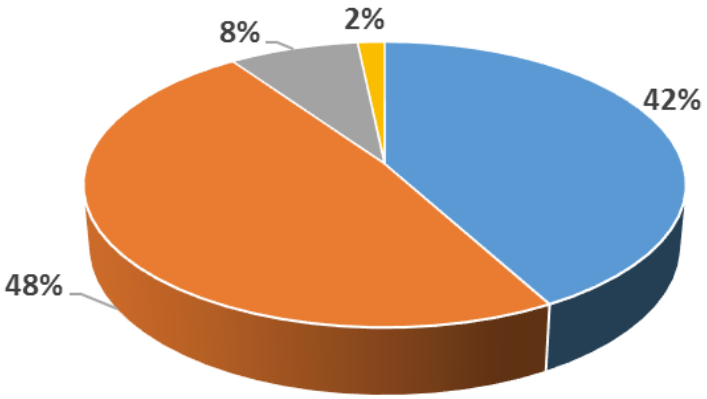

Figure 6.: Answers for question: Do you consider the student practice offers provided by the university or the direct relationships with the companies in the field to be enough to be appropriate?

a) YES, they provide access to student practice positions within companies/special topics (42%),
b) YES (48%),
c) NO, because the student practice is conducted only in the form of laboratory work, even if this is less important (8%),
d) NO, practice does not matter, what is important is the theoretical knowledge accumulated during studying (2 %).

90% of the students considered appropriate the student practice offers provided by the university, because they facilitate the access within companies with experience in student practice activities (Figure 6).

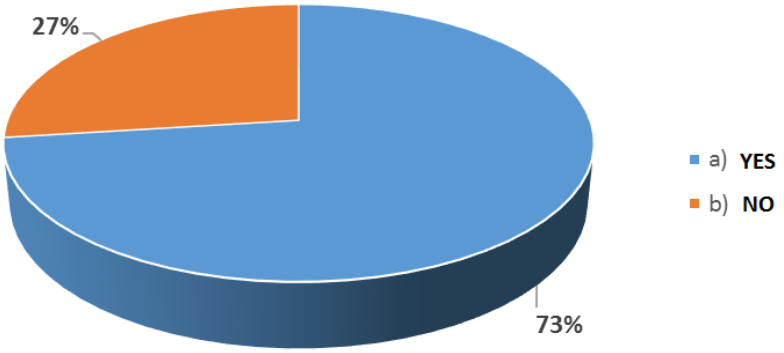

Figure 7.: Answer to the question: Have you ever received logistics and material support to conduct student practice?

A gratifying result is that most respondent students (73%) received logistics and material support to conduct student practice (Figure 7).

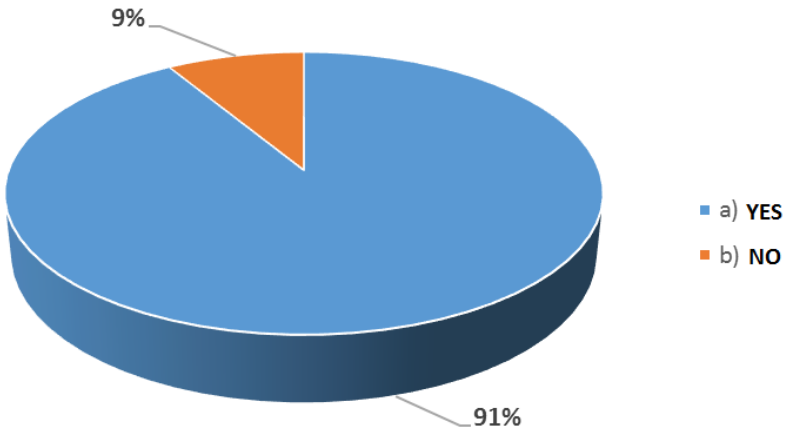

Figure 8.: Answer to the question: Do you consider that student practice must be carried out through activities organized by the university?

Over 90% of the respondents believe that the organisation for the student practice should be carried out by the university's implication, offering practice positions, in close connection (official) with local companies (Figure 8).

