

Contract No. 2020-1- BG01-KA201-079295

## **METHODOLOGICAL GUIDE**

### **ON MODULE 3: MULTIDISCIPLINARY TRAINING**

#### **PROJECT-BASED LEARNING - TECHNOLOGY AND OPPORTUNITIES FOR SCHOOL USE IN THE CONTEXT OF CELESTIN FREINET'S PEDAGOGY**

*Expected results:*

- To acquaint teachers with the essence and interpretations of project-based learning.
- To acquire skills for planning project-based learning .
- To understand the main differences between traditional teaching and learning and technology-based project-based learning.
- To discover new possibilities for combining the possibilities of project-based learning with ideas from the pedagogy of Celestin Freinet, refracted through modern pedagogical realities.
- To enrich the methodological toolkit of teachers with techniques for effective planning of the process of project implementation by students.

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## **INTRODUCTION TO THE SUBJECT AND ARGUMENT ABOUT THE EFFECTIVENESS OF PROJECT-BASED LEARNING TECHNOLOGY**

One of the strategic goals for the development of educational IT is a system and in the 21st century is the realization of person-oriented learning, which takes into account the characteristics of each student to the maximum extent, creates conditions for revealing and developing his potential opportunities.

In search of opportunities aimed at achieving this goal, project-based learning appears to be one of the priority approaches.

The reason for this statement is its ability to provide conditions under which:

- the learning process to provide conditions for students to create educational products themselves and to master the experience in carrying out productive practical-applied activities;
- with different forms and types of differentiation in education depending on the age and individual characteristics of the students;
- the basis of the learning process is cooperation, allowing to create conditions for active joint learning activity of all participants in the educational process.

These opportunities can be supplemented and enriched by the application of methods and techniques from the pedagogy of Celestin Freinet, updated and modernized thanks to the widespread use of digital information and communication technologies in school education and the methodological toolkit of teachers.

Describing his methodology, Celestin Freinet writes the following: “The life of our school is fed by three sources. First - work on \_ school newspaper , as well as organized walks and excursions; second - work in school workshops, where the participation of local workers and craftsmen creates an atmosphere close to real life; and thirdly , since the power of the environment in the life of the school is not yet exhausted, we resort to to help the children themselves, who, getting to know the world around them, are alive and share with us the results of their observations, their impressions and discoveries” (Freinet, 1990)

In the 21st century, the school newspaper can be published not only on paper, but also through digital technologies and is most often published on the school website. The work in workshops is the work in the STEM classrooms, the laboratories equipped with machines and tools, but also in the classrooms, where there is the corresponding technical support. The

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environment remains one of the main sources of knowledge, both in the field of natural cycle sciences, but also in the direction of learning environmental and survival skills.

Within the framework of the reOPEN project , an attempt is made to combine the technology of project-based learning with Frenet's pedagogical ideas refracted through the contemporary context.

## **METHOD OF PROJECTS AND PROJECT-BASED LEARNING – CONCEPTUAL AND TERMINOLOGICAL CLARIFICATIONS**

The project method is not new to pedagogy in the world, but it is experiencing its "Renaissance" in the educational policies of a number of countries in Europe in the 21st century.

It appeared in the 1920s in the United States of America. It is also called the method of problems and is related to the ideas of humanistic trends in philosophy and education, developed by the American philosopher and educator John Dewey and his followers William. H. Kilpatrick, Ellen Parkhurst, et al.

To clarify basic concepts related to the project method, we offer the following definitions:

*The project method* is defined as a system of views in which students gain knowledge in the process of planning and implementing successively more complicated practical tasks - projects.

*The project method* is an educational technology oriented not to the integration of factual knowledge, but to its change and transformation into new ones. The active involvement of students in the construction of these projects gives them the opportunity to explore new ways of human activities in a different socio-cultural environment.

*Project* – time-limited purposeful modification of the individual system with the establishment of the requirements for the quality of the results, the framework costs of funds and resources and the specific organization.

*Project* – a sequence of interconnected events that take place in a time-limited period and directed and towards achieving a unique, but also a clearly defined (concrete) result.

*Project* - independent creativity, finished work performed under the guidance of a teacher with the aim of obtaining the specific result / product planned at the beginning.

