Methodology for Implementing Project-Based Learning in Developing Independent and Creative Thinking of Students

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Abstract: This article is devoted to studying the technology of forming students' creative competencies through project activities. The article examines various forms of project activities (individual, group, interdisciplinary projects) and their potential in developing creative thinking. Research results prove the effectiveness of project activities in forming students' abilities to find non-standard solutions, create new ideas, approach problems creatively, and develop innovative products. The work also considers the role of the teacher in the process of forming creative competencies, creating a stimulating environment, and assessment technologies.

Keywords: project activities, creative competencies, creativity, innovative thinking, creative abilities, divergent thinking, non-standard solutions, student-centered learning, pedagogical technology, creative product, innovation, originality, imagination ability

Introduction. The 21st century is the century of innovation and rapid change, and the economy of modern society is increasingly based on creative and innovative ideas. The most demanded employees in the global labor market are specialists who are able to find unconventional solutions, think creatively and create innovative products. In this regard, higher education institutions are required to prepare graduates who are not only well-educated, but also have highly developed creative competencies.

Creative competencies are the ability of a person to create new, original and valuable ideas, solve problems in unconventional ways, and creatively apply existing knowledge and experience in new conditions. These competencies are necessary not only in the fields of art and design, but also in all other fields of technology, economics, medicine, education and others.

Project activities are one of the most effective pedagogical tools for forming students' creative competencies. In the process of working on a project, students have the opportunity to solve real problems, look for new solutions, test different ideas and create their own unique products. This contributes to the active development of all components of creativity - imagination, divergent thinking, originality and flexibility.

The large-scale reforms being implemented in the field of education in the Republic of Uzbekistan, in particular, the Law "On Higher Education" and the resolutions of the President aimed at improving the quality of education, also emphasize the need to train personnel who can think creatively and innovatively.

Creative competencies: concept, content and significance

The origin of the term creativity goes back to the Latin word "creare" - to create, to create. In pedagogical science, creativity is defined as the ability to create a new, original and valuable product.

Components of creative competencies

1. Cognitive components:

• Divergent thinking - the ability to find many different solutions to a problem;

• Associative thinking - establishing unexpected connections between concepts, objects and phenomena;

• Imagination - the ability to visualize and describe non-existent things;

• Analytical-synthetic ability - breaking down complex problems into parts and combining them in a new way.

2. Personal-motivational components:

• Curiosity - interest in novelty, the unknown;

• Risk-taking - willingness to take risks;

• Independence - defending one's views and fighting for one's ideas;

• Perseverance - achieving goals despite difficulties;

• Openness - openness to new experiences and ideas.

3. Activity components:

• Originality - creating unique, non-repeatable solutions;

• Flexibility - quickly adapting to different situations and changing approaches;

• Productivity - generating a large number of ideas;

• Improvement - developing and perfecting ideas.

The importance of creative competencies in modern education

Creative competencies are important for students in the following ways:

For professional development: Most modern professions require a creative approach, innovative thinking and finding new solutions. Specialists with creative competencies are highly competitive in the labor market.

For personal growth: Creativity expands a person's self-awareness, self-confidence and opportunities for success in life.

For social development: Creative thinkers contribute to the development of society, the creation of innovative projects and the solution of social problems.

For solving global problems: Solving global problems such as environmental problems, economic crises, social conflicts requires new, creative approaches.

The possibilities of project activities in developing creative competencies

Project activities are a type of activity that is goal-oriented, aimed at creating a specific result (product) and carried out within a certain time frame. Project activities create unique opportunities for the development of creative competencies.

Features of project activities that stimulate creativity

1. Problem orientation The project always begins with solving a specific problem. The process of identifying, analyzing and solving the problem activates creative thinking in students. Students are forced to look for new ways, not limited to traditional solutions.

2. Open tasks Project tasks are usually open-ended and accept several correct solutions. This provides students with the opportunity to demonstrate their creative potential, try different options and approaches.

3. Opportunity for experimentation During the project, students can try different methods, make mistakes and gain experience. There is no fear of making mistakes, because this is a natural part of the learning process. This environment is the most favorable conditions for creativity.

4. Independent choice and decision-making In the project, students make independent decisions on many issues: what methods to use, in which direction to move, what materials to use, etc. This independence is necessary for the development of creative thinking.

