

## European Co-financed Projects as a Way to Improve a Didactic Potential of the University

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**Abstract** — This article outlines some aspects concerning realization of the project entitled *Modern learning – development of didactic potential of the university*. Lublin University of Technology accessed the project, which is co-financed by the EU, in September 2008. According to the schedule, until March 2013 the aims of the project should be reached, what means that the process of education will be adjusted to the requirements of national economy and labour market. What is more, the quality of education will increase. A structure of the project was described, as well as methods of introducing particular modules. There were listed things which had already been done, together with some statistics, tables and graphs presenting efficiency of the project. As a conclusion, there were described activities which have not already been done (or which are in progress), but crucial to the project. In general, those activities will not only determine new standards in the process of education and its quality, but also will affect and improve many formal and organizational issues at Lublin University of Technology.

### I. INTRODUCTION

Since the September 2008 Lublin University of Technology (LUT) has been realizing the project entitled *Modern Education – Development of University's Didactic Potential*. This idea had been placed among 287 other propositions from the whole country, competing with each other for the funds assigned by the European Commission, which is a hundred millions of euro for 32 institutions.

In the process of strict selection Lublin University of Technology has been granted of 90 points, whereas at most 100 points could be assigned to the one proposition. As the result, it had been enough to take the 22nd place of the rank list outlining all 32 institutions that had been become eligible to be co-financed.

The Lublin University of Technology is the only higher education institution in its region which had been awarded in the mentioned competition. It has to be underlined that overall amount of assigned funds will almost reach the level of 2.5 millions of euro. As shown in the Fig. 1, majority of those funds will be covered by European Social Fund. Implementation of the project into the structures of the University is planned to be done until the end of March 2013, nonetheless at the current stage of its realization it is undoubtedly possible to determine positive influence on the quality of education in the scale of the whole University.

The main aim of the project is to adjust the level of education at LUT to the real requirements and necessities of industry and labour market. This task also includes improvement of quality of education together with widening and expansion of educational offer.

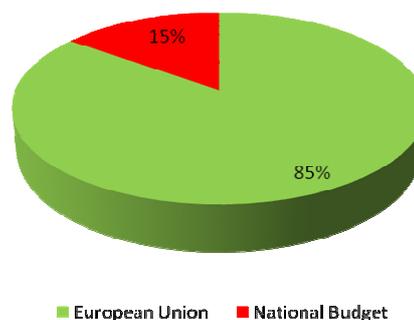


Fig. 1. Co-financing proportions of the project

General aims mentioned above will be achieved by realization and application the following particular aims [1]:

- Increasing the number of people who graduates courses that are crucial from the industrial point of view. This could be done by spreading educational offer, creating new specialty courses and introducing curricula for supplementary classes for those students who have problems with math and physics.
- Improving the qualification level among the academics and the LUT administration employees by organizing studies, trainings and workshops in the country and abroad.
- Enabling knowledge transfer procedures between University and industry through lifelong learning courses and doctoral grants.
- Expanding cooperation range between academic and business environments by continuing the idea of organizing 3-month practices available for students and helping them to be up to date with situation on labour market by organizing conferences, discussion panels and job fairs.
- Appropriate preparation of graduates to entering the labour market as the result of attendance to special workshops and personal trainings which develop skills necessary after graduation but not included in the standard course curriculum.

Taking into consideration fields of impact, the project described above is a widespread and complex program which elements are grouped into 9 big thematic modules implemented by certain faculties or other units in a structure of the University. The following modules of the project could be specified:

1. Material Engineering (introducing and realizing education process at the second-level course, starting of lifelong learning courses, cooperation between higher

education and industry institutions in the country and abroad in the field of exchange of academic personnel).