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Yu. Pakhomova offers two definitions for a learning project - from the students' point of view and from the teacher's point of view:

- The learning project from the students' point of view is an opportunity to do something interesting independently, in a group or in a team, making maximum use of their capabilities; it is an activity that allows you to express yourself, test your strengths, apply knowledge, contribute benefit and publicly show the results of research and creative activity.
- The learning project from the teacher's point of view is a didactic tool enabling learning by design, i.e purposeful activity to find problem-solving approaches on the way to solving tasks in specific situations. (Pakhomova, 2003)

According to K. Velcheva, “we can deduce the following signs of the student project”:

- *problematicity* (the project is based on a certain problem);
- *independence* (educational problem, topic, choice of methods and means for solving the problem, implementation of the project and its protection);
- *duration* (the project is always implemented within certain and limited deadlines and therefore precise planning of time and effort is necessary);
- *phasing* (all planning and design is related to the implementation of certain actions originating from the mandatory stages for the implementation of the project);
- *creativity (creativity)*;
- *personal and/or public significance*;
- *cognitive (educational) focus* of the project topics (without this, one cannot talk about solving didactic tasks in the course of implementing the educational project);
- *mobilization of efforts and resources* (implementation of the project requires a certain concentration of efforts (physical, intellectual, creative) and resources (material, technical, technological, etc.), both at individual design stages and during all work on the project - *only in such conditions of limited time, forces and resources can a valuable product be created*).

The student project is the creation of an educational product based on the project-research activity of the students from the very beginning and until its completion." (Velcheva 2009)

In the project method, the learning process provides conditions for students to create products themselves and gain experience in creative research activities.

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Modern didactic literature operates with the concept of project-based learning, in which it puts the same meaning as the creators of the project method from the beginning of the 20th century.

The application of project-based learning in the modern school is considered by a number of educators as:

1. *New pedagogical technology*, which can solve many current tasks in the course of students' education - "a person-oriented technology, a way to organize the independent activity of students, aimed at solving tasks within the educational project, integrating in itself the problem approach, group methods, reflective, presentation, research, etc.

2. *A method of knowledge, a way of organizing the educational and cognitive activity of the students* - a way to achieve the didactic goals through a detailed development of the problem (technology), which needs to be completed completely, necessarily with a practical result, formed in one or another kind (research or real-made object)." (Pavlova, Pitt 2003)

*The modern model of project-based learning* **Project-based learning** was developed by the Buck Institute of Education (USA) in the late 1990s in response to school reform efforts.

Project-based learning, according to these researchers, is defined as "an instructional method that gives students complex tasks based on challenging questions or problems that include problem solving, decision-making, research skills, and self-reflection that include facilitation by of the teacher, but not given direction. (...) It focuses on questions that make students encounter basic concepts and principles in a practical way. Students conduct their own research on a leading issue, enabling them to develop valuable research skills as they engage in design, problem-solving, decision-making and research activities. Students learn from these experiences, take them into account and apply them to the world outside their classroom (...) A different teaching technique that encourages the practice of forming new learning habits, emphasizing creative thinking skills and allows students to discover that there are many ways to solve a problem." ( <http://www.bie.org> )

Unlike traditional teacher-led classroom activities, students must self-organize their own work and manage their own project work path.

Emphasis is placed on learning activities (often interdisciplinary) that are undertaken by learners over the long term, and on-the-job experiences are taken into account and applied to the world outside the classroom.

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Project-based learning “is not only a potentially effective approach to instruction, but also an essential component of various current models of school reform, and it has a number of requirements: to lead to deep thinking; independent problem solving; practical self-assessment and self-reflection; socially valuable activity and socially significant responsibility for the significance of learning.” (Ravitz, Mergendoller, Markham, 2004)

## TYPES OF PROJECTS

The American professor Edward Collings made the first *classification of educational projects in 1926* :

- *Project games* - games, folk dances, theater, etc. The goal is for children to participate in group activities;
- *Excursion project* - expedient study of the problems related to the environment and social life;
- *Narrative projects*, the purpose of which is to get satisfaction and pleasure from the story in the most diverse forms - verbal, written, vocal ( songs), music (playing the piano);
- *Constructive projects* - the creation of specific, useful products and , the construction of a stage for the school theater, etc. (Collings, 1926)

Projects can be classified according to different criteria and approaches.