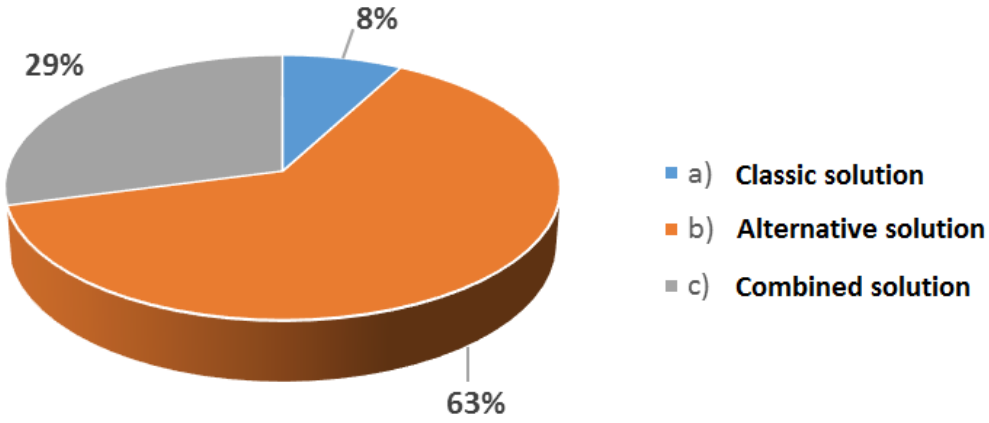

Figure 9. Answer to the question: How do you assess the realization of student practice by choice within certain companies?

a) Non-compliant solution, as certificates do not show reality
b) Good alternative solution, by finding a practice position by one's own resources, the student choosing a convenient place to do her/his student practice (theme, location, other interests)
c) Combined solution, targeting companies of one's own free choice and student practice periods organized by the university

It can be observed (Figure 9) that only 8% of the surveyed students believe that a good solution in the certification of student practice is to present certificates from the company where they carried out the practice.

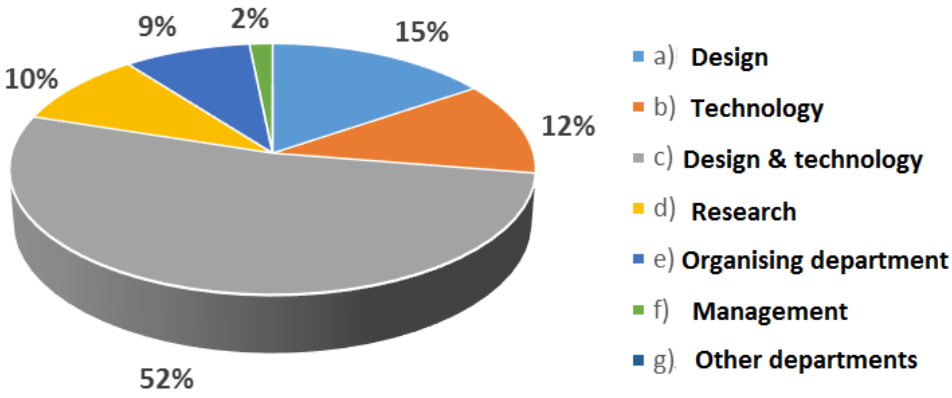

Figure 10.: Answers to question: Regarding student practice in your own field, this should relate to:

a) Design,
b) Technology,
c) Design and technology,
d) Research,
e) Organization,
f) Management,
g) Others, usually interdisciplinary fields.

Most of the surveyed students believe that the periods of student practice should refer to the field Design and execution (79%), followed by the fields Research (10%) and Organization (9%) (Figure 10).
Regarding the way student practice is carried out, students' opinion is divided, some preferring Active participation in order to carry out some works (21%), others Full time during summer (21%), followed by Visits (20%) (Figure 11).

