PROJECT LAB AS A LEARNING TOOL FOR DEVELOPMENT OF PROJECT MANAGEMENT COMPETENCES AT UNIVERSITY

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Abstract

The article introduces the concept of the Project Laboratory (Project Lab) as an innovative learning tool in university. The concept of the Project Lab successfully integrates the students' project management academic knowledge and practical skills, attracting available external and national EU funding and utilizing the professional experience of the faculty in project development and management. The essential part of the Project Lab is students' teamwork – development of real life project application. The aim of the article is to analyze Project Lab pedagogic aspects – learning methods and gained competences, as well as to present and interpret the results of the Project Lab in the RISEBA University. On the basis of the analysis of the results, the further development of the Project Lab is presented for discussion.

The study is done using the desk research, providing literature review about learning methods and project management skills, as well as the project funding opportunities. Besides, an empiric study on Project Lab implementation in Latvia, RISEBA University is carried out, including analysis of quantitative and qualitative data gained during the last three years.

On the basis of the study results the authors have made conclusions and recommendations for further Project Lab development. The authors are coming up with further Project Lab activities in university, diversifying the Project Lab concept for international and multidisciplinary teams and different study levels. In order to measure the efficiency of the Project Lab, the authors have identified the next steps in the improvement of the Project Lab, such as development of the monitoring system of the project outcomes, which can be integrated in the university quality management system, as well as applying the Project Lab concept in multinational teams both for international students and the Erasmus exchange students. The Project Lab as a learning method may be adapted in other universities, regardless of the country of residence.

Keywords: teaching project management, active learning, linking theory and practice, project management competences

1. INTRODUCTION

The publicly available EU and national funds from one side, and a gap in practical linking of academic environment and the working life from the another side have led to a new solution in RISEBA University – The Project Laboratory (Project Lab) as a learning tool for development of professional business project applications during the study process. The concept of the Project Lab integrates the implementation of the students' project management academic knowledge and practical skills, attracting available external and national EU funding, utilizing the professional experience of the faculty in project development and management. The concept of the Project lab is developed basing on the case in RISEBA University. The Project Lab is realized as an internship, where the students apply their knowledge in practice, working in teams under the supervision of the teacher. During the internship students strengthen the project management knowledge and train their professional skills, particularly the soft skills. After piloting the Project Lab concept for three years, results

are summarized and analysed both from professional project management perspective and pedagogical viewpoint.

The aim of the research is to present the Project Lab as a learning method, including the learning outcomes and through these aspects to analyse the results and perspectives of the Project Lab in the RISEBA University. The article provides answers to the research questions: In what extent the Project Lab is linked to the practise? Which EU funds are most popular for the Project application development? Which project management skills do the students gain during the Project Lab?

The first chapter provides pedagogical justification of the project Lab concept – providing overview of different learning types, particularly the active learning, problem based learning and cognitive learning used in the Project Lab. Also the set of skills, defined by Springer and Price is presented in this chapter.

In the second chapter the research methodology and design are described, including the research aim, object and the research questions.

The third chapter includes the description of the Project Lab concept, and provides summary and analysis of the Project Lab results in RISEBA University during 2013-2015.

The conclusions are based on the study presented in this article, and include concrete recommendations for the further improvement of the Project Lab concept and its implementation. The conclusions are generalized and applicable in other universities. Also the conclusions include several theses for further research discussion in project management education area.

2. THEORETICAL BACKGROUND

2.1. PEDAGOGICAL JUSTIFICATION

From the pedagogical viewpoint, the Project Lab students are adults, working in parallel to their studies, and most of them have work experience.

Therefore, Project Lab is dealing with teaching adult persons, and that is why the **adult teaching methods** should be referred**.** According to Rogers (1996) adult education is student-centred, that teachers of adults should be more concerned with what their students are doing than what the teachers as teachers are doing.

Project Lab is **dynamic learning**, especially from the teaching viewpoint. The teacher is active all the time reassessing the student participants, evaluating process. Amending and redefining the goals, reconstructing the methods and content and learning all the time from the participants. The learners too are active, clarifying their intentions and changing their objectives. The teachers and learner join together in relation to a third element (project), a series of agreed but changing goals (Rogers, 1996).

Project Lab is based on **active learning**. Learning is a positive activity on the part of the learner calling in almost all cases for an act of the will (Rogers, 1996). Active learning has been explored by Dale (Dale, 1969). According to the traditional theory of active and passive learning, Dale divides all teaching and learning into two big groups – active and passive. Depending on the level of activity of the students, they can better learn the subject. As more active the students are involved in the learning process, more permanent is the knowledge gained. Passive learning includes such activities as reading, listening, viewing images, and watching videos. According to the Dale's theory, learning passively, after two weeks students remember 10-50% of the subject matter. However, active studies, including workshops, presentations, simulations and doing real things help the students to remember up to 90% of the experienced subject. Project Lab is a typical active learning, as the students learn by doing,

Project Lab is **cognitive learning**. The process of cognitive learning consists of recall and recognition of knowledge, comprehension, understanding the material, exploring it more actively; the application of the comprehended knowledge, using it in concrete situations; then exploring each new situation by breaking it down into its constituted parts (analysis) and building it up into new concepts (synthesis), and finally evaluation in which the learners come to assess the new knowledge, to judge its value in relation to the realization of their goals (Rogers, 1996).