1. Depending on the dominant one’s activities in project a they can be: research, creative, adventure, etc.
2. Depending on the subject area and interdisciplinary connections, they can be: literary, environmental , foreign language , cultural , geographical , historical, musical , theatrical, etc.
3. Depending on the scope of the participants, they can be : from one class , from one school, from districts/or region, international.
4. According to the number of participants in the project – one, two, group;
5. By duration of implementation - short-term, episodic, medium-term and long-term.

*Research projects* require a well-chosen project structure, a clearly defined goal, social relevance, experimental work.

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*Creative projects usually do not have a detailed structure, it is only planned and continues to develop, according to the logic and interests of the project participants. They can agree on desired outcomes (sports games, expeditions, etc.).*

*Adventure (role) projects* they have a planned structure, but it remains open until the end. The deliverables of such projects may be defined at the beginning of the project, but may evolve towards its end. Their level of creativity is very high.

*Practically, these projects* are distinguished from the very beginning by work to obtain the expected result of the activity of the participants in the project, which is necessarily aimed at social interests and can be known as a video film, sound recording, performance, program or other product that is presented publicly.

*Literary and creative project* most often are joint projects of children of different ages and countries, with different social origins and cultural development, but united in the desire to create together – e.g to write a story, a video, poems.

*Environmental projects* require the use of scientific research methods, integration of knowledge *and* skills from different subject areas. Examples of such projects are the projects to study acid rain, the flora and fauna of forests, historical monuments and architecture in industrial cities, stray animals, etc.

*Linguistic (language) projects* are quite popular and are associated with learning foreign languages.

*Cultural projects* - connected to the study of the history and traditions of cultural groups and peoples in individual countries.

## **MAIN COMPONENTS OF THE STUDENTS' PROJECT ACTIVITY**

*The structure of each student project includes:*

- availability of socially significant tasks/problems - research, informational, practical;
- project implementation design;
- exploratory activities in search of information that is interpreted and used to find a solution to the problem or leading question;
- the existence of a significant product as a result of the project activities;

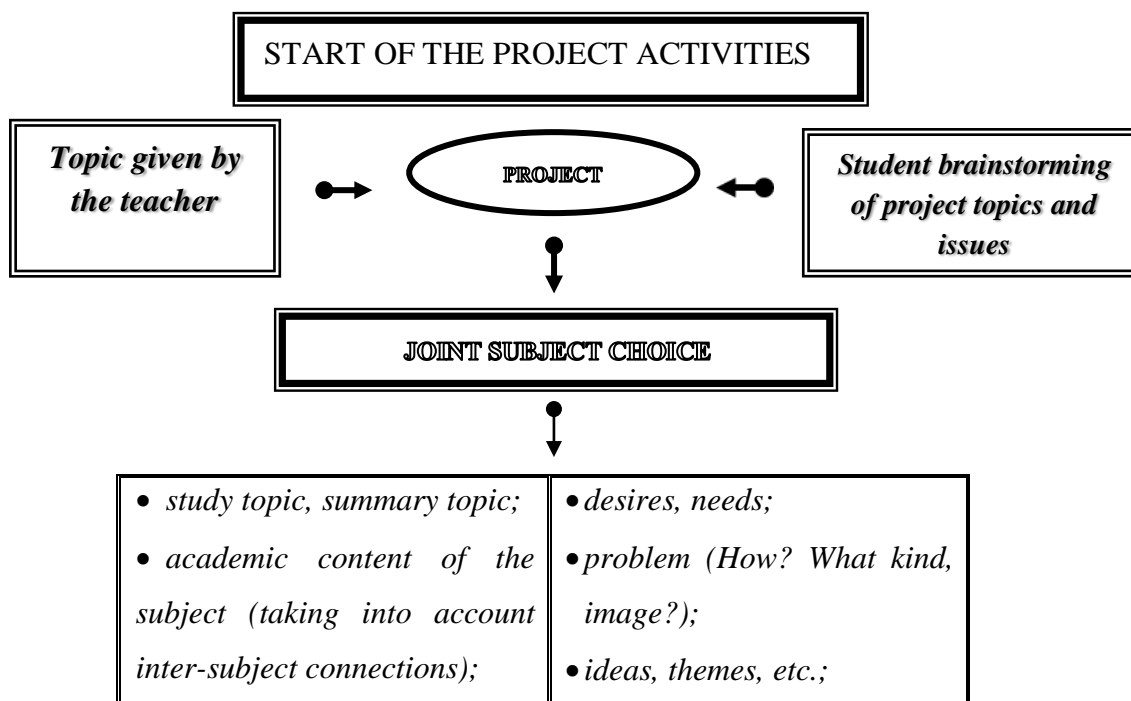
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- presentation / presentation of the product and its social significance to an audience.

