



Section 3. Pedagogy

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PROJECT – BASED LEARNING THE MOST EFFECTIVE WAY OF DEVELOPING STUDENTS’ CRITICAL THINKING

*Lola Rustamovna Djurayeva*¹,

¹ Lecturer, Department of Pedagogy, Basic doctorate (PhD), Bukhara
State Pedagogical Institute, Bukhara, Uzbekistan

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Abstract

This article provides general information about modern pedagogical technology – Project – based learning, its advantages and challenges aimed at developing students’ critical thinking. The relevance of the article is on the formation and development of critical thinking skills among students in the context of modern needs – improving the quality and effectiveness of education. Also implementing this pedagogy in the form of “4– C”, i.e. cooperation, communication, critical thinking, creativity, which is taken from the basis of “K-12” setting. Moreover, this article talks about the origin and historical development of project – based education and the ideas of great educator – scientists along with their huge contribution in prosperity of it. This article reviews a range of literature and research findings, and draws on teachers’ real – life experiences.

Keywords: *critical thinking, 4 – C, collaboration, communication, criticism, creativity, modern pedagogical technologies, PBL – Project Based Learning, professional skills*

Introduction

The 21st century is an era marked by rapid adoption of new technologies, a time when a new stage of scientific development is being created, a new science, scientific research, an effective mechanism for stimulating innovative achievements and implementing them in practice.

The fundamentalization of education clearly shows that in order to form a morally responsible personality, students must be

taught not only to know, but also to think. For the comprehensive development of the younger generation, the development of innovative technologies, the formation of new laws that meet the spirit of the times, and their implementation, specific measures are being strengthened to achieve improved quality at all stages of the education system.

The modern world demands a multidimensional approach to the educational process. The 21st century skills-based curriculum

moves away from learning content and memorization to focus on the skills and abilities that will best serve our young generation. Student engagement and hands-on interdisciplinary learning take precedence over information transfer and the classroom of this era emphasizes a creative and collaborative approach to learning.

To find a solution to the problems and to eliminate the shortcomings in the field of education, huge reforms are being carried out in our country. As a clear proof of this, the principle of “4 C” education of the 21st century skills can be given as an example. The 4 C model is:

- Communication;
- Collaboration;
- Critical thinking;
- Creativity.

Communication – the ability to communicate is a skill that is necessary throughout life. Without communication, it is impossible to establish interpersonally relationships in everyday life, at school, at university, or at work.

Collaboration – cooperation is the skill of working in a team. Accepting help while completing a task, taking into account the point of view of others, defending one’s own opinion, in brief, forming the ability to work cooperatively.

Critical thinking – a critical thinker is an independent thinker. Such people do not adopt the opinions of other people, they always have their own opinions and can prove them with evidence.

Creativity – creative thinking is a way of thinking that distinguishes a person from a machine and artificial intelligence.

Based on this, this article sheds light on the modern pedagogical technology project-based education, which covers the 4C educational model, its advantages and unique aspects.

Theoretical basis and methodology

Project-based learning (PBL) is designed to give students the opportunity to develop knowledge and skills by organizing and actively participating in projects around real-life challenges and problems.

The historical development of project-based education goes back to the ancient

times. While Confucius, the famous Chinese sage, made a fame by participating in debates and discussions with his students, a Greek philosopher Socrates used the method of questioning and rejection, and Aristotle promoted the idea of learning through action, that is, on the basis of practice. As Aristotle wrote in *Nicomachean Ethics*, “What we have to learn to do, we learn by doing”. This is directly related to the authenticity component of the PBL gold standard.

Another promoter of project-based education is the Czech philosopher and pedagogue Jan Amos Comenius, who is the founder of the modern teaching process. As a supporter of universal education, he led schools and advised governments on education. Moreover, he believed that education should be student-centered, not teacher-centered, and connected to everyday experience, focusing on thinking rather than memorizing, and emphasizing learning through multiple tools. He created the first multimedia textbook with wooden pictures. His ideas are closely aligned with key components of PBL, such as reflection and authenticity.

Twentieth-century educational theorist and philosopher John Dewey argued that active experiences better prepare children for life in the real world and challenged the view that students are passive recipients of knowledge.

In Dewey’s idea that learning is more interesting for students who actively participate in the learning process, we can see the roots of the project-based learning components of student choice, voice, and authenticity.

Talian physician and child development expert Maria Montessori founded an international movement based on the idea that young children learn best through experience.

Swiss psychologist Jean Piaget’s “situated learning” approach advocated engaging students in the learning process rather than forcing them to learn by memorization. He is considered the founder of constructivist theory, which shows that people actively construct their knowledge of the world based on the interrelationship between their thoughts and experiences.

In the 1960s, McMaster University in Canada implemented a project-based learning approach that became standard practice in medical schools. Other disciplines such as

engineering, economics, and law soon began using these strategies to teach their students how to solve real-life situations and problems. Some K-12 schools began adopting project-based learning practices in the 1980s.