Project Lab is **experiential learning**. Learning cycle starts with experience, proceeding through reflection on experience, and leading to action which in its turn becomes concrete experience for further reflection (Rogers, 1996). Roger states, that each of the learning cycle stages calls for different learning approaches and appeals to different kinds of persons – experimenters or pragmatists, activists, reflectors and theorizers. In Project Lab this is organized by carrying out the team work, where each student can take his/her natural role and give the best contribution to the team work.

Experiential learning is closely linked to the **problem based learning**. Problem based learning motivates students to define the problem, search for the concepts and cooperative learning. It improves communication skills, and supports a powerful classroom learning process which uses real-life problems. Problem-based learning requires people work with a group or a team, copes with different situations, improves self-learning and self-evaluation skills and motivates people to practice these skills, identifies the steps which are required for implementing the problem based learning as following: a) clarifying concepts, b) defining the problem and listing the concepts which need to be learned, c) brainstorming, d) systematic classification, d) formulating the learning objectives, e) lectures and self – study, f) clearing up and, g) reporting (Ganiron T.U., 2014). Project-based teaching improves the quality of teaching and learning and contributes to cognitive development of higher level involving students into solving of complicated and innovative problem solutions, teaching them complicated processes and procedures such as planning and communication, promoting authentic research and self-directed learning (Lasauskiene and Rauduvaite, 2015).

Many studies support the fact that students participating in project-based learning experiences show significantly higher learning outcomes than traditional instructional methods (Frank and Barzilai, 2006).

Students of the Project Lab usually have different academic backgrounds, interests and experience, applying different learning styles in the cognitive learning process. The **learning styles** in the Project Lab can be (Rogers, 1996):

- **Analogical thinking** – use of existing knowledge and experience – Project Lab students can use their multidisciplinary knowledge and experience in development of a new project;
- **Trial and error** – Project Lab students are allowed to make mistakes and to learn from them at the same time this method can be called discovery learning, where students are active, not passive learners, however this learning requires ability to reflect and analyse – summarize the experience and reflect on it;
- **Meaningful wholes** – to move from simplified wholes to more complex ones, to select out essential wholes from non-essential ones.
- **Less memory, more imitation**, where students rely more on understanding for retention, not memory, and use demonstration (e.g. present and discuss the achieved results) for learning.

The traditional constructivism pedagogic theories emphasize the **learning by doing** principle. This principle joins all the above mentioned learning types. Findings of the Shariff, Johan and Jamil (2013) study shows that giving students' group projects enable students' soft

skills to be developed as the tasks are embedded into the real authentic tasks and in actual environment; and with proper supervision and guidance from the lecturer as project advisor, it accentuates learning by doing.

2.2. PROJECT MANAGEMENT COMPETENCES

According to the Project Management Institution forecast of the project management industry growth (PMI, 2013), it is expected that between 2010 and 2020, 15.7 million new project management roles will be created globally across seven project-intensive industries. Along with the job growth, there will be a significant increase in the economic footprint of the profession (PMI, 2013).

As the project management becomes more important, effective education is vital for organizational competitiveness. In the nearest years, there is expected increasing demand for graduates of university project management programs in all types of industries and also a high demand for other professionals with project management competencies.

The exposure of project management students to 'real' situations through the provision of appropriate learning environments, and the need for them to reflect on their own skills in, and attitudes to projects, has been put forward as an essential strategy to promote more sensible and adequate responses to the emerging complexities we see in project practice (Cordoba and Piki, 2012).

In order to provide the up-to-date project management skills, it is important to follow the tendencies in the project management teaching. Ramazani and Jergeas (Ramazani and Jergeas, 2015) have studied the pedagogic and educational aspects of the project management, and have identified three main factors which educational institutions should consider in developing project managers:

- **developing critical thinking for dealing with complexity**. Ramazani and Jergeas (Ramazani and Jergeas, 2015) explain that a one-size-fits-all approach to project delivery is not practical anymore. Projects create a need to develop reflective and critical thinking by going beyond routine in project education. Some of the ways how to develop reflective skills are cooperation between academics and practitioners using real cases, simulations, role modelling and other active methods of teaching. Ramazani and Jergeas (Ramazani and Jergeas, 2015) emphasize the importance of working as a team because project manager does not have all of the required skills that the team members have.
- **developing softer parameters of managing projects, especially interpersonal skills as opposed to just technical skills**. Ramazani and Jergeas (Ramazani and Jergeas, 2015) research shows a need for a balance between project managers' technical and leadership competencies. The focus of most project management education in the context of universities has been on the technical skills deemed essential to achieve project success. Another possible reason is believed that acquiring technical skills is easier than acquiring the soft skills. Most employers today expect workers to demonstrate and excel in many 'softer' skills such as teamwork and group development. They are keen to tap into these vital soft skills obtained during study and periods of work experience, rather than just degree-specific knowledge (Pant and Baroudi, 2008).
- **preparing project managers to be engaged within the context of real life projects**. Ramazani and Jergeas (Ramazani and Jergeas, 2015) explain that the context and environment play a significant role. There is a need for project management students to be involved in real settings. This is one of the best ways to facilitate the transition from theory to practice. Developing these competencies requires more commitment and cooperation from both educational institutions and participants.