During a presentation, an external assessment is made by a group of experts (teachers, other students, various specialists)./ Teacher group's idea of a task/problem for students' project activity can be taken from a cross-curricular area, a problem area of relevance and social relevance , but students can also propose topics for their project based on : their wants and needs; the needs of people close to them (family, class) or social needs of the city, country, society as a whole; ideas (topics) they wish to realize; doubts and contradictions that provoke them to formulate and solve problems; the problem itself, formulated with the help of a question (for example: how? What kind, image?). (Velcheva, 2009)

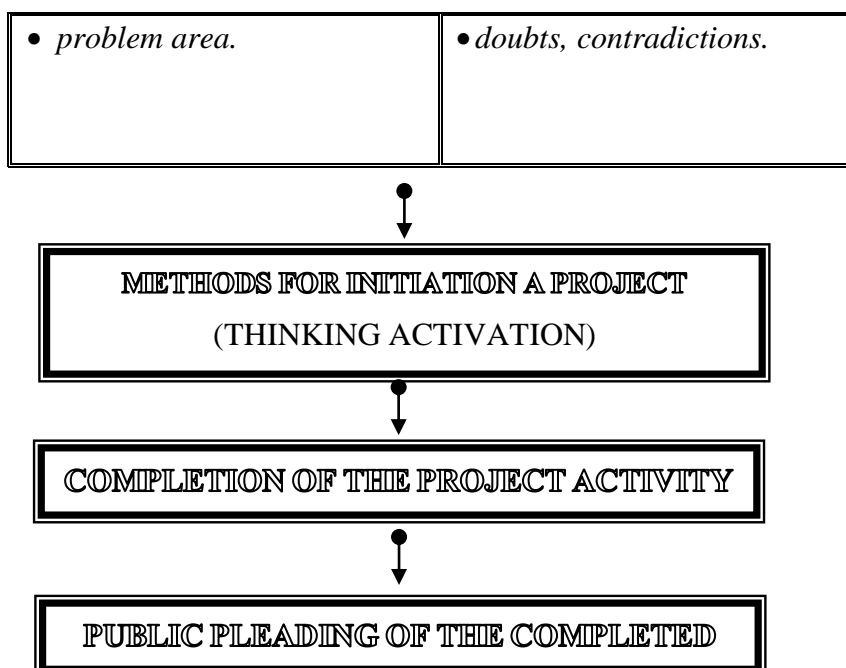
The final version of the topic and the problem of the student project - this is a joint choice of the students and the teacher (as a leader, coordinator, chief consultant of the project), who conducts consultations, discussions, takes into account the resources, time, educational and cognitive focus of the project, knowledge and the skills necessary for the implementation of the given project, including the costs of updating and obtaining the new knowledge in the process of the project activity.

According to K. Velcheva, this can be depicted in the following way :





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### TECHNOLOGY OF PROJECT-BASED LEARNING

Project-based learning is organized around *an open-ended guiding question or challenge*. It thus focuses students to work and deepen their learning by centering on the essential questions, debates, theses and/or problems.

Project-based learning *requires a range of critical thinking, problem solving, collaboration and communication skills* .

Project work begins by introducing students to knowledge and concepts, and once they have mastered them, they are given the opportunity to apply them.

It is known at the outset what end product and/or presentation needs to be prepared and this presupposes the need to acquire specific knowledge and concepts, thereby creating a context and a reason to learn in order to make sense of the information and concepts.

Research is then done to apply them and/or create something new.

