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Application of project activities in the theory and practice of russian universities

Aplicación de actividades de proyecto en la teoría y la práctica de universidades rusas

Lubov Kiryalovna ILYASHENKO 1

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ABSTRACT:

This article presents the bases of project activities in understandable form, they are methodic of instructional design, its specificity, the main theoretical and methodological features of the study, they are essence, structure, functions, principles, basic and specific skills, forms of products of activities of successful functioning in educational-training process of the University. The main thing is outlined that anyone who wants to engage the educational projecting must know. The definition of "project" as a key concept of project activities is given. An author`s personal practical experience of the joint work with the students in the branch of Tyumen industrial University on the working out and writing of various thematic scientific and research projects is presented. A schematic example of the development of the research project without consideration of the individual steps, and specifying the content by students of separate directions under the supervision of the teacher is given.
Keywords: project activity, project, skills, educational technology, students, educational process.

RESUMEN:

En este artículo se presentan las bases de actividades del proyecto en forma comprensible, son metódica de diseño instruccional, su especificidad, el principal teórico y metodológico de las características del estudio, que son la esencia, la estructura, las funciones, principios básicos y los conocimientos específicos, las formas de los productos de las actividades de funcionamiento exitoso en la educación-proceso de formación de la Universidad. Lo principal es que explicó que cualquier persona que quiera participar de la proyección educativa debe conocer. La definición de "proyecto" como un concepto clave de las actividades del proyecto se da. Un autor personal con experiencia práctica en el trabajo en conjunto con los estudiantes en la rama de Tyumen industrial de la Universidad en la elaboración y redacción de diversas temáticas científicas y proyectos de investigación que se presenta. Un ejemplo de esquema el desarrollo del proyecto de investigación sin la consideración de los pasos individuales, y la especificación de los contenidos por parte de los estudiantes de diferentes direcciones bajo la supervisión del profesor es dado.
Palabras clave: C

1. Introduction

At the present stage of civilization`s development the integration processes are actively occurring that are being actualizarsed in society and are reflected in the functioning of social institutions, specifically in education.

As the training experience shows, application of new educational technologies for the needs of the educational process is the simplest and most affordable means to improve this process. Any modern pedagogical technology represents a synthesis of achievements of pedagogical science and practice, combination of traditional elements of past experience and that which is born of social progress, humanization and democratization of society. Therefore, for the successful functioning of pedagogical systems elaborate debugging of all its components is needed.

Well-organized training process gives the learner the opportunity to express themselves creatively, to test themselves in different forms of intellectual work (Serikov, 1994). Developing opportunities of various forms and methods of teaching, their comprehensive and thoughtful application allow together with interest to the discipline to increase the efficiency of training process as a whole, its quality. The application of the project activities allows to realize maximally the creative potential, to reveal skills, to activate cognitive, independent activity and to stimulate scientific-research activities of students (Babanskij, 1982).

The project activity is a joint activity of students with a common goal, agreed methods and ways of activity that can be reflected in the projecting (the process of creating the project), in educational project (organizational form of work focused on the study of a complete educational theme or training unit) and in projective-research activities (activity on projecting of own research).

A project activity for student has many pedagogical possibilities: it will allow to express themselves individually or in a group, to reveal maximally their creativity potential, to try their hands, to show their result in public, to apply their knowledge.

The origins of the project activity took place in the engineering disciplines, they are: systems engineering, methods of operations research, theories of solutions, network planning, ergonomics, etc. These subjects are based on the theory of designing, linking in the professional activities two sign systems “man-technics”. In the basis there is the development of cognitive skills of students, abilities to independently construct their knowledge, skills to navigate in the informational space, development of critical thinking, making conditions for creative self-realization of students, awareness of the importance of their work, formation of the culture of business communication, formation of professional competence (Bespal'ko, 1995).

2. Methodology

The project activity is not a fundamentally new technology in pedagogics. Many philosophers have noted that project activity has inborn character. Even 300 years ago, the Czech teacher Ya. A. Komenskij expressed the idea to introduce the research stimulus for success in training. The American philosophers J. Dewey and V.Kilpatrick applied research principle in the form of academic work.

J. Dewey proposed to build training on an active basis, through expedient activity of students, being consistent with his personal interest in this knowledge. Hence it was extremely important to show them their personal interest in the acquired knowledge that can and must be useful to them in life. For this such problem was important, taken from real life, that was familiar and meaningful for the student, for solving of which it was necessary to use the acquired knowledge, new knowledge that has not been received yet. The teacher suggests new sources of information, and can just direct the thought of the student in the right direction for individual search. But in the result the student must solve the problem individually by applying the necessary knowledge, sometimes from different spheres, to get real and tangible results. Thus, problem becomes the project activity (D`yachenko, 1989).