Also Springer (Springer, 2013) has studied the project management learning outcomes, and faces a problem that project management has to have rigorous standards and guidelines to define the work of project management professionals, but there is not a single set of project management competencies agreed and defined. He explained that the competencies include the behaviours indicative of what is required to be successful in the respective discipline. Competencies are manifested behaviours, which can be developed through training.

On the basis of empiric study of the companies, Springer (Springer, 2013) has defined the main **quantitative and qualitative project management behaviours** that are identified by the companies. **The quantitative behaviours** include the key training on the tools and techniques that enable monitoring the costs, schedule, and technical performance baseline.

The Qualitative behaviours, resulting from this research (Springer, 2013) are - understanding the global environment - seeing the bigger picture; understanding leadership, understanding team dynamics and individual personalities - team building and team development; understanding decision making; understanding the business case for diversity and attendant inclusivity.

Furthermore, as shows Springer (Springer, 2013) research, 85% of the behaviours of the top researched companies believe qualitative behaviours are at least as important as quantitative. This allows concluding that training of qualitative behaviours contributes to preparation of project managers demanded by the labour market. Springer's research shows behaviours a project manager shall have, but it doesn't specify the necessary skills for a project manager.

Project management as a profession and project management skills are mentioned as highly demanded in the near future market in Latvia (Ministry of Economics, 2014). The survey points out that project manager will be one of the most demanded professions in future. The project management skills, together with such skills as language knowledge, multitasking and multidisciplinary skills, leadership skills, international communication, flexibility and creativity are mentioned among the most market demanded qualities both in business and state sectors.

Recent literature reports a clear link between successful project outcomes and presence of such project management skills (Price, 2013):

- **Technical skills** (business analysis, change control, configuration management, contract management, domain knowledge, estimating, facilitation skills, financial management, meetings management, project planning, report writing, requirements definition, resource scheduling, risk management, vendor management, workshop design and delivery)
- **Managerial skills** (communicating skills, decision making, delegating skills, HR management, organisation skills, problem solving and analysis, self-organisation, staff development, stakeholder management, team building, time management);
- **Interpersonal skills** (conflict management, dealing with difficult people, empathy, emotional intelligence, influencing, integrity and honesty, motivational leadership, negotiating skills, relationship building, resilience and adaptability).

Project management skills help students solve problems, become leaders, think critically, develop as team players and take responsibility. It provides experiences that help build the 21st-century skills most desired by future employers, while equipping students for success in their personal lives (Fromm and Trilling, 2013).

3. RESEARCH METHODOLOGY

The study is done using the desk research and literature review, as well as an empiric study - analysis of quantitative and qualitative data gained analysing the results of the Project Lab implementation in Latvia, RISEBA University.

Literature review is used to explain pedagogic approach and project management skills. The literature has an important function to help provide background and context to the research, establishing the research problem and the gap which researches aim to fill thought the considerations of previous work (Tong, Thomson, 2015).

Desk research, particularly the internal one is used to describe Project Lab concept. The internal desk research is used for this research because its main advantage is that it involves internal and existing organizational resources to organize the collected data in such a way that it is not only efficient but also usable (Management, 2008).

Research is based on **quantitative method** (collected data about Project Lab) and **qualitative method** (feedback analysis of Project Lab students). Cresswell (Cresswell, 2013) states there are three ways to mix methods: 1) two solitudes of mixed methods, 2) sequential use of mixed methods, 3) integrated use of mixed methods. In the Project Lab research are used two solitudes of the mixed method approach, whereby both quantitative and qualitative studies feed the results but they are done separately. Two different methods are completed separately and the results are combined after the fact.

The aim of the research is to present the Project Lab as a learning method, including the learning outcomes and through these aspects to analyse the results and perspectives of the Project Lab in the RISEBA University. During the research the authors answer the research questions: In what extent the Project Lab is linked to the practise? Which EU funds are most popular for the Project application development? Which project management skills do the students gain during the Project Lab?

In order to answer the research questions, besides the review of learning methods and project management competences, the empiric analysis of the first three years Project Lab piloting is carried out. On the basis of the analysis of the results, the further development and potential improvements of the Project Lab are presented for discussion.

4. ANALYSIS OF PROJECT LABORATORY

4.1. THE PROJECT LABORATORY CONCEPT AND ORGANISATION

The Project Lab concept is developed basing on the needs of the labour market, opportunities of using university academic capacity in development of the students' professional skills, and current EU funding availability for innovative business development. The idea of the Project Lab concept is based on the University study program requirements for development of professional project management skills, and availability of EU funding for development of the project applications.