When the teacher uses project-based learning there is a problem without a predetermined answer and an atmosphere that tolerates error and change. Students make independent decisions within the project parameters, plan the process to reach a solution and have the chance to choose and implement the activities. In the course of the work, current

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evaluations are given, and the final results - i.e the product of the project is evaluated according to the quality criteria.

A *technological modular model* from a group of American experts includes:

*Module 1 – Defining Expected Results*

- Work in a team of teachers to formulate and develop the project idea;
- Deciding on the scope of the project;
- Selection of indicators to achieve the result;
- Determining the overall results;
- Work on project design criteria;
- Creating an optimal learning environment;

*Module 2 – Preparing the leading questions*

- Construction of the questions;
- Clarification of questions;
- Generalization of questions;
- Development of standard based questions

*Module 3 – Planning the assessment*

- Defining the result and evaluation criteria;
- Comparing the product with the result;
- Use of rubrics;

*Module 4 - Project Map*

• Organization of the activities by the teacher, who creates the environment and provides the prerequisites for successful independent research work of the students;

• Directing the students' attention to the key problems and focusing on the ways to solve them during the implementation of the project;

- Collection of resources by students;
- Formation of the matrix of the implementation ie. development of a project implementation plan and its practical implementation;

*Module 5 – Project Management*

- Understanding the role of the teacher as a manager;
- Sharing the goals with the students;

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- Using different methods and tools to solve problems;
- Use of fulcrums and cornerstones;
- Assessment and reflection plan. (Ravitz, Mergendoller, Markham)

I. Sergeev offers several technological models for project-based learning, among which the most suitable for schools working in the conditions of the constructivist paradigm, such as those included in the present project, is the following:

1. Determination of the subject, theme, goals and tasks of the project, selection of a leader (1-2 months).
2. Implementation of the work (2-3 months).
3. Preliminary presentation of the product of the project and the work in front of one's own or someone else's class in order to establish the level of understanding and mastery of the material, as well as improving the skills to understand the questions and answer them (1 month).
4. Preparation and implementation of project defense before experts at the school level (2 months).
5. Summaries and presentation at a school conference. (Sergeev 2003, 10 )

## **THE NEW ROLES OF THE TEACHER THE PROJECT-BASED LEARNING PROCESS**

*The specific challenges faced by teachers* in project-based learning are related to:

- the selection or construction of situations that presuppose the possibility of good projects;
- structuring problems as learning opportunities;
- collaborating with colleagues to develop interdisciplinary projects;
- the dynamic management of the learning process and independent learning;
- the integration of technologies where appropriate;
- assisting students in giving authentic assessments.

Even if teachers are willing to take risks, to overcome the initial challenges, the support of the school leadership is important, which can support them by implementing more flexible

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schedules, such as block timetables or increasing the planning team and providing teachers with opportunities for professional development because project work requires more time both for planning by teachers and also for implementation by students.

And. Sergeev brings out *seven role functions of the teacher*, which he realizes in the course of guiding project-based learning:

- *Enthusiast, initiator* (increases students' motivation, supports them, encourages them, directs the project in the direction of achieving specific results);
- *Specialist* (has knowledge and skills in design issues);
- *Consultant* (organizer of access to resources, to other specialists);
- *Manager* (responsible for planning and control of project implementation deadlines);
- „*A person who asks questions*“ (according to J. Pitt - this is the one who organizes a discussion of approaches to overcome the difficulties that have arisen along the way with guiding questions, the one who detects mistakes and generally maintains the feedback);
- *Coordinator* during the entire process of the project activity;
- *Expert* (provides an accurate analysis of the results of the project implementation, helps to derive the current assessment in the project activity). (Sergeev 2003)

## **IN WHICH CURRICULUM IS PROJECT-BASED LEARNING APPLICABLE?**

The answer is in all academic subjects, with a high degree of efficiency in its application.