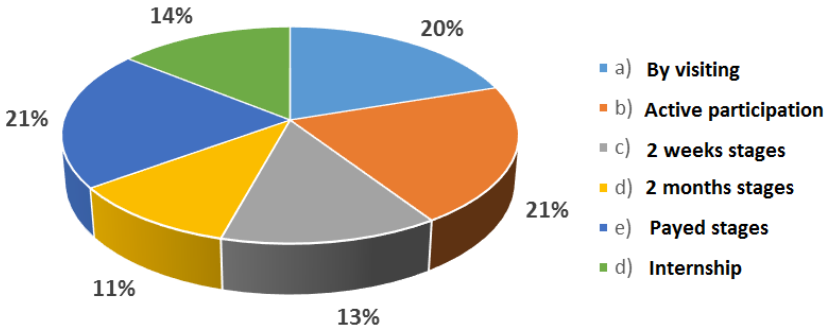

Figure 11.: Answer to the question: How do you think that students should participate in the practice activity?

a) As a visit, the number of hours being covered only by this activity of practical counseling;
b) Active participation in order to carry out some works;
c) 2 week period annually;
d) 2 month period during one year of study;
e) Full time during summer;
f) Internships, paid or unpaid, in the 3rd year of study.

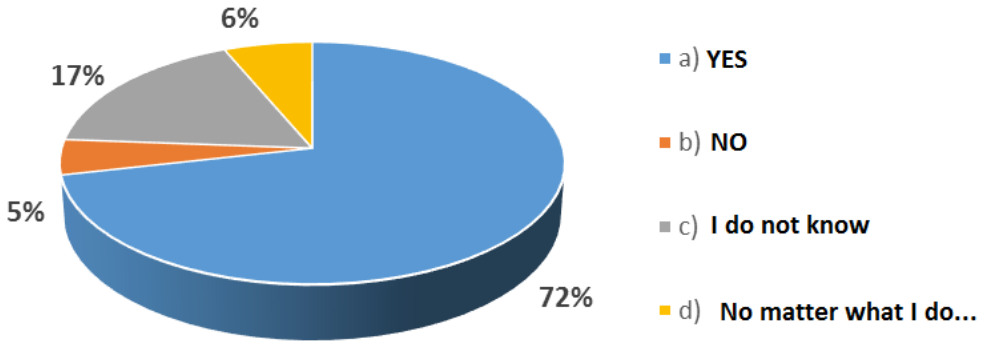

Figure 12.: Answer to the question: Do you think that conducting a student practice increases your employment opportunities?

a) YES;
b) NO;
c) I DO NOT KNOW;
d) No matter the student practice conducted, I believe that the whole system of relationships will enable my employment, i.e. finding a first job.

It stands out that 72% of the respondent students consider that conducting a student practice increases their chance of finding a job (Figure 12).
Regarding the opinion on the knowledge acquired by students in their practice activities carried out previously, students believe that this knowledge was Fundamental, but without application (53%), Very useful (25%), Current, with immediate applicability (14%) (Figure 13).

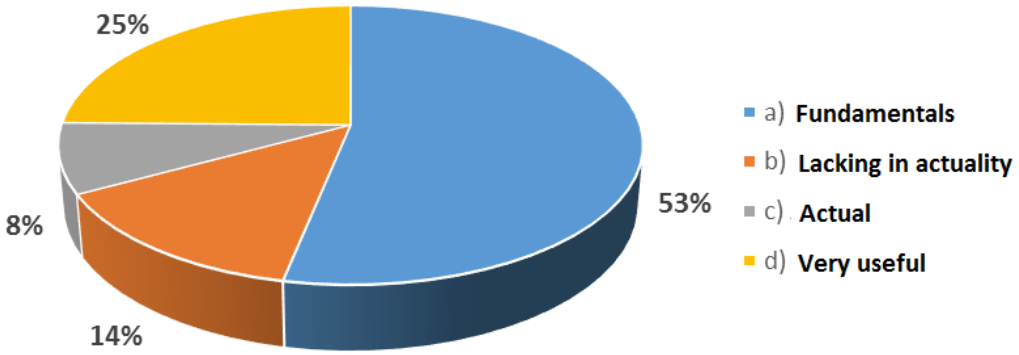

Figure 13.: Answer to the question: How do you consider the knowledge you acquired from the practice activity so far:

a) Fundamental, but without immediate application,
b) Lacking actuality,
c) Current, with immediate applicability,
d) Very useful, it complements my knowledge and widens my horizons/employment opportunities.