The aim of the Project Lab is to apply project management theory in practice, by development of real life project applications – searching for project funding opportunities, formulating project idea, aims and tasks in accordance to the selected project idea, and funding program opportunities, development of the project team and managing teamwork, looking for project partners and communicating with them, communicating with the relevant state/international agencies administrating the project programs, development of the project application in official form.

The Project Lab is organised in the framework of Internship. It is integrated in the curriculum of Postgraduate Business studies, and it corresponds to 9 ECTS, including both

face-to-face classes (lectures, workshops, group and individual consultations), as well as active learning and work in teams and individually (Project Laboratory Course Specification, 2015).

The Concept of the Project Lab is based on the active and experiential learning – learning by doing – making experiments, gaining experience, reflecting on that and then conceptualizing the gained experience. The Project Lab learning process allows making mistakes and stimulates students to learn from their experience. It is supposed that during the Project Lab students strengthen their theoretical knowledge in project management and gain tacit knowledge as well as qualitative and quantitative skills necessary for practical project management.

After completing the internship in the Project Lab, the students have achieved the intended learning outcomes, and are able to find relevant publicly available information on project funding, to formulate the project idea, in agreement with the project applicant, and the formal requirements of the funding programs, possess an ability to develop a project proposal according to the formal requirements, and are able to present the project proposal to the project specialists – experts.

The students' experience in the Project Lab depends also on the customers involved in the Project Lab activities. There are identified three types of the Project Lab customers: the student's residence company, the residence university, and the external customers. The first choice is the student's residence company, as it keeps the highest motivation for project application development. The external project ideas are usually presented to the students by the teacher and the representatives of the companies during the classes.

The Project Lab teachers' role is more important than the one in traditional internship or usual classes. In the Project Lab the teacher is giving lectures – review on the project management theory and summary in development of the project proposal, moderating creative thinking and discussion workshops, as well as supporting students as an individual tutor. The teacher is supervising the whole project development process, monitoring the team work and project development.

All of Ramazani and Jergeas (Ramazani and Jergeas, 2015) ideas were considered in the establishment of the Project Lab. The students work in real settings, solve issues of various levels of complexity, and apply the theoretical knowledge acquired during the internship. During this process the students apply critical thinking in analysing and assessing the information they get from their own experience in the communication and studying of official and corporate documents.

In order to describe the Project Lab organisation process, the authors have examined similar experience from Finland, particularly Turku University of Applied Sciences (TUAS). TUAS has developed a teaching and learning method, called Research Hatchery. This method is used to involve student teams actively in development of research projects. Project Lab is similar to the Research Hatchery, therefore describing the Project Lab organization the authors refer to the project development process phases, described by TUAS (Rasanen, Kyllonen, 2013) - planning, initiating, working and closing phases. As well as the Research Hatchery, the Project Lab study process includes five main phases: preparation, planning, initiating, working and closing (see Figure 1).

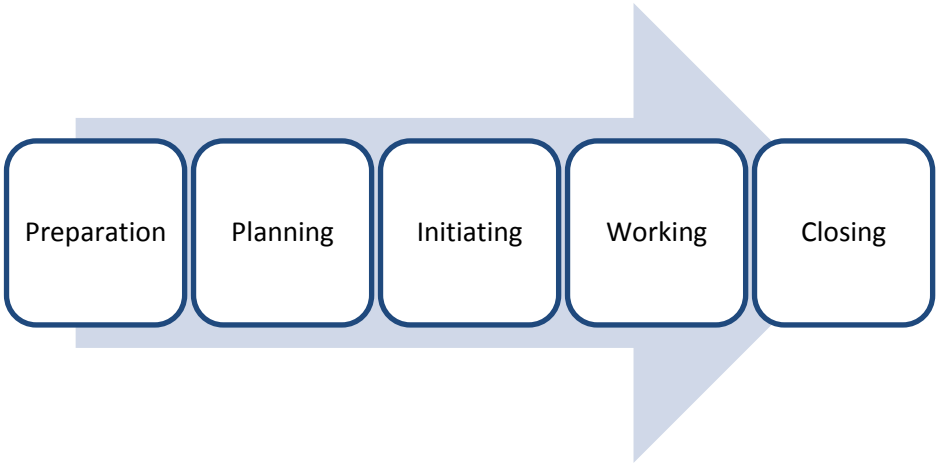

Figure 1. The main phases of the Project Lab study process.

In the preparation phase, the students review the theoretical knowledge in the scope of project application development and learn about different project funding opportunities, select the most appropriate project ideas and their relevance to the funding program opportunities. In this phase the teacher together with students reviews different customer offers, and the students choose the most appropriate project direction for them.

During the face-to-face classes, the students review their theoretical knowledge on project development, and link them with practice by preparing real project applications in teams.

The theoretical part of the face-to-face classes is illustrated with practical samples. The theoretical part includes such important topics as the basic activities in the project development process (project planning, mission and aims, project scope, time and task schedule, project management and monitoring, project team). Also, the students learn the basic rules for filling out the project application forms and submission regulations, study the sources of information for project funding programs, as well as learn about searching international, national partners and communication with them.

