

## The Role of Project Activities in the Formation of Future Specialists

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**Abstract:** Contemporary economic, engineering and other activities impose high requirements on the specialists that emerge from higher educational establishments. A rapid increase in information scope and intensive growth in human activities combine to create a need for societal and educational reform. The formation of an innovative economy, based on the commercialization of new research and technology ideas, requires significant changes in the system by which personnel undergoes training. It increases a need in the development of methods and changing of strategies for the educational activities of colleges and universities, promoting the formation of relevant competencies of future graduates. Education is set to become a resource for specialist training, percipient to any new trends in science, technology and business.

**Key words:** Training, education system's modernization, capital, higher school, human capital assets

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### INTRODUCTION

In today's context, the problem of quality improvement of specialist's professional training becomes increasingly apparent as is evidenced by changes in the world around them. It involves the formation of personal qualities that allow specialists not only to see the problem independently but also to define the problem and solve it. The education system as it is today which covered the requirements of industrial society and qualitatively contributed to its progress, now more than ever conflicts with the requirements of developing information-oriented industrial society which produces a demand for education and professional training in a wider variety of forms, compared to the existent ones (Polat and Bukharina, 2002). Contemporary society needs socially mature, competitive young people, who have initiative and are, in their turn, oriented to positive self-actualization in all spheres of life-sustaining activities of society and have the capability to adapt and creatively modify the surrounding community.

The modernization of education and the transition to competency-based education formed the basis and inspiration for the wide and comprehensive project development. The point is that the base characteristic of competency is connected with the method of its formation: it is developed and manifested only during the

process of activities and its quality is specified by the extent of involvement in activities. For that reason, the project-based learning method in education holds great expectations, associated with its capabilities to organize education during the activities process to develop the potential to apply knowledge, competencies and skills for the solution of practical and vital tasks. Within this framework, the project development (project-based learning) began to be thought of as a tool for competency development. At that, the skill set formed during the project development process is generally acknowledged to change in different learning practices. Today, society is set to become such as it has the access to the newest information technologies, connections worldwide with constant drive to new knowledge and technologies. Society's well-being also requires the development of the whole education system. Naturally, the whole new education system must be based on new teaching methods, composing a foundation for professional psycho-physiological preparedness of members of society. In pedagogical terms, the quality of education is its commitment not only to the acquisition of specified amount of knowledge by students but also to the personal enhancement, cognitive powers, vital skills and personal qualities. Under this approach any forms, methods and technologies are considered for the purposes of a principal educational task to provide the

most favorable conditions for learning, self-education and personal enhancement. Currently, the educational system by all means involves three prime factors: information, involving the conception and principles which is the foundation of the system (scientific, availability, prospectivity, succession, strategies transformation, etc.); instrumental (instruments of labour, software and academic support, educational facilities, etc.) social (personnel and its readiness for realization of goal).

All three factors are interdependent and reversible: a change of one implies a change of the other two. The difficulty of tasks, raised before education, complicates the whole learning process which can be qualitatively introduced into the educational system where the important and integral part will have new pedagogical technologies. The quality improvement of teaching according to new information technologies and their usage in the learning process, allows students to behave more actively during the process of training and to get feedback from teachers. Due to severe competition in the labour market, there is an increase in the requirements of graduates associated with placement. This is because currently the graduate must have not only background knowledge in his speciality but also many of the most-coveted qualities such as critical thinking, creativity, adaptability, determination, capacity for professional advancement and others. For successful professional engagement, it is necessary to grasp modern information and communications technologies, new methods of curriculum design and others. At the heart of all these skills lies project-based learning.

## **MATERIALS AND METHODS**

In the present study, we introduced the general characterization of the project-based learning model in higher educational establishments. We emphasize that it is a non-classical model which involves a practice-oriented, project-based learning, student's assignment to departmental projects, forming of individual routes. Apart from lectures and courses, there are also such organizational forms as workshops and project designs. Under implementation of such forms, it becomes possible to conduct work in the target-oriented thesis projects. Through them, the students get involved in existing professional activities themselves at specified working areas, together with the professionals who work there. It is very important that the authors examining the problems of project development implementation in higher educational establishment, start to talk about changing the way the teaching process is organized and also the content of teaching activities.

The project-based learning practice in foreign countries comes from this perspective of special interest (Dvoretzkiy and Puchkov, 2003). However, generally one considers the content and achievements in engineering design which is a culmination point in a graduate's preparation for professional activities in the area of methods and technologies and all other disciplines train the graduate towards participation in project development. The engineering design discipline is carried out for almost every year of study and usually consists of an introductory course of lectures in design techniques and project development itself as student's individual work.

