

CHAPTER 1

CHAPTER 1

APPLICATION OF PROJECT TECHNOLOGIES DURING THE FORMATION OF THE ENVIRONMENTAL COMPETENCE OF HIGH SCHOOL STUDENTS TO OVERCOME THE ENVIRONMENTAL CONSEQUENCES OF THE WAR

ABSTRACT

The section is devoted to the study of the features, content, forms and methods of forming the environmental competence of high school students by means of project-research activities. The state of development of the problem of the formation of environmental competence among high school students by means of project-research activities in the context of their continuous development is analyzed; the essence and structure of the concepts "environmental competence of high school students", "formation of environmental competence in high school students in the context of overcoming the environmental consequences of the war", "educational project", "project-research activity", "creative process" are specified. Scientific-methodical and educational support for innovative methods of forming the environmental competence of high school students by means of project-research activities has been created. The chapter is dedicated to the study and representation of the project activities of high school students in the conditions of overcoming the environmental consequences of the war through the developed algorithm of actions: analysis of the ecological situation of a specific region; determination of the goals of project activity; development of a strategy for the implementation of project activities; forming a team of project executors; attraction of resources for project implementation; implementation of activities to overcome the environmental consequences of the war; monitoring and evaluation of project activity results; reporting to the community and sharing the experience of successful project activities; the process of monitoring the implementation of project activities; the process of correcting the results of project activities. The specified material provides the opportunity for teachers to use it during the educational process and is a model for creating their own environmental projects.

KEYWORDS

Environmental competence, high school students, environmental problems, elimination of environmental consequences of the war, educational projects, project-research activity.

1.1 THE RELEVANCE OF THE IMPLEMENTATION OF ENVIRONMENTAL PROJECTS BY HIGH SCHOOL STUDENTS IN THE CONDITIONS OF OVERCOMING THE ENVIRONMENTAL CONSEQUENCES OF THE WAR

Under modern conditions, when military conflicts and their consequences are becoming an indispensable part of reality for many countries, the issue of adaptation of young people, particularly high school students, to these difficult conditions is especially relevant. War and armed conflict can have serious environmental consequences, including pollution of soil, water and air, and destruction of ecosystems and natural resources. In such conditions, the environmental project activity of high school students becomes especially important, as it is aimed at preserving and restoring the environment, as well as increasing environmental awareness among young people.

The aggression of the armed forces of the Russian Federation in Ukraine, heavy ground weapons, including long-range artillery, missiles, naval ships and military aircraft, have led to large casualties among the civilian population and damage to the natural system of Ukraine. The results of the war for the environment (increased radiation background in the Chernobyl zone due to the movement of heavy armored vehicles and other transport on contaminated soils and the raising of radioactive dust into the air; damage by ballistic missiles to oil depots throughout the territory of Ukraine and air pollution over residential areas with toxic products of open combustion; damage to gas pipelines in populated areas, powerful explosions and shock waves; damage to enterprises in various industries and the creation of chemical hazards for civilians and ecosystems) require the implementation of appropriate measures to ensure environmental safety in Ukraine.

It is clear to the general public that after the end of the war, environmental problems will be evident for a long time. During the war, more than a thousand rockets were fired at Ukraine, tens of thousands of military equipment of the occupiers of various types were destroyed, which led to the accumulation of carcinogenic waste: spilled fuel, destroyed equipment and spent weapons, detonated missiles.

The negative impact on the environment threatens the health and lives of all those who remain in Ukraine now and will live in the future. Debris, formed during the current shelling of buildings, poisons the air, burns the skin, and other organs. Chemicals, released from damaged facilities and critical infrastructure, seep into the ground, poisoning soil and plants important to the food industry.

For example, damage to water, sanitation and hygiene infrastructure creates widespread health threats, including typhoid, cholera, dysentery and polio, among others. As a result of rising temperatures due to the lack of centralized water supply and sanitation, the decomposition of thousands of corpses under rubble, a catastrophic lack of drinking water and food, powerful and deadly epidemics can break out, which is undoubtedly a consequence of environmental pollution.

Thus, today's complex military conditions dictate a change in the priorities of the state and society regarding the formation of the environmental competence of education seekers as future specialists and participants in the reconstruction and qualitative transformation of the country.