During the workshops students discuss their project ideas and search for project funding opportunities, selecting the most relevant ones for the implementation of their ideas. If necessary, under the leadership of the teacher, there are organized the creative thinking sessions (e.g. development of the project ideas, formulation of the project title, assessment of several project ideas and selecting the best one, etc.). Students are recommended to visit the national or international agencies, administrating different funding programs, and to learn communication with them and benefit from their advice.

In the project planning phase, the students define the project topic and develop the project concept; they agree on the team members and elect the team leader; students also plan the time for project development and the main activities, as well as assign responsibilities of the team members. In this phase it is important to understand the project funding sources and available funding. In the end of the planning phase, the student tams present the project concept in the class, and it is discussed with teacher and other classmates to clear all the questions.

In the project initiating phase the project is created. Students agree on the project concept, aims and expected results, methods, duration, resources. In this phase the students develop also the project work plan.

In this phase student teams meet individually, share their responsibilities. This phase includes both group work and individual work, where students learn to accomplish the intended tasks in time, as well as discuss the achieved results.

In this phase, the students also meet in a workshop in a class. During the workshops the students discuss and share their experience in cooperation with the agencies, and project application progress. If necessary, students use creativity techniques for development or assessment of the project ideas.

In the case of development of cooperation projects, students are supposed to organize the partner search, and communication with the potential project partners. Students learn about different partner search tools, but also they practically gain partnering communication skills. Especially valuable experience is the communication with cross-cultural partners.

In the project working phase the biggest part the project application is developed. If in the previous phase the students agreed on the concepts, terms and responsibilities, as well as the brief work plan, then in this phase they fulfil their duties according to the agreed. In this phase the major work for development of the project application is done. That requires the team work, individual work, tutorials with teacher and also with the relevant administrating agency experts.

In case of international projects, also the networking and communication with project partners has to be done. In this phase the students face most of difficulties, but at the same time the learning is the most effective. The teacher role is to support, motivate and encourage, as well as to point out the most visible mistakes. It is very important in this phase that the student groups meet and exchange experience, this way learning from each other.

In the closing phase the project application is developed and presented. Student groups come together to finalize the project application form, prepare the internship report and develop the internship review in a presentation form. During entire internship process, students fill in the internship diary, pointing out what, when and by whom was done, how long time did every activity take. During the Project Lab internship or after that, the students are supposed to submit the project application At the end of the internship, the students provide the internship review in the format of PowerPoint presentation, covering the main project issues, challenges faced during the project, teamwork description and also a feedback on the internship as such. In the final workshop students present their projects, thus exchanging their experience and learning from each other.

4.2. SUBSTANTIATION OF THE PROJECT LAB AND ANALYSIS OF THE PILOTING RESULTS

The Project Lab concept and organisation described above, was developed on the basis of studies both of pedagogical benefits of the active learning to link theory and practice, as well as the study of the labour market needs and EU and national project funding opportunities.

Latvia as the Member of the European Union (EU) is implementing EU funded projects since 2004. According to the statistic data (Ministry of Finance, 2015), in the programming period 2007-2013 the largest financial instruments were ERDF, ESF and CF. In the programming period 2007-2013 Latvia has received EUR 4.53 billion through EU funds (ERDF, ESF and CF). In addition, Latvia also received financial resources within the framework of the European Community initiatives EQUAL and INTERREG, as well as other EU financed programmes. Most well-known of them are Youth in Action, Comenius, Erasmus, Leonardo da Vinci, Grundtvig, LIFE programme, Cross-border cooperation

programmes, European Economic Area Financial Mechanism and the Norwegian Financial Mechanism programmes, Latvian – Swiss cooperation programme.

Projects of these and other areas in the planning period 2007 – 2013 were submitted by public, private and non-governmental organisations (NGOs), groups of inhabitants, and individuals; however, in order to spend all of the available funds, quality of the project applications is a crucial precondition.

The wide offer of the EU and national funding programs was one of the main reasons for development of the Project Lab concept as the academic platform for development of project applications.

The authors of the paper have studied the first results of the Project Lab in RISEBA University, covering the time period from 2013-2015. All the research results are obtained analysing the student's Internship reports- project applications, diaries and internship report presentations, where students were asked to provide feedback on the Project Lab process and impact to their professional skills. From the moment the Project Lab was launched until 30 June 2015 forty students have been involved in the Project Lab and they have prepared 23 project applications. The total amount of project financing has reached 1'282'377 EUR.

Considering the EU offered options of the Structural Funds (SF) in Latvia, the majority of the projects developed in the Project Lab, are the SF funded projects.

Analysing the funding mechanisms of the Project Lab projects, the most popular funding mechanism within the Project Lab has been ERDF with 6 project applications, including 3 project applications for the sub-activity „Acquiring Foreign Markets – External Marketing", 2 – for the sub-activity „Development of a network of family doctors", and 1 – „Development of new products and technologies – supporting the launching of production of new products and technologies".

In EAFRD program the students have developed 4 project applications, including 2 project applications for the activity „Modernisation of rural farms", 1 – for the activity „Creating added value to agriculture products", and 1 – for „Supporting investments in rural farms".