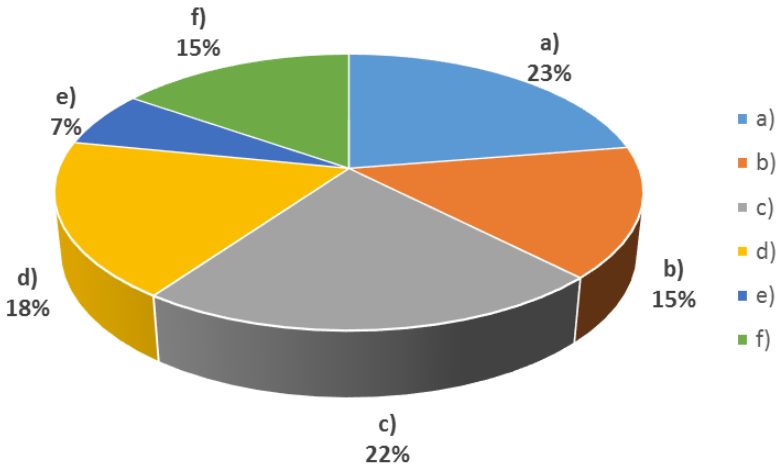

Figure 14.: Answers to the question: There are different methods for career development through student practice. Which do you think are the best?

a) Mandatory annual student practice in institutionalized regime, according to curricula
b) Student practice covering a number of hours required by the curricula, carried out in jobs individually identified
c) Student practice in the 2nd year of study (in summer) according to a number of hours required by the university curricula, given that specializations are usually chosen at the beginning of the 3rd year of study
d) Student practice performed in the 3rd year of study, according to a number of hours required by the university curricula, with an employer
e) Continuous student practice, tutored by a specialist either in the university or in the economic environment or combined
f) Student practice performed after a period of professional counselling and guidance, which must begin in the 1st year of study

The best methods for career development through student practice are considered to be the following, according to the students surveyed: 23% - mandatory annual student practice, according to curricula; 22% - student practice in the 2nd year of study and 18% - student practice in the 3rd year of study (Figure 14).

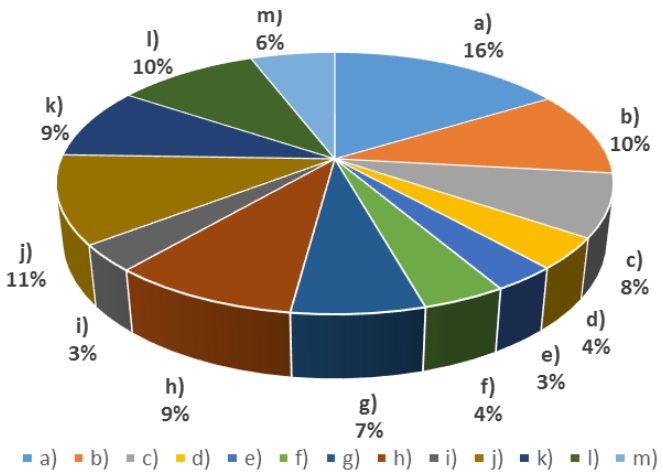

Figure 15.: Answer to the question: Which do you think are the skills that can be developed through participation to student practice activity (maximum 10 answers can be indicated)

a. knowledge and understanding of some basic concepts of advanced and priority technologies of the economy,
b. compliance with regulation/ procedures/ schedule/ timetable,
c. creativity,
d. intellectual property right,
e. ICT,
f. environmental protection,
g. current level of information,
h. importance of teamwork quality,
i. redaction,
j. technical expression,
k. socializing with colleagues and business representatives,
l. group integration,
m. Speech and writing.

Among the skills that students would like to develop during the period of student practice, the following are included: knowledge and understanding of some basic concepts (16%); technical expression (11%); compliance with regulation/ procedures/ schedule (10%); group integration (10%); teamwork (9%) and socializing with colleagues and business representatives (9%) (Figure 15).