War leaves destruction in its wake, including environmental disasters, pollution and destruction of natural resources, which requires appropriate measures to restore the environment and ensure

vital conditions for people and nature. Let's consider in more detail what aspects should be taken into account when creating project cases in the following conditions:

1. Analysis of environmental problems. The first step in creating a project case is the analysis of environmental problems that arose as a result of the war. These can be contamination of soils and water bodies with chemical substances, destruction of ecosystems, loss of biodiversity and other environmental crises.

2. Determination of the goals and objectives of the project. The second step is to define the specific goals and objectives of the project. This can be, for example, restoration of natural ecosystems, reduction of water pollution, restoration of resources to ensure the vital needs of the population, etc.

3. Development of strategies and methods. After defining the goals, it is necessary to develop strategies and methods for their achievement. This may include the cleaning of territories from garbage and chemical pollution, restoration of vegetation, creation of new water supply and water purification systems, etc.

4. Implementation of the project and achievement of results. High school students can implement their project by performing planned actions and achieving defined goals. This may include the organization of working groups, carrying out work in territories with a damaged ecosystem, planting trees and plants, conducting educational activities, etc.

5. Evaluation of results and lessons learned. After the project is completed, it is important to evaluate its results and learn the lessons obtained. This will help determine the successes and shortcomings of the project, as well as draw conclusions for future initiatives.

6. Dissemination of experience and impact on society. Equally important is the dissemination of experience and impact on society. The creation of a project case will make it possible to convey information about environmental problems and ways to solve them to the public, as well as to mobilize society to action.

The creation of project cases during the implementation of environmental projects by high school students in the conditions of overcoming the environmental consequences of the war is an important step in preserving nature and ensuring vital conditions for people. These cases not only demonstrate concrete examples of positive impact on the environment, but also teach students to systematize their knowledge and experience, identify problems and ways to solve them, and effectively communicate their ideas and achievements with others.

1.2 METHODOLOGICAL FOUNDATIONS OF PROJECT TECHNOLOGIES. TERMINOLOGICAL AND CATEGORICAL APPARATUS

The theoretical analysis of the problem of the application of project technologies during the formation of the environmental competence of high school students to overcome the environmental consequences of the war made it possible to clarify the terminological and categorical apparatus of the study.

Environmental competence of students in accordance with the State Standard of Basic Secondary Education includes the ability to be aware of the ecological foundations of nature use, the need for nature protection, to comply with the requirements of behavior in nature, to use natural resources sparingly, to understand the importance of the context and interdependence of economic activity and the need to preserve nature, which will contribute to ensuring the sustainable development of society [4].

Environmental competence of high school students *includes the ability to consciously act in the natural environment on the basis of acquired environmental knowledge, abilities, skills, experience and values regarding the responsible use of natural resources, actualization of decision-making skills, performance of appropriate actions, responsibility, awareness of the consequences for the environment in order to ensure sustainable development of society.*

The formation of environmental competence in high school students in the context of overcoming the environmental consequences of the war is a purposeful process of forming the ability to quickly determine the level of environmental pollution and identify environmental threats during military operations, modeling the zone of spread of the level of pollution, drawing up an action plan to prevent the occurrence of pollution and restore the affected areas during the war, **which is based on the personal and collective practical experience of high school students**, *which was formed during the previous project-research activity (hereinafter the activity) in a project-oriented educational environment; on the knowledge and ideas about the activity, its purpose, means, result, which the student of senior classes chooses independently or with the participation of a peer, an adult; on the emotional and value attitude to one's own activity, which was formed and accepted by a high school student to one's own experience of environmental action and selected for use during participation in project technology.*

Modernity actualizes project technology as an innovative for the formation of the competence of education seekers, which is currently one of the most promising in the professional training of specialists. Thanks to the specified technology, the educational process is filled with a professional context, and the ability of education seekers to self-education, self-improvement, effective educational and cognitive activity, the development of creativity, communication, independence, and research competence is formed.

The results of the generalization of the studied psychological and pedagogical literature on the topic of the study are presented in the content analysis of the concept of "project technologies" in **Table 1.1**.

In view of the research carried out, the educational project is identified with an integrative didactic technology of learning and education, aimed at developing the competence of the learner; the method of teaching and the form of organization of educational and cognitive activity, which involves the cooperation of all participants in the educational process with the aim of obtaining a specific result for a certain period – from one lesson to several months.

We understand **the project-research activity of high school students** as a set of environmental actions, the direction of which demonstrates a conscious line of movement/trajectory/path

of the student's own activity, which is in development, the driving force of which is the motive of creation in a project-oriented educational environment. The environmental activity of a high school student is a manifestation of the creative process in a project-oriented educational environment.