Under the EEA and Norwegian Financial Mechanism, Youth in Action, Society Integration Foundation programs, state owned joint-stock company "Latvian Development Finance Institution Altum" (ALTUM), there were developed two project applications in each of them.

One project application was drafted for each of the following financial mechanisms and programmes: ESF, Climate Change Financial Instrument (CCFI), Lifelong Learning program, LATVIAN - SWISS Cooperation Programme, U.S. Embassy grant program.

The project applications covered various fields: business development, construction, marketing activities, development of new products, education, and youth activities.

52% of the project applications were developed for private entities, 20% – for non-governmental organisations (NGO), 20% – for RISEBA University, and 8% – for public authorities. The private entities include small and middle size enterprises, rural farms, individual merchants, and family practices, whereas the public sector was represented by municipalities and educational establishments. The private, public applicants and NGOs were mainly either the enterprises, including RISEBA University, employers, or external clients. The projects are represented from all types of legal persons. It is an acquirement for the students to understand differences among various projects and gain experience from each other.

In order to improve the Project Lab performance and its recognition in the project management education area, the study of the Project Lab as a service for external customers was made. The study highly appreciated the quality of the developed projects, and as a result,

it is considered to offer the Project Lab services to the external clients as a part of the official RISEBA University service portfolio.

Analyzing the Project Lab results, the authors realized that 52% of the Project Lab projects were developed individually by one student, while the rest – by student team.

52% of project applications are developed by the student teams from 2-4 persons. Students establish the teams, according to common interests or personal features, and while developing the project application they nominate the team leader, and gain remarkable teamwork experience and skills. 48% of students are individually responsible for project application preparation because working in business sector they prefer to develop a project application for their own companies. Those project teams include one student and employees from the company. During development of the project application the students are consulted by the Project Lab teacher thus contributing to the direct interaction of academic and real world.

A separate part of the study was devoted to analyse the Project Lab student's feedback. Students have pointed out the benefits, advantages as well as disadvantages of the Project Lab as a learning method. It is supposed that analysis of the feedback results and implementation of positive changes will lead to further improvements of the Project Lab.

During the studies of entire Project management program, the students acquire project management theory and various project management skills. In carrying out the tasks of Project Lab, the students indicated they had acquired new skills. Referring to types of skills defined by Price (2013) and based on student feedback it can be concluded that all of the listed skills are being trained:

Technical skills. During the planning stage, the development of the project application involves skills like estimating, resource scheduling, and financial management. For the development of project applications, students learn to plan meetings, manage risks related to project preparation, and draft a final report at the end.

According to the advantages listed by students, Project Lab helps in developing the technical skills as well. First of all, these are planning skills working with a real project within real settings, since most of the students have not had experience like this before. Project Lab students have come to the conclusion that planning takes a lot of time to draft a qualitative project application, and time shall be scheduled for revisions and internal communication of the final version of the application.

After the Project Lab, students are able to plan the budget, and are aware that the budget may change several times due to various internal and external factors. The financial plan of the project is very important. The students indicated that before engaging in the drafting of the project it is important to study the financial situation of a company to assess its suitability to the conditions of the project call. It is also important to verify, whether the company is able to implement the project and ensure its sustainability. Students indicated that along with the financial planning other resources should be planned as well – the assets and human resources. Timely planning the resources helps for successful planning of the budget.

Managerial skills. In order to start the development of the project application, the students should possess several managerial skills: communication skills, organization skills and self-organization, and processing forward the project, application of theoretical knowledge info practice. These skills are developed and applied during the whole Project Lab. Students learn also the decision-making skills, that are important to meet the project milestones and the schedule. During the whole Project Lab, the students train also the time management skills. The time management skills have several dimensions - management of students' own time and teamwork time in the cooperation with the customer, and also the planned time schedule of the project.

The students emphasize that the communication skills were trained the most. Communication should be precise, structured, well-considered, due, and involving all of the stakeholders. Students also pointed that the communication should be regular so that the information on the project concept, its structure, and other conditions is clear and understandable for all stakeholders. They recommend getting acquainted with the project implementation settings, since this helps in improving the quality of the project application.

Students noted that the stakeholders should be more interested in the implementation of the project idea. Most of the students stressed that the collection of information should be a highly responsible process. Documentation related to drafting the project application should be read carefully and fully understood – particularly the relevant laws and regulations, methodological materials, etc. Also, during the elaboration of the project the direct and open communication with the representatives from the managing authority is very important. Students noted they have had various experience – there were positive cases with joint solutions, and negative, when they failed to get answers to their queries that arose during the development of the project application.

An important skill the students acquired during Project Lab was the time management. Students pointed out that the development of a project application is teamwork, and any delays by a single team member affect the overall result. The teamwork and the project time management is strongly influenced by the external conditions – the availability of the EU funding programs and the chosen time period of the Project Lab. There is a high risk to launch the Project Lab activities in summer time, as there is a gap in the EU Funding availability and it is also a vacation time which impacts communication with relevant authorities and people. From the experience gained, the best timing for Project Lab activities is January – May.