The first stage in organization of the teaching process is a stage of problem statement in the project. Different programmes have different approaches to the task of problem situation formulation. For example, the University of Edinburgh offers several problem situations (cost reduction of mosquito trap, scoop for atlantic water) from which the students can choose one, in order to find the solution during the project development. At the same time, each team should complete the corresponding form which specifies the technical proposal and objectives, along with the necessary resources. These are essentially provided by university, although the availability of other external partners is not excluded. This proposal should then be approved by the project coordinator in order for further work to be. In the meantime, several research teams work with university and these are willing to accept students who can take the opportunity to obtain project experience. The University of Caledonia offers considerable freedom, although it is a prerequisite that projects should be industry-oriented and those that are more oriented on research and development should actively engage with the industrial community (Balapanov, 2006).

The most severe requirements and those that are closest to reality are those of the French programme in the discipline of interior design at the Mining School of Paris on a speciality of civil construction which is of a higher level than baccalaureate programs. Here, the interior design involves a supreme initiative and student's focusing on real needs of society in any of the following spheres: scientific, economic, cultural, social or humanitarian. Aside from this, the project must have an innovative nature and be practical for immediate implementation as a product, service, event, organization, etc. The possibilities for realization are connected with the market feasibility of the offered product in particular with the search for partners and customers. Thus, the programme specifies that "the search for financial resources forms an integral part of the project". The

school helps only by providing students with the opportunity to use research and development centres and specialised data bases.

Analysis of skills formed during project activities in different universities makes it possible to highlight several types of results. Composition and presentation of the project scope and project's outputs: skills on presentation of a written action plan, taking on the project to positive conclusion; to write a technical report on work performed; to submit a report on work performed in the conference format; to make professional oral presentations including preliminary and critical feedback on the project, final presentations to create written professional reports, including instructions; to understand the content and style of oral presentations.

Data processing and knowledge on the project: acquisition and understanding of information contained in modern technical literature, for example, economic publications, magazines, books, collections, based on results of conferences and supplementary literature on computer hardware, software, tools of engineering design, etc., proficiency to demonstrate the ability to collect, correlate and use information from various sources, combine the knowledge, obtained at all disciplines.

Comparing the results of work presented in the projects of scholars and students, it can be concluded that at the higher level of education, a greater degree of emphasis is placed on skills (competencies) which are formed through the student's participation in the project. In higher education, the commitment appears to form project skills, allowing the student to develop and implement projects. These skills are already considered as professional for example, in the context of an engineering design course. On the basis of presented material, we will try to formulate: a hypothesis for content, structure and for opportunities of project competencies formation in higher educational establishments.

Modern students are considerably dynamic with pro-active attitudes. Although, in this day and age of computerization, the students are overloaded with floods of information. And it is not always the case that the methods used by previous generations to present information will be quite so efficient in studies of contemporary material by contemporary children. We all realize that our primary objective as teachers is not only to provide the trainees with a specific set of knowledge, to teach them in primary ways and activity algorithms but also to educate them to be well-versed in complex information flows, in efficiently setting out those timely and most relevant questions and to independently obtain the reasoned answers to them (Pakhomova, 2004).

The main requirements to the application of project-based learning: availability of a problem or task that is significant in terms of research and creativity that requiring integrated knowledge and investigative research for its solution (for example, the analysis of population problem in various regions worldwide; creation of series of coverages on the same problem from different ends of the globe (the problem of acid rains impact on the environment).

Practical, theoretical, cognitive significance of proposed findings (for example, reporting to the appropriate services on demographic condition of the region, factors affecting this condition, trends, observed in the development of the considered problem; joint newspaper publication, Almanac with on-the-spot reports; forest conservation at different locations, plan of action and others. Independent (individual, paired, group) work of students.

Structuring of informative part of the project (with specification of stage-by-stage results). Application of research methods: problem definition, research objectives resulting from it, hypothesizing and solutions, discussion of research methods, composition of final results, analysis of the obtained data, summarizing, review, conclusions (the use in the course of joint studies of "brainstorming" technique, "round table", statistical methods, performance reports, reviews).

**Goal setting:** Effective goal formulation is a special skill. Setting the goal is the starting point for the project as a whole. These particular goals constitute a driving force for each project and all the efforts of its participants are focused on their achievement.

Especially attention should be paid to the objectives statement because the half of the success of the whole work depends on the accuracy of this part of the project implementation. Firstly, the most common objectives are defined, then gradually they are increasingly detailed, till they reach the level of maximal concrete objective, facing each participant of the project. Without begrudging of time and efforts on goal setting, the projectization, in this case will become a step by step achievement of the established goals from the lowest to the highest.

But not to cross the line. Being a victim of circumstantiality, it is possible to lose the plot and in this case, the list of minor objectives will interrupt the achievement of the main one.

**Cognitive goals:** Perception of objects from the surrounding reality; examination of solution methods of evolving problems, acquisition of skills in working with primary sources; experimental set up, conducting tests.