● **Table 1.1** Content analysis of the concept of "project technologies"

Author	Concept definition
N. Vovk, I. Viktorenko, I. Fed	personally oriented technology and method of organizing students' independent activities, aimed at solving the set tasks and goals, involves reflective, presentational, research, search activities of students, integrates a problem-based approach, group methods [2]
O. Ilyina	joint educational and cognitive, creative game activity of students with a common goal, coordinated methods of activity, aimed at achieving a common result [7]
O. Kobernyk, S. Yashchuk	practice of personally oriented learning in the process of a student's concrete work, based on his/her free choice, taking into account his/her interests. In the student's mind, it looks like: "Everything I learn, I know, and what I need it for and where I can apply this knowledge." [8]
G. Romanova	Teacher's activity, aimed at substantiating the target idea, development and implementation of the didactic project as an innovative model of the learning process [14]
O. Khischenko	form of educational and cognitive activity, which consists in the motivational achievement of a consciously set goal of making a creative project, ensures the unity and continuity of various aspects of the learning process, is a means of developing the personality of the subject of learning [23]

In the context of the presented research, we understand **the process of creation** as a set of consecutive ecological actions, steps for the existence of choice and use of means, aimed at achieving a certain goal, a real consequence/result, which occurs naturally and forms the environmental competence of a high school student/affects the development (restoration) of the ecosystem of Ukraine in the context of overcoming the environmental consequences of the war.

The very process of creation, according to the scientist I. Bekh, involves the active participation of a high school student in the use of his/her own experience of activities, which brings to life the idea of creating, giving existence to the new, preserving the high-quality past, created and adopted in the life of the student as an example/sample of the creation of parents, teachers, scientists. The student's moral-behavioral fund, formed at the level of the image of moral actions, prompts to determine the reasons and goals of those moral actions, which must be supported by an emotional-motivational component, which is always deeply individual and depends on the psychological characteristics of the high school student [1]. The process of creation also involves the drawing of plans, the content of which is filled with the processes of preservation, prevention and elimination, which enable the processes of restoration and the emergence of a new one, created by the student now on his/her own initiative or collective decision. The appearance of a real

consequence – a result that satisfies the need and to which the act of a high school student is directed, is connected with the motivational basis of the act. Having an existing motivational basis that arises at a certain stage of the formation of moral action, the teacher must ensure the dominance of higher moral and spiritual motives, that is, values that constitute the goal of personality development. Such educational activity of the teacher unfolds at the stage of the student's awareness of the act at the scientific-conceptual (essential) level [1].

In such a situation, which involves the process of creation, the student is the cause of the emergence of the new, the revival of the already existing; along with this, the student can be the cause of the actions and deeds of peers or adults and shape their creative process with their own environmental actions. The content of the process of creation in the ecosystem involves ecological actions, activities that are aimed at a real consequence – the creation of the life of all living things that surrounds the high school student today.

1.3 THE PROCESS OF PROJECT ACTIVITIES OF HIGH SCHOOL STUDENTS IN THE CONTEXT OF OVERCOMING THE ENVIRONMENTAL CONSEQUENCES OF THE WAR

The process of project activity of high school students in the conditions of war and post-war reconstruction of Ukraine should be aimed at providing them with support, developing resources to overcome difficulties and building a positive perspective for the future.

A sociological survey, conducted among Ukrainians by the Kyiv International Institute of Sociology, made it possible to identify a number of environmental problems, caused by the war. Among the main environmental problems, caused by military actions, Ukrainians include: radiation contamination (56.4 % of respondents), mining of agricultural land and forest plantations (39.5 % of respondents), spread of poisonous substances as a result of shelling of oil depots, gas storage facilities, and chemical facilities industry (36.5 % of Ukrainians).

According to the respondents, the severe consequences of the war for Ukraine's environment are also related to: pollution of rivers, ponds and seas, caused by the sinking of ships, spread of oil products and explosives; destruction of protected areas, destruction of ecosystems, death of animals and birds, forest fires; destruction of treatment facilities, dams, water supply networks; littering of territories with fragments of destroyed buildings, gutted cars, remains of household items and appliances, etc.; significant air pollution.