A project activity was attracting the attention of Russian teachers. The ideas of project-based training were originated in Russia almost at the same time with the developments of American teachers. Under the supervision of the teacher S. T. Shatskiy in 1905 a small group of employees was organized, attempting to actively use the project methods in teaching practice. Later, during the Soviet era, these ideas have become widely implemented into school, but not carefully and consistently.

In 1990 in Russia the project activity intensified in connection with the development of the idea of standardization of higher education. Analyzing the features of development of project activity, we can see that this activity is being actualized in times of change.

"All that I perceive, I know for what and where it is needed for me and how I can apply this knowledge" – that is the fundamental thesis of the modern understanding of the methods of projects that attracts many educational systems, tending to find a reasonable balance between academic knowledge and pragmatic skills (Bezrukova, 1996).

Let us consider in more details components of the project activity.

The purpose of using of the project method in education is inclusion of a student in creative scientific-research work in the early stages of training in University.

The basic principles of this activity are: obtaining a sound scientific knowledge in the sphere of future profession; teaching to the accurate observations and analysis of the received information; introduction to the experimental work; the formation of logical, critical, problem-oriented interdisciplinary thinking (Verbitskiy, 1991).

A key notion in project activity is the notion of "project". The project is six "I" –namely, problem, projecting, search the information, product, presentation, and portfolio (Ilyashenko, 2017).

Basic requirements for use of method of projects:

1. There is a need in presence of a socially-significant problem (research, informational, practical);

2. Project implementation begins with the designing of the project (planning specific actions to resolve the problem; indication of the type of product and forms of presentation; specifying timelines and responsible persons);

3. Each project requires research work of the student (the process of individual cognitive work aimed at acquiring new knowledge);

4. As the result of the work on the project is a product, that is a tool that the students developed to resolve this problem;

5. Performance of the project in the form of presentation;

6. All project materials need to be collected in a portfolio.

The selection of themes of projects in different situations might be different. Themes can be formulated in the framework of the approved educational programs, or be nominated by a teacher in accordance with teaching situation in the subject, natural professional interests, interests and abilities of students. Themes of the projects may be offered by the students, which, of course, are guided in this by their own interests, not only by purely cognitive ones, but also the creative, applied. The themes of the projects may be related to a theoretical question of university educational program with the aim to deepen knowledge of individual students on this question, to differentiate the training process. More often, however, the themes of the projects are relevant to some practical issue being relevant to practical life and requiring attraction of students` knowledge not on one subject but from different spheres, as well as creative thinking of students, research skills (Berezhnova, 2006).

In order to attract students to the project activities, it is necessary that their abilities, in our opinion, meet the following requirements (Table 1. Requirements to students)

Table 1
Requirements to students

1. The knowledge of basic research methods	1. Analysis of the bibliography

	2. Search sources of information 3. The accumulation and processing of data 4. The scientific explanation of the obtained results 5. Vision and advancement of new problems 6. The advancement of hypotheses, the method of their solution
Research methods	
Theoretical (analysis, synthesis, abstraction, comparative analysis, classification)	**Empirical** (observation, conversation, testing, experiment, description and review of the bibliography)
2. Knowledge of computer literacy	1. The ability to enter and edit information 2. The ability to process achieved quantitative data using spreadsheet software 3. The ability to use databases 4. The ability to print information, etc.
3. The ability to integrate knowledge from different fields	Interdisciplinary connections to solve cognitive tasks are being taking into account

The role of the student in the organization of education becomes even more important as during an organized training process of self-learning the student individually chooses the educational path in the developed in detail and skillfully organized learning environment (Ibatova, 2017). Working in mini-teams on the development of the term paper, the student not only acquires the experience of social interaction in a creative team of like-minded people, forms his or her own point of view of the principles of cooperation and scientific organization of work, but also uses acquired knowledge in his or her activity, having denoted his or her becoming as a subject of cognition, developing as a whole all parties of the personal "I" in a particular activity, its self-control and introspection. This contributes to self-development of the student, increasing his or her status of the subject of the educational process (Monakhov, 1995).

Depending on typological grounds we selected the following projects:

1. depending on the dominant activities (study, research, creative, role, applied);
2. depending on the substantive field (mono projects, interdisciplinary projects);
3. depending on the nature of the coordination of the project (direct and hidden);
4. depending on the number of participants (individual, group, pair);
5. depending on the nature of the contacts (among participants of institution, group, city, region, country, different countries);
6. depending on the duration of the project (short-term, medium-term, long-term).

It seems that in modern conditions we can speak of the establishment of the foundations of project-based training, which is seen as developmental, based on the sequential implementation of complex training projects with information pauses for assimilation of basic theoretical knowledge. It should be noted that to switch the entire educational process to project-based training is impractical. For the current stage of development of the educational system it is important to enrich the practice by a variety of technologies, one of which can be technology of project-based training.