2. Renewal Energy Sources – spreading the range and increasing the quality of educational offer (doctoral grants, new curricula, courses and lifelong learning activities, industrial practices and trainings for academics).
3. Increasing qualifications of the University employees in the context of language skills (foreign language training with the TOIEC or LCCI exam at the end of the course).
4. New lifelong learning course – Industrial Design.
5. Cooperation between LUT faculties (new interdisciplinary courses like Power and Information Engineering in Environmental Engineering or Effective Energy Management containing courses taught in English).
6. Increasing competences of University's administrative employees by attendance to a special course Management and administration in higher education institutions.
7. The Engineer Age subproject (a module introduced by Students Career Advisory Unit operating within the structures of the Lublin University of Technology; this module includes personal training, 3-month practices for students, supplementary classes curricula for math and physics, preparation for active job searching, conferences and job fairs).
8. Developing of didactic and pedagogical skills of the academics (workshops: interpersonal communication in the process of the knowledge passing as the way to increase quality of education level, methods of scientific works and articles preparation, new teaching techniques presented on the basis of the e-learning and the blended-learning, databases as the way to gathering information, voice emission and the rules of giving a speech).
9. Project coordination, accountancy, administration and evaluation of results.

Taking into consideration education in electrical engineering, the most important is the second module – Renewal Energy Sources. Its structure has been shown in the Fig. 2.

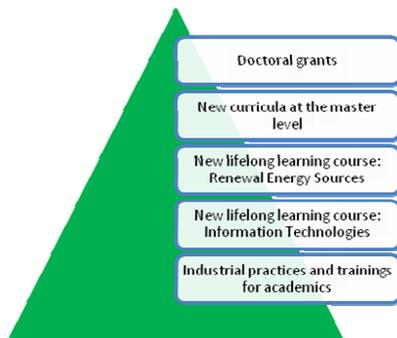


Fig. 2. Structure of the second module of the project

## II. CURRENT SITUATION

At present in all project activities about 1955 men and women are involved, which is 87% of assumed number of project's participants. Until September 2010 there had been 223 persons who completely finished their involvement in the project modules. However, until now 1715 persons have been still attending the project. Gender structure of all people who have taken part in the project shows Fig. 3.

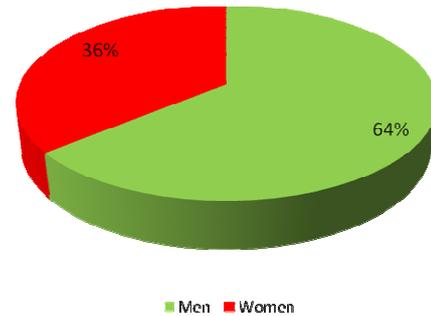


Fig. 3. Gender structure of all project's participants

Among them over 680 are the students of Lublin University of Technology who benefits the individual trainings and supplementary classes of math and physics. Remaining part of people at most consists of administrative and didactic employees of LUT who decided to take part in free courses, workshops improving didactic skills or foreign language course. One person had just come back from the didactic practice in Università Politecnica delle Marche, Italy.

In March 2009 special lifelong learning course of Information Technologies was started in the Electrical and Information Engineering Faculty. In this case a number of candidates was much more than actual possibilities of enrolment. In the result it was necessary to choose only 20 among over 80 candidates. The course consists of two-term studies finished by the final exam. During 224 hours of theoretical and practical classes students are obliged to complete following subjects:

1. Office applications (8 hours of lectures and 16 hours of laboratories). Aim of the classes: to introduce and develop methods of work with popular office application instruments. Participants will get skills which are necessary to prepare and format text documents, spreadsheets and graphic presentation. They will acknowledge theory of Visual Basic for Application in order to learn how to write individual MS Office macros.
2. Computer graphics (8 hours of lectures and 16 hours of laboratories). Aim of the classes: to familiarize students with professional systems and applications for 2D and 3D vector graphics edition (AutoCAD, SolidEdge) and raster graphic edition (GIMP). Students will be able to create and modify basic 2D and 3D vector objects and also to manage attributes of drawings and objects. As the result they will learn how to make