The correlation of types of environmental pollution, caused by the negative consequences of the war and their impact on the human body (**Table 1.2**), confirms the low degree of ability of Ukrainian citizens to practically apply knowledge about the paradigm of safety behavior, both their own and in relation to objects that pose an environmental threat, and implementation of health care competence in difficult environmental circumstances.

The process of project activities of high school students in the conditions of war is primarily important to start with the analysis of the ecological state of the specified region after the war or

armed conflict. This may include assessing levels of air, water and soil pollution, as well as studying the effects of military operations on ecosystems and natural resources. On the basis of this analysis, it is possible to determine the priority directions of environmental activities for high school students. For example, if war or conflict continues in the southern regions, where widespread unemployment and economic instability may be a problem, the adjustment of project activities may include elements of economic recovery through small business support or agricultural development projects.

● **Table 1.2** Correlation of types of environmental pollution and their impact on the human body

Environmental pollution type	Impact on human health
Debris formed during the current shelling of buildings	Air pollution, burns of skin, other organs
Chemicals released from damaged facilities and critical infrastructure	Pollution of soils and water bodies, agricultural plant and animal products
Damage to water supply and drainage infrastructure	Consumption of contaminated drinking water, which leads to diseases and poisoning of the human body, in particular typhoid, cholera, dysentery, poliomyelitis
Biological pollution (decomposition of thousands of corpses under rubble)	Possibility of outbreaks of deadly epidemics
Air and water pollution	Respiratory and digestive diseases
Sudden exposure to an intense sound due to a gunshot or explosion	Barotrauma, acoustic trauma, acubarotrauma (traumatic damage to hearing organs)
Radiation pollution, emission	Threat of oncological diseases due to contamination of environmental components with radioactive particles

Next, it is worth developing and implementing environmental protection projects, aimed at restoring and protecting natural resources, reducing pollution and increasing environmental awareness.

In order to achieve the goal of the project activity of high school students in the conditions of overcoming the environmental consequences of the war, the following sequence of operations can be considered:

1. Analysis of the ecological situation of a specific region.
2. Determination of the goals of project activity.
3. Development of a strategy for the implementation of project activities.
4. Formation of a team of project executors.
5. Involvement of resources for project implementation.
6. Implementation of activities to overcome the environmental consequences of the war.
7. Monitoring and evaluation of project activity results.
8. Reporting to the community and sharing the experience of successful project activities.
9. The process of monitoring the implementation of project activities.
10. The process of correcting the results of project activities.

We detail the above sequence of operations, that is, the algorithm of actions during the organization and implementation of an environmental project by high school students:

1. Analysis of the ecological situation of a specific region.

The first step is to carry out a detailed analysis of the environmental consequences of the war in a specific region. This includes identifying the main sources of pollution, the level of damage to ecosystems, and identifying the most critical problems. Let's take a closer look at the first step – the analysis of the situation, which involves a detailed analysis of the environmental consequences of the war in a specific region.

Collection of information. The initial stage is the collection of all available information about the state of the environment in the military conflict of the specified region. This may include reports from environmental organizations, data from local authorities, scientific research, photos and videos, etc.

Assessment of the level of pollution. Data analysis to determine the level of pollution of various components of the environment: air, water, soil, biodiversity. This includes identifying the types of pollutants, their distribution and environmental impact.

Identification of the main problems. Establishing the main environmental problems arising as a result of the war. This can be the destruction of forests, pollution of water bodies, emissions of harmful substances into the air, destruction of natural places of mass recreation, etc.

Determination of promising directions of action. On the basis of the obtained data, it is necessary to determine promising directions of action to overcome environmental problems. This can be restoration and protection of natural territories, cleaning of polluted water bodies, reduction of emissions of harmful substances, introduction of ecological technologies, etc.

Taking into account the peculiarities of the region. It is important to take into account the specific features of each region, such as climatic conditions, geographical location, and the presence of unique ecosystems. This will help to develop strategies more effective and adapted to specific conditions.

Analysis of the situation is an important stage in the planning of any project, especially one, aimed at solving complex environmental problems. It allows you to understand the scale of the problem, determine priorities and develop an effective action strategy to achieve the set goals.

2. Determination of the goals of project activity.

After the analysis, you need to determine the specific goals of the project. It can be the cleaning of water bodies, restoration of forests, reduction of emissions of harmful substances or other tasks, aimed at improving the ecological situation.

Formulation of the main goal is the first step, which involves a clear formulation of the main goal of the project, which should be aimed at solving a specific problem, identified during the analysis of the situation. For example, the main goal may be to restore the ecosystem of a certain natural place or reduce the level of pollution of water resources.