**Organizational activity goals:** Acquisition of self-organizational skills; efficiency in goals setting, activity planning; development of group working, learning of discussion running technique.

**Creative goals:** Artistic objectives, design, simulation, projecting, etc. To try to formulate the most common goals facing the modern school, it can be said that the primary objective is to utilise project development training as a multipurpose skill. "The full range of didactic, psychological and pedagogical, organizational and managerial tools, allowing, in the first place, to form the trainee's project activities, to teach the student project development, we call project-based learning".

Selection of project's topic can vary, depending on different situations. In some cases, the topic can be formulated by the specialists of educational institutions in the framework of the approved programmes. In others pushed by teachers, taking into account the case study of their own subject, natural professional interests, interests and skills of trainees. Thirdly, the project's topic can be suggested by the students themselves which certainly, are guided by their personal interests, not only purely cognitive but also creative and practical.

The results of the accomplished projects must be objective, in other words they must be properly finalized (video film, album, "travelling" log book, computer-generated newspaper, almanac). In the course of evaluation of any project task, it is necessary to involve knowledge and skills in various areas: chemistry, physics, foreign and native languages. The teacher's primary objective in project method is as follows:

- To specify methods in the project specification
- To organize a collective or group discussion which methods can be used for the solution of each of the project's tasks, established during the project specification development
- To visualize the check-list of all methods, applied in project activities, from which the students can choose theirs and discuss in groups their effectiveness in solving one task or another

Trainees should know that in the project development process, the following methods can be used:

- Sources of literature review
- Theoretical modelling and generalization
- Various surveys: questionnaires, interviews, conversations; inquires through the internet

- Observation, according to a specific programme
- Tests and experiments
- Statistical methods of data processing

## RESULTS AND DISCUSSION

Let us start with the action system of the teacher and students in the project-based learning process. For the purpose of highlighting of teacher and student's action system, it is important to identify the project development stages. The exclusive requirement each project's work stage must have its specific product (Table 1).

One of the developers of the project-based learning is the American professor Collings who offered the world's first classification of class projects which could be applied and find their place in the educational process of higher education. Game's projects various games, folk dancing, theatrical productions, etc. The objective participation of students in group activities.

Excursionist projects the theological study of problems associated with the natural environment and social life. Narrative projects aimed at the enjoyment from the story in most multifarious forms-oral, written, vocal (song), musical (playing on the piano). Constructive projects creation of a specific, useful product: production of rabbit trap, etc.

**Modern classification of class projects:** The project can be group or individual. Each of them has its own undisputed advantages. Contemporary classification is made on the basis of the prevailing activities of the students: practice-oriented project (from schoolbook to recommendations on economic recovery of the country); research project examination of any problem in accordance with all rules of the scientific examination; informative project information collection and processing, regarding a significant problem for the purpose of its presentation to a wide audience (article in mass media, information on the Internet); creativity project maximally free original approach in the solution of the problem. product almanacs, video films, staging, creations of fine arts creations or applied and decorative arts, etc. Role-based project literature, historical, etc., business role-playing games, the result of which remains open till the very end. The classification of projects is possible by:

- Subject areas
- Range of activity
- Deadlines
- Number of performers
- Importance of results

Table 1: Action systems of teacher and students at different project's work stages

Stages	Teacher's activities	Student's activities
<b>Development of project specification</b>		
Selection of project's topic	The teacher selects the possible topics and offers them to students The teacher offers students to collectively select the project's topic The teacher participates in the discussion of topics, suggested by students	The students discuss and take the general consensus on the topic The group of students together with the teacher select the topics and offer them to the class for discussion The students independently select the topics and offer them to the class for discussion
Project's topics and sub-topics highlighting	The teacher preliminarily picks up the sub-topics and offers them for student's choice The teacher contributes to the discussion of project's sub-topics by the students	Each student chooses a sub-topic for himself or suggests a new one The students actively discuss and suggest the sub-topics options. Each student chooses one of them for himself (i.e., chooses his role)
Formation of creative groups	The teacher conducts the arrangements for incorporation of students who selected the specific sub-topics and types of activities for themselves	The students have already chosen their roles and are grouped accordingly in small teams
Preparation of materials for the research work: formulation of questions, requiring answers, task for teams, selection of literature	If the project is extensive, the teacher develops, the specifications and questions for research activities and literature in advance	Individual students from various groups participate in the process of specifications development. Questions, requiring answers can be developed in teams with further group discussion
Definition of ways to present results of the project's activity	The teacher participates in the discussion	The students discuss different ways of presenting the results of the project's activity in groups and later in class rooms: video film, album, genuine objects, literature, drawing room and etc.
Project development	The teacher advises, coordinates the work of students, encourages their activities	The students are carrying out the research activities
Presentation of the results	The teacher advises, coordinates the work of students, encourages their activities	The students, firstly in groups, then together with other groups, present the results in accordance with the accepted rules
Presentation	The teacher performs the expert evaluation (for example, invites the students of other specialities as experts, etc.)	Report on the results of their work
Self-analysis	Evaluates its activities on the basis of marks and performance of students	Draw conclusions of their work, formulate wishes, collectively discuss the marks for the performed work