5. Creating a real product The final result of the project is a specific, visible product (project work, prototype, model, presentation, etc.). Creating a real product encourages students to be responsible, careful and creative.

Different forms of project activity and their creative potential

Individual projects Individual projects give the student complete creative freedom. The student plans and implements the project in accordance with his interests, abilities and ideas. This form allows you to maximally reveal the student's personal creative potential.

Advantages:

• Complete creative independence;
• Work based on personal interests;
• Development at your own pace;
• Full awareness of responsibility.

Group projects In group projects, several students work together. In this form, creativity is further enhanced, since the thoughts, experiences and approaches of different people are combined.

Advantages:

• Exchange and enrichment of ideas;
• Collective creativity (brainstorming);
• Motivate each other;
• Combine different skills and abilities;
• Develop social creativity skills.

Interdisciplinary projects Interdisciplinary projects are carried out within the boundaries of several disciplines and require the integration of knowledge from different fields. These are projects that require the highest level of creativity.

Advantages:

• Systematic and complex thinking develops;
• Unexpected connections are established between different fields;
• The ability to find innovative solutions increases;
• Modeling complex problems in real life.

Practical projects Practical projects are aimed at creating a product that has clear practical value. For example, creating a website, developing a mobile application, drawing up a business plan, etc.

Advantages:

• Experience in solving real problems;
• Practical value of the result;
• Development of professional skills;
• High level of motivation.

Technology for forming creative competencies through project activities

To effectively form creative competencies, special pedagogical technology and approach are necessary. The main components of this technology are presented below.

Stage 1: Creating a creative environment

It is important to create favorable psychological and organizational conditions for creativity.

Psychological safety:

• Elimination of fear of making mistakes;
• Acceptance and respect for any idea;
• Constructive feedback instead of criticism;
• Creating an atmosphere of trust between students.

Stimulating physical environment:

• A comfortable place for creative work;
• Necessary materials and tools;
• Inspiring visual elements;
• The possibility of free movement and communication.

Methodological readiness:

• Tasks that stimulate creativity;
• Various resources and sources;
• Modern technologies and programs;
• A set of creative methods and techniques.

Stage 2: Choosing a project topic

The project topic plays an important role in creative activity. A properly selected topic helps to reveal the creative potential of students.

Topic selection criteria:

• Compliance with the interests and needs of students;
• Open and multi-variable nature of the problem;
• Practical significance;
• Possibility of a creative approach;
• Interdisciplinary nature;
• Modernity and relevance.

Methods of proposing topics:

• Proposal by students themselves;
• Presentation of a list of topics by the teacher;
• Search for problems from real life;
• Orders from production, business or social organizations.

Stage 3: Idea generation

At this stage, it is necessary to activate creative thinking to the maximum.

Brainstorming technique:

• Accept all ideas uncritically;
• Attention to quantity (quality is evaluated later);
• Development of other people’s ideas;
• Support for unexpected and "crazy" ideas.

SCAMPER technique: This technique uses the following questions to change existing ideas and create new ones:

• S (Substitute) - What can be replaced?
• C (Combine) - What can be combined?
• A (Adapt) - What can be adapted?
• M (Modify) - What can be changed?
• P (Put to other uses) - Put to other uses?
• E (Eliminate) - What can be eliminated?
• R (Reverse/Rearrange) - What can be reversed or rearranged?

Mind mapping method: Creating a system of connections and sub-ideas branching out from a central idea. This method develops associative thinking and helps to find new connections.

"6 Thinking Hats" technique: This technique by Edward de Bono teaches you to look at a problem from six different perspectives:

• White hat - facts and information;
• Red hat - emotions and intuition;
• Black hat - criticism and risks;
• Yellow hat - optimism and opportunities;
• Green hat - creativity and new ideas;
• Blue hat - process management.

Stage 4: Selection and development of ideas

The stage of evaluating the ideas generated and selecting the most promising ones.

Evaluation criteria:

• Originality and novelty;

• Feasibility of practical implementation;

• Availability of resources;

• Expected effect;

• Student interest and motivation.

Prototyping: Creating an initial prototype of the selected idea. This process further develops creativity, because turning an idea into a real product requires making many creative decisions.

Stage 5: Project Implementation

This is the longest and most creatively rich stage.