Setting specific goals is possible on the basis of a defined purpose, that is, you need to define specific, measurable and achievable goals that will help achieve this purpose. Defining goals is

a key stage in planning any project, as they determine the course of action and criteria for success. Clearly formulated goals help to focus on necessary tasks and efficiently use resources to achieve improvements in solving environmental problems. For example, goals may include cleaning a certain number of hectares of land from pollution, restoring a certain type of plant or animal, reducing the content of harmful substances in water bodies, etc.

It is advisable **to formulate strategies and tasks** after setting goals, it is necessary to develop strategies and specific tasks that will be aimed at achieving the set goals. This may include the development of plans to clean water bodies, the implementation of measures to restore vegetation cover, the implementation of environmental education programs, etc.

Consideration of resources should be carried out at the stage of defining goals, as it is important to consider available resources, such as human, material and financial, that can be used to implement the project. This will help make the goals realistic and achievable.

Setting deadlines is an important element because every goal should have a clearly defined deadline. This will help determine the work schedule and ensure the timely achievement of the set goals.

3. Development of a strategy for the implementation of project activities.

Planning the specific actions to be taken to achieve the goals may include discussion and development of the technical, financial and organizational aspects of the project.

Discussion and analysis of the technical aspects of the project include the necessary equipment, tools, and technologies that will be used to perform the work. This may include such types of work as: developing methods for cleaning water bodies, restoring vegetation, building barriers to prevent the spread of pollution, etc.

Analysis of financial aspects is the next step, which is carried out through the analysis of financial aspects of the project, including the assessment of the costs of materials, equipment, transportation, labor costs, as well as the search for opportunities to receive funding from various sources, such as government grants, sponsorship support, charitable contributions, etc. *The analysis of the financial aspects of the project* includes an estimate of costs for the purchase of equipment, materials, wages, transportation costs, etc.; developing the project budget and finding sources of funding, such as government grants, sponsorship support, charitable contributions, foundations, etc.

Development of organizational aspects – the third step, which includes the development of organizational aspects of projects Discussion and development of technical aspects of the project takes place subject to compliance with the sequence of actions, namely: determination of the necessary equipment and materials for performance of work; development of methods for cleaning contaminated areas, restoration of natural resources, restoration of ecosystems, etc.; study of modern technologies and methods that can be used to solve environmental problems as efficiently as possible.

During the development of the organizational aspects of the project, special attention should be paid to the formation of the team and the distribution of responsibilities among its members. Let's consider in more detail and concretize this process in the form of an action algorithm:

1. *Formation of the team by defining the necessary roles and competencies.* Various skills and knowledge are required for the successful implementation of the project. For example, ecologists, engineers, financiers, organizers, communication specialists, etc. may be needed.

2. It is advisable *to search for candidates* openly or with the help of a targeted set of team members who have the necessary skills and motivation to work on the project.

3. *Involvement of volunteers and employees* is valuable, so it is advisable to consider the possibilities of involving volunteers and other interested persons to participate in the project.

4. *Division of duties* is also important to define roles and responsibilities. Therefore, each team member must have clearly defined duties and responsibilities for the performance of certain tasks.

5. *Creating an organizational structure* and establishing a hierarchy and team structure that reflects the distribution of responsibilities and relationships between participants.

6. *The development of the reporting and communication system* in environmental projects, performed by high school students, is of key importance both for the project itself and for its impact on the environment and society in general. A properly organized reporting system allows you to effectively monitor the progress of the project, identify its strengths and weaknesses, as well as attract interested parties to cooperation and support. Communication, in particular, allows high school students to express their ideas, share knowledge and experience with other project participants and the public, which contributes to spreading awareness of environmental issues and mobilizing society to action.

The first thing to consider in the process of developing a reporting and communication system for an environmental project for high school students is adaptation to the target audience. Given that these are high school students, communication strategies and formats must be appropriately selected to be interesting, comprehensible, and engage participants in active participation.

Second, the reporting system should be systematic and comprehensive. This means that high school students should regularly record their progress, tasks completed, time and resources spent, as well as note the results achieved and learning outcomes. Such a system will allow effective project management, identifying problems and ways to solve them in a timely manner.

Third, communication should be two-way and open. High school students should be able to express their ideas and opinions, listen and respond to the opinions of their peers, and communicate with stakeholders, such as teachers, parents, environmental experts, and other members of the public.