According to their educational focus, the subjects can be divided into two large groups:

- First group - these are the subjects forming a system of special and general academic knowledge, skills and competences. The application of the systematic approach in the construction of the curricula implies a traditional selection of forms and methods of training - as a condition for high quality of the output of the relevant educational degree. Such subjects are Bulgarian language and literature, history, geography, biology, chemistry, physics and mathematics.
- The second group of subjects is oriented towards the formation of civic, informational, communicative and other competences and they are to a significant extent integrated and/or

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applied in nature. It is important to note that they are closely related to the surrounding social environment and the future personal and professional development of students. The group under consideration includes foreign language learning, information technology, fine arts, technology and entrepreneurship, computer modeling, philosophy, civic education.

## **PLANNING THE PROJECT-BASED LEARNING**

Planning project-based learning is part of the teacher's strategic planning, which is done at the beginning of the school year.

It is associated with preliminary work on familiarization with the educational content that will be studied within the academic year in the various academic subjects. This can only be accomplished through the teamwork of all teachers who teach in the given class/parallel. Joint discussions of subjects from the learning content, on which cross-curricular connections can be found, allows to identify topics for interdisciplinary projects.

Project-based learning is planned by the team of two or three teachers who teach the subjects included in the topic of the interdisciplinary project. In primary classes, where most of the subjects are taught by one teacher - the primary teacher, the teachers of music, physical education, computer modeling (information technology), foreign language can be involved. A guiding principle for constructing the team is the topic that will be developed on the basis of the established interdisciplinary connections.

The team of teachers plans to:

- the topic of the project;
- the subjects from which information will be extracted for the development of the project;
- the main/key questions;
- the duration of the project;
- the product/result to be achieved / created by students;
- the process evaluation criteria;
- the product evaluation criteria;
- the final performance/presentation;
- the appropriate audience – parents, other students;

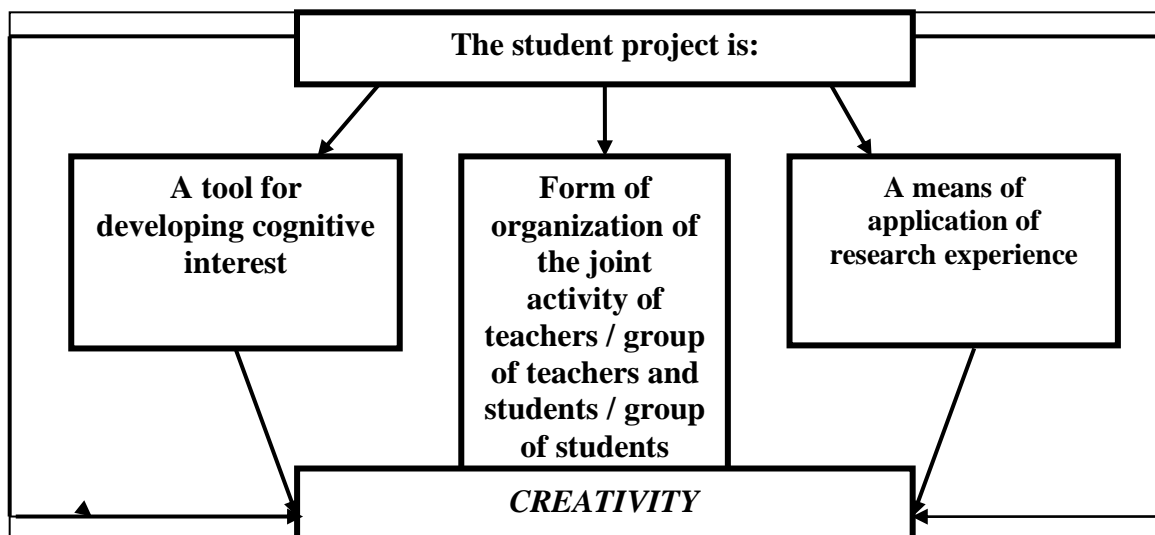
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- the jury, which will evaluate during the public presentation of the presentation/performance/model/model or other product of the project activity.

Planning is reflected in *a work plan*, which can be presented through various tabular formats.

In the Appendix to this Methodological Guide, two models are proposed to represent the planning process.

### ADVANTAGES AND BENEFITS OF PROJECT-BASED LEARNING



*The main advantages of project-based learning* are:

- creates opportunities for groups of students to explore meaningful questions that require them to gather information and think critically;
- allows voice and gives students choice because they learn to work independently and take responsibility;
- supports the development of metacognitive and cognitive thinking skills, such as collaboration, self-monitoring, data analysis, and allows students to receive and analyze information from different perspectives, as well as evaluate it;

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- includes feedback and revision so that students use peer critique to improve their work and create better products;
- results in a publicly presented product and/or presentation, which teaches that what you do is subject to public scrutiny and criticism.