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3. Results and Discussions

An interesting experience of using the project method gained at the Department of natural-

scientific and humanitarian disciplines of the branch of Tyumen industrial University. Students have been taken part and are taking active part in research and project work focused on methods of teaching mathematics in a technical University. The themes of the projects are very different, for example: the study of interdisciplinary links, the study of mathematical competence of future engineers, the study of the functioning of the mathematical school for training to enter the University in math in the city of Surgut, the study of a person`s appearance with the help of mathematical methods, etc. Usually these projects are engaged by students of 2-3 courses.

Work on the project goes step by step under the supervision of a teacher. At the beginning the theme and goals of the project are considered. As the theme of the project can be an object, or a particular matter, or direction, or problematic theme. Then a group to work on the project is being formed, the steps of work are being planned, the research is being taken place, conclusions and results are being drawn. The project is represented in the form of defense. The next step is the evaluation of the project, consisting of self-assessment, assessment by other groups, teacher assessments and evaluation by a specially created group of experts.

For students, it`s a great experience that will come in handy when writing graduation thesis of the bachelor, as well as this is the experience of getting project skills (Table 2. Basic and special project skills).

Table 2
Basic and special project skills

Skills	**The characteristics of the skills**
Basic project skills	
Problematization	Identification and formulation of problem from a number of problems in the formulation of the tasks arising from this issue
Goal setting	A conscious process of identifying and setting objectives and targets
Planning	Consideration of all conditions of upcoming activity, ways, methods and means of its achievement, making necessary rational decisions for the implementation of intention
Reflection	Thought on the work done, introspection
Special project skills	
Mental activity	Advancement of the idea, problematization, goal-setting and formulating of target, advancement of the hypothesis, statement of a question, planning of activity
Presentation	The formulation of the verbal report, the choice of methods and forms of visual presentations, making the objects of clarity, the preparation of a written report on the work done
Communicative	To listen and understand others, to express themselves, to compromise, to communicate within

	the group
Searching	To find information, to conduct an Internet search, to formulate keywords
Informational	Structuring of information, allocation of main thing, reception and transmission of information, the orderly storage and search
Conducting the instrumental experiment	The design of the workplace, selection of necessary equipment, conducting the experiment, measurement the parameters, analysis of the obtained results

In the form of defending of project work it is possible to conduct the exam. A new form of the exam is only offered to students who have shown excellent knowledge on the subject for the entire period of study, as a traditional exam does not meet either the needs of their mind, no interests. Development of project theme mobilizes the students` knowledge on the solution of the problem, attaches to scientific work. This form of exam is interesting to students, as experience have proved.

After defending the project, as usually, the result of such activities are: a page on the website, business plan, video, exhibition, collection, reference, textbook, and recommendations. As well as the results of the research are being presented at conferences of different levels, both international and regional. Teachers co-authored by students write scientific articles on research projects.

Let us give a schematic example of developing a research project by students of separate direction under the supervision of a teacher.

Theme. Interdisciplinary connections in the study of mathematics in a technical University

Object: the process of training mathematics in a technical University

Subject: interdisciplinary connections of mathematics with other disciplines of technical College.

Objective: establishment of interdisciplinary connections of mathematics with other disciplines of a technical University, and their application to enhance students` motivation to study mathematics.

Tasks: 1. To study and analyze the state of the problem of interdisciplinary communications in the technical University.

2. To select the most optimal methods and techniques of organization of educational activities with the use of tasks of integration matter.

3. To identify the initial level of training motivation.

4. To test the effectiveness of the proposed ideas in practice.

5. To carry out the analysis, generalization of the results obtained during the implementation of the ideas.

Methods: analysis, questionnaires, elements of statistics, working with sources, talk with students and teachers.

Participants: a group of two second year students.

Dates: medium-term project.

Performance of project: report on the work done, study guide.

Analysis and evaluation of the results of working under the project: is being conducted at the international scientific-practical conference held at the University.

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4. Conclusions

So, let us highlight the theoretical positions of project training:

1. in the main focus there is a student and promoting the development of his or her creative abilities;

2. the educational process is based not in logic of the subject, but the logic of activities that have personal meaning for the student that enhances his or her motivation in training;

3. individual pace of work on the project ensures that every student will come to his or her level of development;

4. an integrated approach to the development of training projects contributes to the balanced development of the basic physiological and mental functions of the student;

5. deep, conscious acquisition of basic knowledge is provided through universal use in different situations.

Thus, the essence of project-based training is that the student in the process of working on a training project comprehends the real processes and objects. It assumes coping specific situations by the student, the inclusion of his or her to penetration into the deep of phenomena, processes and constructing of new objects.

Thus, such technologies must necessarily be introduced into the system of modern education, because they have certain prospects for further practical improvement.

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1. Industrial University of Tyumen, 625000, Ural Federal District, Tyumen Region, Tyumen, Volodarsky Str. 38.Russia, E-mail: margussa@yandex.ru

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