## 15. EDUCATION

- and print technical design and what are the possibilities of digital processing of raster graphics.
3. Information systems designing (6 hours of lectures and 6 hours of laboratories). Aim of the classes: to make the participants familiar with information concerning designing and application of information systems. They will study methodology of structural analysis and designing of information systems together with UML language. Students will obtain skills of designing functional structure (primary and additional processes), information structure, user interface and information system modelling.
  4. Network operating system on the basis of MS Windows and Novell (14 hours of lectures and 14 hours of laboratories). Aim of the classes: to make the auditors familiar with modern solutions offered by such network operating systems like MS Windows and Novell NetWare. Among the topics of discussion there will be communication standards in computer networks, available network devices and cabling topology.
  5. Network operating system on the basis of Linux (14 hours of lectures and 14 hours of laboratories). Aim of the classes: to prepare students to effective using of Linux operating system, starting from the basics like distributions' type comparison, OS and applications installation and maintenance, console navigation.
  6. Web pages designing (14 hours of lectures and 14 hours of laboratories). Aim of the classes: to familiarize attendees with the newest standards concerning web page designing, HTML language obligatory specification, CSS technology, and PHP programming script language. In the scope of the subject there are the newest methods of creation, testing and updating web pages.
  7. Computer programming (8 hours of lectures and 12 hours of laboratories). Aim of the classes: to introduce visual, object and event oriented programming constructions and their usage in the process of autonomous application building in the integrated programming environment like Delphi. Students will learn how to use the most important components of Delphi in order to design advanced user forms which are able to process graphic, numeric and text data.
  8. Database systems (8 hours of lectures and 12 hours of laboratories). Aim of the classes: to introduce the theory and practical issues concerning designing of database systems. Students are obliged to learn SQL language. The main task of this course is to give the students a possibility to get practical skills of creating database systems in MySQL. In details, they are learning how to define database scheme, tables, queries, perspectives, reports, etc. They are mastering in the most important SQL language elements and methods of database securing and administrating.
  9. Programming in SQL language (6 hours of lectures and 6 hours of laboratories). Aim of the classes: to prepare

auditors to manage relation database systems using SQL language.

10. Physical phenomena and processes modelling (8 hours of lectures and 10 hours of laboratories). Aim of the classes: to make attendees of the course familiar with basics of modelling certain phenomena and physical processes that appear in the environment. It is necessary to demonstrate physical basics and laws which are specific for heat exchange and electric field. Methods of making electrical and thermodynamic models will also be introduced.
11. Diploma seminar.

In September 2009 the enrolment for new course had been announced, which was Renewal Energy Sources studies. During 224 hours of theoretical and practical classes students were obliged to complete subjects as Renewal Energy Sources, Wind Power Engineering, Cooperation Between Renewal Energy Sources and Energy Storages, Integrated Systems of Solar and Geothermal Energy, Industrial Devices Powered by the Solar Energy, Restrictions of Economy, Ecology and Law in Renewal Energy Sources Technology, Autonomous Renewal Energy Sources Dedicated to Supply Habitable Buildings, Technologies of Extracting and Processing Biomass and Biogas, Designing of Electrical and Heating Installations Supplied with Renewal Energy Sources, Small Hydro Power Plants and Diploma Seminar.

At the beginning of April 2009 first group of students started their 3-month practices in companies located along the region. In 2009 one hundred students took part in such practices programs. It has to be underlined that there were much more candidates, however the number of vacancies was limited. Among graduates of this program over 40 per cent had been proposed to continue cooperation with the companies they had practice before. In 2010 the number of applications to the program also had been greater than expected. Unfortunately it had to be limited to 69 students. This year not only students but also employers are particularly interested in the project. More than a hundred companies declared their willingness to cooperate in future. Until now only one company refused its partnership. In order to develop graduates competences and prepare them to enter the labour market the LUT Career Advisory Unit organise additional courses for students. Those trainings are not located in the main course curricula and consist of three thematic parts: integration and team building, competence management and autopresentation during job interview. Statistics made at the end of 2009 revealed that until then 390 students have taken part in mentioned trainings. Nonetheless it is planned to train totally 600 students until the end of 2010.