Experimental work: Students should try different methods, experiment, and look for new solutions. In this process:

• Making mistakes is a natural phenomenon;

• Every mistake is a source of new knowledge;

• Failure is an opportunity to find a new path;

• Continuous improvement and optimization.

Creative problem solving: Many unexpected problems arise during the project process. These problems are a great opportunity to develop creative thinking. The teacher should encourage students to find their own solutions rather than providing ready-made answers.

Reflection and correction: Regularly analyze the progress of the project, evaluate what is working well and what needs to be changed. This process develops students' ability to understand and manage their own creative processes.

Step 6: Presenting the Project Results

Presenting the final product is also an important manifestation of creative competencies.

Creative Presentation: Students should present their projects in an interesting, original and impressive way. This may include:

• Non-traditional presentation formats;

• Visual and multimedia elements;

• Interactive demonstrations;

• Storytelling techniques.

Portfolio Creation: A creative portfolio that reflects all stages of the project process. It should include the evolution of ideas, sketches, prototypes, conclusions and results.

Criteria and methods for assessing creative competencies

Assessing creative competencies is fundamentally different from assessing traditional knowledge and skills. This process requires a multi-criteria and multi-level approach.

Criteria for assessing creativity

1. Originality (20-25 points)

• Novelty and uniqueness of the idea;

• Departure from standard solutions;

• Presence of a personal creative signature;

• Non-repetition.

2. Productivity (15-20 points)

• Number of ideas;

• Variety of approaches;

• Modernity of options;
• Speed and efficiency of thinking.
3. Adaptability (15-20 points)
• Generating ideas in different categories;
• Ability to change approaches;
• View from different perspectives;
• Adapt to the context.
4. Refinement (15-20 points)
• Elaborating the idea in detail;
• Enriching with details;
• Aesthetic improvement;
• Increasing functionality.
5. Problem-solving efficiency (10-15 points)
• Relevance of the solution to the problem;
• Practical applicability;
• Resource efficiency;
• Expected results.
6. Creativity of the process (10-15 points)
• Creative methods used in the project process;
• Experimental approach;
• Ability to learn from mistakes;
• Continuous improvement.

Assessment Methods

Portfolio Assessment: Assessment based on a collection of materials that reflect the student's entire creative process. A portfolio includes:

• Initial ideas and sketches;
• Research materials;
• Prototypes and test results;
• Final product;
• Reflective writing.

Expert Assessment: Assessment by several experts (teachers, industry professionals, other students) using various criteria.

Self-Assessment: Student's assessment of their own creative work. This develops reflective thinking and helps the student understand their strengths and weaknesses.

Group Assessment: Students working in a group evaluate each other's contributions and creative additions.

Writing Assessment: Comparing several projects and ranking them in terms of originality, practical significance, and quality of execution.

The role of the teacher in project activities

The role of the teacher in the process of forming creative competencies has its own characteristics.

The main tasks of the teacher

Inspiring: The teacher should inspire students to creative activity, express confidence in their creative potential and support them.

Facilitating: Facilitating the process without controlling it. Creating conditions for students to work independently, but guiding when necessary.

Creating a creative environment: Creating an environment of psychological safety, openness and experimentation. Forming a positive attitude towards mistakes.

Questioning: Asking questions that encourage students to think, rather than giving ready-made answers:

- "What other ways could there be?"
- "What would happen if ...?"
- "How could this be improved?"
- "Are there other aspects of the problem?"

Resource provider: Providing or guiding the necessary materials, tools, information sources and technologies.

Evaluator and Appraiser: Recognizing and appreciating students' creative efforts. Assessing the process, not just the outcome.

Things a teacher should not do

- Provide ready-made solutions;
- Over-control;
- Criticize students' ideas;
- Encourage only standard approaches;
- Negatively react to mistakes;
- Over-involvement in the process;
- Focus only on the outcome, ignoring the process.

Pedagogical conditions for the development of creative competencies

Creative competencies develop best in optimal conditions.

1. Psychological conditions:

- An atmosphere of safety and trust;
- Acceptance of any idea;
- An environment free from criticism;
- Tolerance for mistakes;
- Positive attitude and support.

2. Pedagogical conditions:

- Student-centered learning;
- Problem-based and research-oriented tasks;
- Interdisciplinary approach;
- Various teaching methods and technologies;
- Combination of individual and group work;
- Practical orientation.