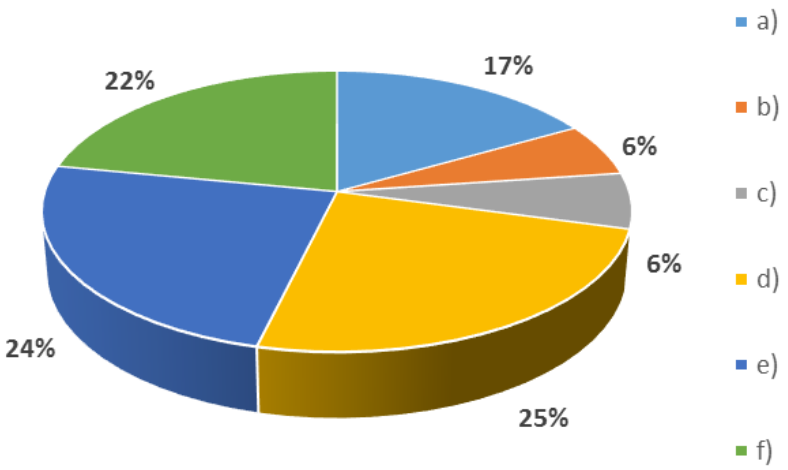

Figure 16.: Answers to the question: Since you are a member of the project's target group, which do you think are the most effective activities offered for counseling (you can circle maximum 3 variants):

a) Counseling through educational courses,
b) Individual interactive work on the portal,
c) Watching educational movies offered by the portal,
d) One day thematic trips,
e) Several days thematic trips,
f) Job shadow-type experiences.

Among the activities carried out within the project Practicor EuroRegio, 25% of the students believe that the most effective was One day thematic trips, followed by Several days thematic trips (24%), Job shadow-type experiences (22%) and Counselling through educational courses (17%). Activities such as Individual

interactive work on the portal and Watching movies were seen as less effective (Figure 16).

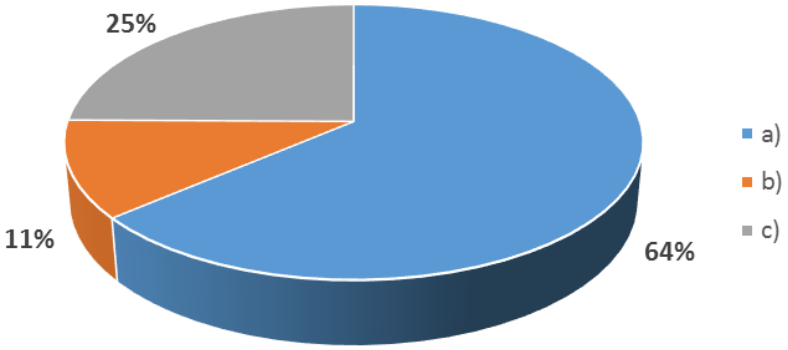

Figure 17.: Answers to the question: Do you consider that your future evolution and career development depend on the student practice performed?

a) YES, they depended very much,
b) NO, they do not depend, luck and knowing how to cope with are the ones that matter,
c) I refrain from an answer.

A proportion of 64% of the students surveyed believe that professional evolution and career development depend on the student practice they performed during the university degree (Figure 17).

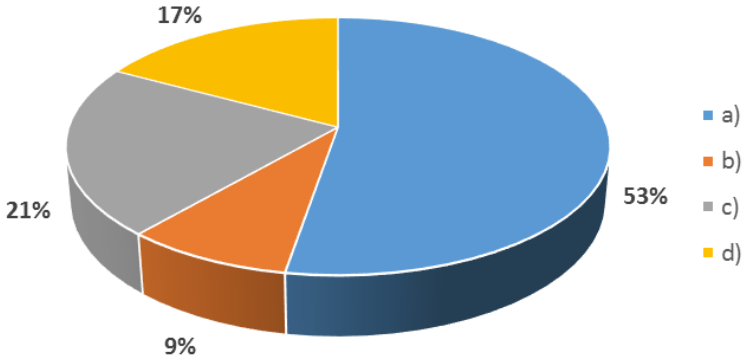

Figure 18.: Answers to the question: Do you think that the theoretical educational offer is correlated in relation to the load of the student practice in the university curricula?

a) YES,
b) NO,
c) I refrain from an answer,
d) Too much theory, lacking correlation with/cross-reference to the actual economic needs.

The majority of students (53%) think there is a good correlation between the load of the student practice in the university and the theoretical formation. However, 17% of the respondents believe that there is too much theory in the university curricula (Figure 18).