Students indicated they have acquired new knowledge and experience in teamwork during the Project Lab. One of the key aspects is that a team should have one person in charge to delegate tasks, make decisions, and control the overall course of the project. Students noted that the team formed by students often lacks experience in theoretical issues of the project, and in such cases they have to work with an outsource.

Not all the projects launched in the Project Lab lead to a productive result, sometimes the started project fails. One of the main reasons is the lack of teamwork ability. The failure of the started project is a part of the learning process. A failure is a good matter to reflect on the reasons of it, to identify the gaps in the team work and also the Project Lab concept as such. It is important that also students take part in the failure analysis during the classes, and come to the conclusions about the crucial role of the team leader and team member harmony, ability to share tasks and responsibilities. At the same time, for the Project Lab organisers a failure case is a matter for the improvements of the Project Lab concept – to pay especially strong attention to the student teamwork, to monitor it and to identify any problems in the teamwork that may lead to a failure.

Interpersonal skills. The project management requires the technical and managerial skills such as planning, estimating, decision making, measuring, controlling, etc. When a subjective situation arises, a student needs various soft skills to decide on the appropriate direction of action. If all of the skills are not trained during the project application development, the students acquire them also during experience exchange with other student teams, presenting their projects during the Project Lab classes.

During the Project Lab the students improve their interpersonal skills. They indicated that it is important to remain positive also under high stress, and one shall not stop when facing difficulties and rejections. A project team should be flexible, ready to changes, and sometimes – unexpected turns. Students pointed out that the team leader should be able to motivate the team, but where a project is drafted by one person – it is important to be able to

control the situation. Team members should be open to each other, and according to student feedbacks the tasks carried out within Project Lab contribute to teambuilding at a high level.

Students have pointed out that during the Project Lab they improve both their **quantitative behaviours and qualitative behaviours.** Students use project management tools and techniques acquired during the study process and project application development. To draft a project application a problem should be defined and justified, activities, budget, time, human resources should be planned, sustainability of the project, risks, relation of the project with other projects and activities should be described, and thus the quantitative behaviours are trained.

Students also train qualitative behaviours:

- *Understanding the global environment.* In the development of project application the students learn to understand that the development of project application is not isolated from the real world. The student should study the field of the project application theme. In doing this, the students acquire also the qualitative behaviour, called seeing the bigger picture.
- *Understanding leadership*. The students understand the essence of this qualitative behaviour at the end of Project Lab, when they submit and present the project application. They point out in the presentation: at what moment the most input was necessary to reach the overall aim, when they had to motivate the project team, what challenges did they face and how did they solve them. This makes the students understand the essence and necessity of leadership in the project settings.
- *Understanding team dynamics and individual personalities*. Teamwork is analyzed before because 48% of the Project Lab projects were developed by student team, 52% – by one student and employees from the company. It is a great challenge for the students to cooperate in development of a common project application – to share the tasks and responsibilities, to implement them, to communicate and to come to a common consensus. It allows understanding of the team dynamics and evaluating what features of personality are important in project management. As mentioned before, the concept of the Project Lab allows making mistakes.
- *Understanding decision making*. Decision-making is among the key skills the students have to acquire during Project Lab. The students should become aware that each decision affects the result. First decisions made by the students individually are made already choosing the project topic and funding. After that the students make decisions regularly to move forward the development of the project application.
- *Understanding the business case for diversity and attendant inclusivity*. Each Project Lab project is developed for a real entity representing a particular industry. To ensure the competitiveness, innovativeness of the project application, and the practical added value of the project, the students study of the particular industry and summarize and review different parameters of the business.

From the observations of the authors of the article, there are no dominating learning styles, but as the most of the Project Lab results is a team work, usually a mixed version of different learning styles is applied, and leads to a successful implementation of the intended learning outcomes. Project Lab provides the practical training environment for development of new projects, turning project ideas into real project applications. The pedagogical concept of the Project Lab allows students to make experiments, to fail, and to learn from their mistakes. The pedagogical concept of the Project Lab is adjusted to all kind of students, with different backgrounds and experience, and for multidisciplinary teams. There are no methodological restrictions - everyone can use the specific experience and relevant

knowledge and skills to reach the intended learning outcome – ability to develop a real project application.

CONCLUSIONS

Project Lab is a new and innovative concept for acquiring project management skills in Latvia.

The authors have answered the first research question – what are the advantages and learning benefits in the Project Lab, and what potential gaps might be in the organisation of the project Lab. Project Lab is closely linked to the practice – business and working world, during the learning process linking theory and practice. The project applications are developed for real entities, and they are based on real problem situations, utilizing real company resources and looking for productive and innovative solutions and leading to practically applicable results. This way the Project Lab is an excellent active and cognitive learning tool.

The Project Lab concept implies the dependence on the available EU funding programs. As the ESF and ERDF programs have recently had the biggest offer of the project calls, also in the Project Lab the students have developed the projects mainly in the programs co-funded by ESF and ERDF. The Project Lab gives a comprehensive insight in the funding programs, as well as strengthens the students' confidence on the importance of EU provided program and project financing tools.