A very important element of the project is the series of supplementary classes aimed at first-grade students who have problems with passing math and physics exams at the beginning of their courses. A lot of students from all faculties and courses were significantly interested in attendance to the additional lectures. Unfortunately, it was impossible to ensure this form of education to all

interested students. As it is shown in the graph below (Fig. 4), in the 2008/2009 academic year 518 students attended the classes. Among them were 68 students of Electrical and Information Engineering Faculty. In this academic year there are 469 attendees and 51 students of Electrical and Information Engineering Faculty among them. It has to be underlined that described project positively affected the process of education, because about 80 per cent of students who attended additional lectures have passed their math and physics exams.

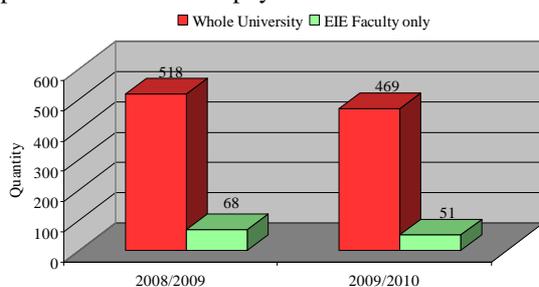


Fig. 4. Structure of students attending the supplementary classes

To sum up, at this stage of the project some tasks have been completed whereas other are in realization phase. Table 1 presents a set of indicators showing which tasks are currently in progress.

TABLE I  
ACHIEVED PROJECT INDICATORS

Indicator name	Target indicator value	Indicator value from the beginning of the project			Indicator realization level
		Women	Men	Overall	
Number of students who finished practices in industrial companies	190	72	111	183	96%
Number of new specialistic courses	4	N/A	N/A	2	50%
Number of doctoral grants	20	1	10	11	55%
Number of realized practices for academics in the country and abroad	27	1	4	5	19%
Number of attendees of <i>Industrial Design</i> lifelong learning course	72	14	20	34	47%
Number of attendees of <i>Management and Administration in Higher Education Institutions</i> lifelong learning course	40	31	9	40	100%
Number of attendees of <i>Effective Energy Management</i> lifelong learning course	100	1	11	12	12%
Number of attendees of <i>New Materials in Engineering</i> lifelong learning course	44	2	28	30	68%
Number of attendees of <i>Information Technologies</i> lifelong learning course	56	5	15	20	36%
Number of attendees of <i>Renewal Energy Sources</i> lifelong learning course	56	6	7	13	23%
Number of participants who had been certified in English language skills	70	30	47	77	110%
Number of didactic hours of math and physics supplementary classes	2250	N/A	N/A	2250	100%

### III. CONCLUSION

As the conclusion it should be assumed that the project *Modern Education – development of university's didactic potential* have been introducing added value into a lot of aspects, fields and activities in the structure of Lublin University off Technology. An education offer has been enlarged by starting a lot of new courses, which made studying at LUT more attractive. What is more, a new perspective has been created for those academics, who want to improve their didactic qualifications and language skills. Simultaneously many students-involving activities have been introduced. Young people now have the opportunity to gather practical knowledge concerning methods of job searching and get necessary experience before graduation. This experience could help the students in better understanding theory acknowledged in the standard process of education. As the result it is possible to notice positive changes in the students' attitude to their University. It is supposed that those changes will spread as long as the project will be continued.

### IV. REFERENCES

- [1] A. Wac-Włodarczyk and P. Billewicz, "Lublin University of Technology as a Partner of EIE-Surveyor Project. Report on Fulfillment of Task 1.1 – Tuning Questionnaires" *EAEIE 2008 Conference Proceedings*