But regardless of the project types, all of them are:

- To some extent special and unique
- Aimed at the achievement of specific goals
- Time-constrained
- Involve the coordinated implementation of interconnected activities

In terms of complexity the projects can be single-project and inter-subject. Single-projects are implemented within the framework of one school subject or one knowledge area. Inter-subject projects are implemented after working hours under the guidance of specialists on various fields of expertise.

By the nature of contacts, the projects can be within the classroom, intra-school, regional and international. The last two are usually realized as telecommunication projects, using the Internet and modern methods of computer technologies. The evaluation criteria of the projects must be understandable, the number of them should not be >7-10. In the first instance, the performance in general should be evaluated, not only the presentation. The evaluation method permits a comprehensive analysis of the performed work. On the basis of recommended criteria, the student himself, pedagogue and classmates

appraise the project work, fill in the expert map and calculate the average grade. However, already in this assignment the attention is turned to the fact that there are at least two existing results. The first one is concealed this is a pedagogical effect from the student's involvement into "acquisition of knowledge" and its logical application: formation of personal qualities, motivation, self-analysis and self-evaluation, the skill to make a choice and comprehend both the consequences of this choice and the results of personal activities (Chechel, 1998). The second one is the accomplished project itself where the focus is not on the volume of the acquired information but its application in the activity and the actual result the implementation level of the forethought in the material. Unfortunately, the first fruitful part remains out of the attention scope at the project defence. The author does not suggest the solutions to this problem. However, we do begin to realize that there must be other various ways of presenting results and the project's product.

Project-based learning is always focused on independent activity of the students during the course of particular a period of time (Jones, 1986). The results of the accomplished projects must be as the saying goes, "tangible": if it is a conceptual problem then its specific

solution, if practical the concrete result, ready to be implemented. For many students the attractiveness of this method lies in the authenticity of best practices. The students play the role of people who are working in the examined industry and behave themselves in the same way as these people.

### **CONCLUSION**

Fundamental changes in the social, economic and spiritual life of our society specify the state and prospects for the development of national education in the 21st century. In higher education at the present stage, broad recognition is received by the concept that denies the “filling model of education” and focuses on the development of such an educational-bringing-up-process, where the education completes the task of student’s involvement in active independent educational and cognitive work, modelling the process of their further self-education.

The achievement of active individual attitude of students in learning can be possible only when the knowledge acquired by the student attains a personal meaning for him. However, the availability of such meaning does not guarantee the independence of the student’s attitude in educational perception. The scope of knowledge required for acquisition by the student, not only rises sharply but also is rapidly renewed which predetermines the focus of the educational process in higher school on the acquisition of the exercised knowledge and skills of a methodological nature, promoting them to independently obtain and acquire knowledge that is both comprehensive and special in character.

Formation of independent behaviour in educational perception for junior students raises the possibilities of their adaptation to peculiarities of higher education and overcoming the range of social-psychological, didactic, information conflicts which are common to this age.

Therefore, as follows from the literature analysis as well as practical implementation of the project-based learning method, we determined that project-based learning is an efficient means for the development of adaptation and independent behaviour of students. In conclusion we would like to suggest some general rules for pedagogues the project leaders.

Endeavour to take a creative approach to everything, control all kinds of conformism manifestations and stereotypical banal solutions. Be geared to the process of examinational research not only to the result. Endeavour

to open and develop in each child his individual propensities and capabilities. In the course of work do not forget about the scholar’s upbringing. Try to be less guiding, help children to act independently, avoid direct instructions, regarding what they should be occupied with.

Avoid ill-considered assumptions, learn not to hurry with pronouncing the evaluative judgements and teach students to act the same. While appraising, remember better ten times to praise for nothing, than one time to criticise for nothing. Do not rely on the thought that the students already have particular fundamental knowledge and skills help them to acquire new ones. Remember about the pedagogical result do not do for the student something that he can do by himself.

Teach students to identify the connections between objects, events and occurrences. Teach students to act independently, accustom them to skills geared towards the original solution of problems, individual research and analysis of situations. Try to form skills on the independent solution of research problems. Use tight situations (problems) that have occurred to students at home as a task area for the application of the skills they have obtained for the solution of research tasks.

Teach students predominantly to thinking, not to thoughts. Train them to the ability of fishing for information, not swallowing it cut and dried. Try to train students to analyze, synthesize and classify the obtained information. Help students to learn how to manage the process of self-examination.

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