In the 21st century, project-based learning has been further developed as an instructional method for K-12 education. A project-based learning environment engages students in hands-on learning, gives students more choice about what they learn, and puts students in charge of their own learning.

Studies conducted at Stanford and Vanderbilt universities have shown that students in schools that use project-based learning outperform traditional school students in math, problem solving, and planning.

Based on years of literature review and educational research, the Buck Institute for Education (BIE) has identified seven key elements of PBL-Project-Based Education. Together, these elements are called the “Gold Standard” of Project-Based Learning. According to these standards, the main elements of project design are:

- A complex problem or question;
- Continuous research;
- Authenticity;
- Student voice (point of view) and choice;
- Reflection;
- Criticism and revision;
- Public product.

All of these elements, when used as a whole, allow learners to understand and learn the essential knowledge and skills necessary for success, rather than simply through rote memorization. Another benefit of project-based learning is its peculiarity is that this type of education teaches the student to take responsibility for the task he has to perform for a certain period of time.

“Solving real-world issues that matter is important to us as adults – and it’s important to our students,” explain Lathram, Lenz, and Vander Ark in their e-book, *Preparing Students for a Project-Based World*.

Discussion and results

Project-based learning creates an environment that fosters collaboration and effective communication skills. Students work in teams, learn to express their opinions, listen

actively, and share different points of view. Collaborative project-based discussions foster a sense of shared communication and encourage students to value teamwork. These experiences equip them with important interpersonal skills that are important in the professional world, where collaboration and effective communication are highly sought after qualities. Project-based learning has a number of advantages, including:

Relevance to real life. Project-based learning directly answers the question most students have during their learning process: “How will this be useful in life?” Instead of abstract knowledge, students will have the experience of solving specific problems.

Comprehensive approach. In the process of working on a project, students conduct researches, collect information from various sources, and rely on the knowledge and skills they already have.

Develop thinking. By developing a project plan, students develop logic, critical thinking, and the ability to defend their point of view.

Student-oriented. The goal of project-based education is not to teach the students to solve problems that are convenient for teachers to investigate, but to make the students interested in the studied topic, to encourage them to think critically, so that they could search solution themselves.

Motivation. Project-based learning awakens the student’s natural desire for self-expression. When students have the opportunity to “realize” something, they are more interested in doing it better than anyone else.

Self-expression. Project work does not limit the student from choosing a solution, there are no right answers, the main thing is that the result corresponds to the goal. Thus, the project leaves a lot of room for creativity. This is certainly not only good, but unique, elegant and efficient work that deserves special attention. It encourages children to use their imagination and find innovative solutions.

Multi-subjectivity. Work on the project involves the integration of various scientific disciplines.

Efficiency. Project-based learning gives students the opportunity not only to acquire valuable skills, but also to create something

useful. For example, children can design a brochure for a school, create a design for a HEI website or make chairs, the main thing is that the result will be clear and productive.

Communication. Working together on a project helps bring the team together, teaches young people to work in a team, share responsibilities, play the role of leaders and executors, and listen to each other.

Interest. Project-based learning should be useful and interesting, which is one of the secrets of its effectiveness.

Examples of project-based learning include:

- *Community Service:* Students identify a community problem, such as flooding or environmental pollution, and develop a service project to solve it. They plan and implement activities such as organizing food deliveries, cleaning up a local park, or creating awareness campaigns. This project develops empathy, civic responsibility and problem-solving skills;
- *Literary Adaptation:* Students choose their favorite book or play and create a screen adaptation such as a short film or graphic novel. They analyze themes, develop characters, and bring the story to life. This project will enhance storytelling, artistic expression, and literary analysis skills;
- *Scientific research:* students conduct experiments to collect data and study the results. Then they carefully analyze the collected data. Finally, they draw conclusions and share their findings in a report or presentation;

- *Cultural Exchange Project:* Students explore different cultures and create a project that promotes understanding and appreciation. They can create multimedia presentations, organize cultural festivals or have virtual exchanges with students from other countries. This project promotes global awareness, cooperation and intercultural communication.

While doing project at each stage, students would face problems, search for information, use logical, critical and design thinking, imagination, draw, calculate, work with hands, show patience and perseverance, and finally they also use public speaking skills. They also realize their strengths and weaknesses and gradually develop unique problem-solving skills that they can later use in other areas.

In preparing students, teachers, and leaders for the project-based world, PBL is recognized as the most appropriate approach to inspire, activate, and support socially isolated, human learners. Admittedly, PBL serves to create a generation of students (teachers and leaders) who are passionate about meaningful, authentic, and often real-world learning, engaged in and promoting deeper learning that leads to academic and professional success.

Conclusion

In conclusion, it should be noted that PBL – Project-based learning helps prepare students for “real life”, since they naturally learn to apply theoretical knowledge in practice.

Project-based education is one of the most effective ways to acquire knowledge through practical assignments.

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© Djurayev L. R.
Contact: lolarustamovna8080@gmail.com