Although the availability of EU project funding may be considered as an advantage in the implementation of the Project Lab, there is a very important risk for the Project Lab in long-term. The reduction or closing of the EU program funding may cause disturbances in the Project Lab realization. To avoid this risk, another one, modified concept of the Project Lab should be created, with similar aims but different funding options.

The study has provided answer to the second research question – how does the project Lab help students to acquire specific project management competences? The analysis of the study result present a set of essential project management skills that are gained and trained by students in the Project Lab, such as team work, communication, decision making. According to the authors' opinion, especially important is teamwork. About half of the analysed projects are developed in students' teams, but another half – by single students, in cooperation with the representatives of the customer company. According to the research results, those teams formed from several students reach higher results than the teams consisting of one student and non-student participants. This conclusion has driven to the improvements of the Project Lab concept according to the requirements for the team size for developing project applications.

All the parties involved in the Project Lab – students, teachers and clients are satisfied with the Project Lab concept and results. However, taking into account the study results and conclusions there are marked several areas for further improvements. Firstly, in order to improve the assessment of the Project Lab results, it is foreseen to develop an assessment for evaluation of the project management skills. The defined skills should be based on the IPMA Competence baseline. It is planned to use this assessment before and after the Project Lab to identify the leering progress, comparing the results. This way both the personal development and the efficiency of the Project Lab will be measured.

Another area for improvement is the development of the Project Lab monitoring system, implementing it during the current time of the Project Lab and following the project application submission process and the project evaluation success rate. Also these data will serve as the Project Lab efficiency indicator.

After the above mentioned improvements and their piloting, it is considered that in future the Project Lab services can be offered as outsourcing services for external clients.

REFERENCES

1. Cordoba J.-R.., Piki A., (2012), Facilitating project management education through groups as systems. International Journal of Project Management, Volume 30, 83-93.
2. Cresswell, J.W., (2013), Qualitative Inquiry and Research Design: Choosing among five approaches third edition. Sage Publications, USA.
3. Dale, E., (1969), Audiovisual Means of Teaching, available at: http://eric.ed.gov/?id=ED043234 (accessed: 23rd August 2015).
4. Frank, M. & Barzilai, A. (2006). Project-based technology: Instructional strategy for developing technological literacy, Journal of Technology Education, 18(1), 39-53.
5. Fromm D., Trilling B., (2013), Integrating Project Management Into CTE Programs, Techniques: Connecting Education & Careers, Vol. 88, 10-11.
6. Ganiron T.U., (2014), The Impact of Higher Level Thinking on Students' Achievement toward Project Management Course, International Journal of u- and e- Service, Science and Technology Vol.7, 17-226
7. Lasauskiene J., Rauduvaite A., (2015), Project-Based Learning at University: Teaching Experiences of Lecturers, Procedia - Social and Behavioral Sciences in 7th World Conference on Educational Sciences, (WCES-2015), , Greece , 788 – 792
8. Management Study Guide, (2008), Desk Research - Methodology and Techniques, available at: http://www.managementstudyguide.com/desk-research.htm (accessed: 15th August 2015).
9. Ministry of Economics of Republic of Latvia (2014), Informative Report on Medium and Long-term Labour Market Forecasts, available at: https://www.em.gov.lv/files/tautsaimniecibas_attistiba/Gala_zinojums_ENG_Dorus_09_2013.pdf (accessed: 25th August 2015).
10. Ministry of Finance of the Republic of Latvia (2015), Programming Period 2007 – 2013, available at: http://www.esfondi.lv/page.php?id=658 (accessed: 25th August 2015).
11. Pant I., Baroudi B., (2008), Project management education: The human skills imperative, International Journal of Project Management, Volume 26, 124–128
12. Price J., (2013), Career paths in project management, Lock D., Scott L. (Ed.) Handbook of People in Project management., Publisher: Gower Publishing limited, 771.
13. Project Laboratory Course Specification (2015), Riga International School of Economics and Business Administration.
14. Project management institute (PMI), (2013), Talent Gap Report - Project management between 2010+2020, PMI, USA.
15. Ramazani J., Jergeas G., (2015), Project management and the journey from good to great: The benefits of investment in project management training and education. International Journal of Project management No.33., 41-52.
16. Rasanen M., Kyllonen A., (2013), Research Hatchery as a cradle for new innovators, Publisher: Turku University of Applied Sciences, Tampere.
17. Rogers A., (1996), Teaching Adults, 2nd ed., Publisher: Open University press, Buckingham.
18. Shariff S.M., Johan Z.J., Jamil N.A., (2013), Assessment of Project Management Skills and Learning Outcomes in Students' Projects. Procedia - Social and Behavioral Sciences of 6th International Conference on University Learning and Teaching (InCULT 2012), Malaysia, 2013, 745 – 754.
19. Spinger L.M., (2013), Project and program management: a competency-based approach, 2nd ed., Publisher: Purdue University Press, USA.
20. Tong M., Thomson C., (2015), Developing a Critical Literature Review for Project Management Research, Passian B. (Ed.), Designs, methods and Practices for Research of Project management, Publisher: Gower Publishing Limited,153 – 171.