Students must do much more than recall information, they must use higher order thinking skills, learn to work as a team, and contribute their efforts to its success. They must listen to others and express their own ideas clearly, be able to read a variety of materials, write, draw or otherwise express themselves in many ways and make effective presentations.

This leads to the formation of several groups of skills:

- *reflexive skills*: to make sense of the task, for the solution of which there is a lack of knowledge; to answer the question: What do I need to learn to solve the problem?;
- *research skills*: for independent search for knowledge from different fields; to independently find specific information in the information field; to find several options for solving the problem; to raise hypotheses; to establish causal relationships;
- *teamwork skills*: for team planning; to interact with each partner; for mutual assistance in the group in solving common tasks; for business partner communication; to find the mistakes of their partners in the work process and their elimination;
- *technological skills*: to design processes and/or products; to perform previously mastered technological operations; for proper use of tools and fixtures; to reach the set level of quality; to understand the properties of materials; to ensure personal safety and rational organization of the workplace;
- *managerial skills*: for planning activities, time and resources; for making decisions and predicting their consequences; to analyze own activity.
- *communication skills*: for asking questions; to engage in dialogue; to lead a discussion; to assert one's own position and point of view; to make reasonable compromises;
- *presentation skills*: for giving a public speech; artistic skills; for the use of visual aids in public presentation; for formulating answers to unplanned (unexpected) questions, etc." (Sergeev 2003, 27-28)

The use of project -based learning in school would lead to significant results for pedagogical environments such as:

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- *orientation of individual training;*
- *enabling learning;*
- *stimulating the initiative and the growth of creative possibilities.*



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### **ONLINE PROJECT BASED EDUCATIONAL RESOURCES**

<http://www.bie.org>

<https://vr.cct.bg>

### **VIDEOS FOR PROJECT-BASED TRAININGS**

Edutopia's 10 Big Ideas to Improve Public Education

[https://www.youtube.com/watch?v=H7CKc0ImOic&list=PLssIh1\\_V22f5YBt0WD0\\_Ag2sCfyDhuEYE](https://www.youtube.com/watch?v=H7CKc0ImOic&list=PLssIh1_V22f5YBt0WD0_Ag2sCfyDhuEYE)

Project Based Learning: Explained. <https://www.youtube.com/watch?v=LMCZvGesRz8>

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## APPLICATIONS

### Planning model - 1

Project planning form

Project Theme/ Topic:

Designed by:

School:

Class:

Big Question (or problem):

Interdisciplinary links:

Language	Mathematics	Science	Music	Arts	IT	PE

End Product:

Activities:

How the end product will be presented?

How the project will be assessed?

What support should be provided for the students?

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Plan for the teachers:

	Activity	Responsible teacher	Resources/ materials	Deadline
1.				
2.				

Plan for the Students:

	Activity	Working alone or in a group with...	Resources/ materials	Deadline
1.				
2.				

Reflection:

What did I learn during the project?

--

What skills did I practice?

--

What I and my group did well?

--

What will I/we change next time?

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**Planning model – 2**

**PROJECT-BASED LEARNING PLANNING SHEET**

<p><b>PROJECT SUBJECT:</b></p> <p>Made by .....</p> <p>School .....</p> <p>Class .....</p>						
<p><b>GUIDING QUESTIONS:</b></p>    						
<b>INTERSUBJECT CONNECTIONS/INTERDISCIPLINARY INTERACTIONS</b>						
<b>WHITE</b>	<b>MATT</b>	<b>OS</b>	<b>MUS</b>	<b>AI</b>	<b>And</b>	<b>PHYS</b>
<p><b>PRODUCT :</b></p>    						

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Activities (situations):

#### PLANNING THE STUDENTS' WORK

What will they do?

Where will they find information?

How will they present the product?

#### PLANNING THE TEACHER'S WORK

What will it do during each step?

How will students be managed and supported in their work?

By what criteria will it be evaluated?