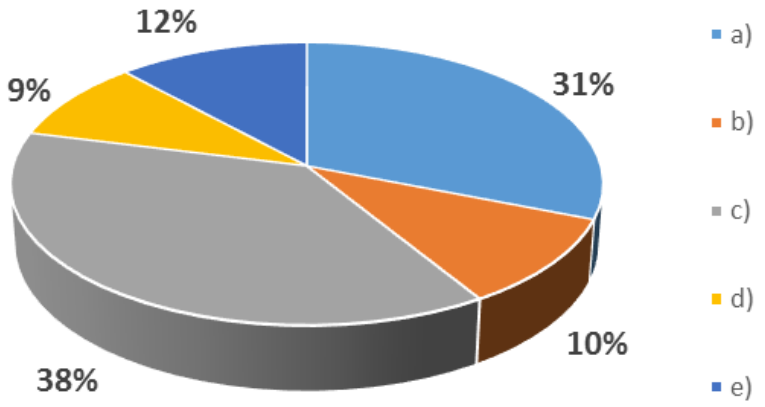

Figure 19.: Answers for the question: Which do you think is the greatest difficulty you faced when you went before an employer?

a) Lack of minimal technical knowledge
b) Lack of communication skills
c) Lack of practical skills
d) Lack of knowledge of a foreign language
e) Lack of some technical and economic knowledge

The greatest difficulty faced by students when coming before an employer was Lack of practical skills (38%), Lack of technical skills (31%), Lack of technical and economic knowledge and Lack of knowledge of a foreign language (10%) (Figure 19).

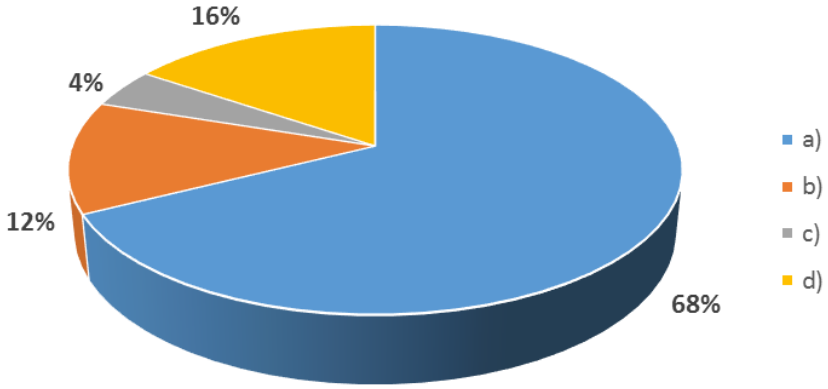

Figure 20.: Answers for the question: Has the topic of your graduation thesis or final/specific discipline project helped you in your professional formation?

a) YES,
b) NO,
c) Almost at all, I work in a totally different field,
d) Very little.

A proportion of 68% of the students surveyed believe that the final/discipline projects they did during university helped them in their professional formation (Figure 20).

11.7 Conclusions

Practice and internships are considered to be the key link between specialist and the social needs of the economic environment. They assure a local development as key issue.
Currently there is a great demand for professionals trained to support sustainable development tendencies of the European Community, especially in energy, transport and modern technologies such as IT, including agriculture domains.
These ever-increasing necessary trends is resulting from basic (not only local) needs, arisen both from companies of all kind as well from industrial units, and must result from a training strategy developed by universities and offered to its students, in close connection with the regional demand and necessities of the economy and society!
The words of King Ferdinand I, spoken at the inauguration of the original Politehnica University of Timisoara building (the present Faculty of the Mechanical Engineering of the university) became the motto that guided many generations: “It is not the walls that create a school, but the spirit which reigns in it” and represents the spiritual inheritance turned in facts by both students and professors that were formed and served this stable cultural and scientific unit in time. This spirit is motivating us, as contemporaneous, to build up an even brighter future!

11.8 Acknowledgement

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- POSDRU/90/2.1/S/48816,– PRACTICOR (Educational transnational network on guidance, counseling and career practice correlated with the labor market in the knowledge society);
- POSDRU/87/1.3/S/6139,– CONCORD (National Network of Training courses for teachers of Vocational and Technical School continuous Education);
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