3. Organizational conditions:

- Flexible curriculum;
- Sufficient time for project activities;
- Necessary technical and material resources;
- Modern technologies and programs;
- Special places for creative activities.

4. Motivational conditions:

- Projects of practical significance;
- Compliance with personal interests and needs;
- Recognition and reward of success;
- The opportunity to present the results to the general public;

• Involvement of external experts and professionals.

Conclusion

Project activity is a powerful and effective pedagogical tool for the formation of students' creative competencies. In the process of working on a project, students not only develop all the components of creativity - originality, flexibility, productivity, improvement - but also gain experience in creatively solving real problems.

A number of conditions are necessary for the full realization of the creative potential of project activity: creating a creative environment, a student-centered approach, the role of the teacher as a facilitator, the use of various forms and methods, and a multi-criteria assessment system. When these conditions are provided, project activity maximizes the creative potential of students and helps to form them as innovative thinkers, creative problem-solvers.

In the modern world, creative competencies are not just an additional advantage, but a prerequisite for professional success and personal development. Therefore, higher education institutions should introduce project activities as an integral part of the educational process and pay special attention to the development of students' creative potential.

The widespread introduction of project-based education and the formation of creative competencies in the higher education system of Uzbekistan is one of the important steps towards building an innovative economy and a knowledge society.

References

1. O'zbekiston Respublikasining "Oliy ta'lim to'g'risida"gi Qonuni. - Toshkent, 2020.

2. O'zbekiston Respublikasi Prezidentining "Oliy ta'lim muassasalarida ta'lim sifatini oshirish va ularning mamlakatda amalga oshirilayotgan keng qamrovli islohotlarda faol ishtirokini ta'minlash bo'yicha qo'shimcha chora-tadbirlar to'g'risida"gi Farmoni. PF-5847-son, 2019 yil 8 oktyabr.

3. Azizxo'jayeva N.N. Pedagogik texnologiya va pedagogik mahorat. - Toshkent: TDPU, 2003. - 175 b.

4. Begimqulov U. Zamonaviy ta'lim texnologiyalari. - Toshkent: Fan va texnologiya, 2013. - 248 b.

5. Yo'ldoshev J.G'., Usmonov S.A. Kreativ pedagog. - Toshkent: Iqtisod-moliya, 2010. - 216 b.

6. Gilford J.P. Kreativnost // Psikhologiya myshleniya. - Moskva: Progress, 1965. - S. 433-456.

7. Torrens E.P. Pooshchreniye i razvitiye kreativnosti v shkole. - Moskva: Prosveshcheniye, 1974. - 192 s.

8. Novikova T.G. Proyektnyye tekhnologii na urokax i vo vneurochnoy deyatelnosti // Narodnoye obrazovaniye. - 2000. - №7. - S. 151-157.

9. Polat Ye.S., Bukharkin M.Yu. Sovremennyye pedagogicheskiye i informatsionnyye tekhnologii v sisteme obrazovaniya. - Moskva: Akademiya, 2010. - 368 s.

10. Tunik Ye.Ye. Psikhologiya kreativnosti. - Sankt-Peterburg: Piter, 2021. - 544 s.

11. Amabile T.M. Creativity in Context: Update to the Social Psychology of Creativity. - Boulder: Westview Press, 1996. - 317 p.

12. Craft A. Creativity in Schools: Tensions and Dilemmas. - London: Routledge, 2005. - 224 p.

13. Csikszentmihalyi M. Creativity: Flow and the Psychology of Discovery and Invention. - New York: Harper Collins, 1996. - 456 p.

14. De Bono E. Lateral Thinking: Creativity Step by Step. - New York: Harper & Row, 1970. - 300 p.

15. Robinson K. Out of Our Minds: Learning to be Creative. - Oxford: Capstone, 2011. - 377 p.

16. Sternberg R.J., Lubart T.I. Defying the Crowd: Cultivating Creativity in a Culture of Conformity. - New York: Free Press, 1995. - 320 p.

17. Thomas J.W. A Review of Research on Project-Based Learning. - San Rafael: Autodesk Foundation, 2000. - 45 p.

18. https://edu.uz - O’zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi rasmiy veb-sayti.