Fourth, it is important to consider the impact of the project on the environment and society. The reporting system should provide for the collection and analysis of relevant data on the environmental impact of the project, its benefits to the community and possible risks. This will help not only to evaluate the effectiveness of the project, but also to identify possible ways for further improvement and development.

Finally, the reporting and communication system must be accessible to all stakeholders. This may include creating a website or blog, organizing exhibitions, presentations and other events where high school students can demonstrate their achievements and communicate with the community.

Therefore, the development of the reporting and communication system is a key element of the successful implementation of the environmental project by high school students. Target orientation, systematicity, openness and adaptability to the audience allow not only to effectively manage the project, but also to maximize its potential for impacting the environment and society in general.

4. Formation of a team of project executors.

Taking into account the individual characteristics of each member of a group of high school students for the implementation of environmentally oriented project activities through the assignment of their roles is an important aspect for successfully overcoming the environmental consequences of the war in a specific region. Assigning roles to each member of the group helps to take into account their abilities, interests and motivation, which contributes to the effective performance of tasks and the achievement of the common goal.

The first step of this process *is to analyze the skills and knowledge of each member of the group*. Some high school students may have a background in the field of ecology, others in leadership, communications or technical knowledge or artistic fields. This analysis will help allocate roles in the group, so that each member can make the most of their abilities and complement others.

Next is the consideration of interests and motivation. Each participant has his/her own interests and motivations. One may be interested in researching the impact of pollution on river ecosystems, another in developing water treatment technologies. Taking into account these individual characteristics will enable the distribution of roles in a group of high school students to successfully overcome the environmental consequences of the war in a specific region.

The final stage is *the assignment of roles*. Based on the analysis of skills, knowledge, interests and motivation of each participant, specific roles in the group can be assigned. For example, someone with a research background may be responsible for analyzing environmental problems, while someone with a technical background may be responsible for developing technical solutions. These can be roles, such as project manager, environmental experts, engineers, financial analysts, organizers, marketers, etc.

Possible roles of project executors:

The project coordinator is the person responsible for the overall management of the project. He/she sets goals, defines tasks and assigns their fulfillment to group members. The coordinator is also responsible for organizing meetings, monitoring deadlines and coordinating the work of all participants.

The researcher on the environmental effects of the war studies the effects of the war on the environment in a specific region. He/she collects and analyzes data on air, water and soil pollution, the impact on local fauna and flora. The results of the study will help the group develop strategies to overcome environmental problems.

The technical expert is responsible for developing technical solutions to solve environmental problems. He/she can study water purification technologies, the use of renewable energy sources, or methods of restoring damaged ecosystems.

The public activist engages in interaction with the local population, organizations and authorities. This executor develops and implements environmental education programs, organizes environmental events and actions to attract attention to the problem.

The communication manager is responsible for internal and external communication. He/she creates communication strategies for the promotion of the project, interacts with the media, prepares informational materials and ensures internal communication in the group.

The financial analyst is responsible for the financial aspect of the project. This specialist develops budgets, maintains financial records, seeks funding opportunities and ensures efficient use of resources. An important activity is to encourage *cooperation and mutual assistance*, so that each participant understands his/her responsibilities and is ready to help others. Stimulating mutual assistance and cooperation helps to unite the team and achieve better results.

These roles can be adapted depending on the specific needs and capabilities of the group of high school students and the specifics of environmental problems in the region. It is important that each member of the group has clear tasks and feels their importance in achieving the common goal of overcoming the environmental consequences of the war.

5. Involvement of resources for project implementation.

One of the key stages of project implementation is attracting the necessary resources for it. It can be human capital (project participants, volunteers), material resources (tools, equipment) and financial resources. Let's detail the specified aspects:

1. **Human capital**, as mentioned earlier, is the *participants of the project*, that is, high school students who take an active part in the implementation of various tasks of the project, from the research and analysis of the problem to the direct implementation of environmental measures. In addition, they are *volunteers* who can help with certain tasks or perform supporting or accompanying functions, which will allow to attract additional labor forces.

2. **Material resources** are the supply part of the project, which includes *tools and equipment*, because depending on the nature of the project, various equipment may be needed for conducting research, removing pollution, restoring ecosystems, etc. No less important are materials, for example, plant materials for reforestation, means for cleaning water bodies, building materials for infrastructure restoration, etc.

3. **Financial resources** become especially significant in the context of the significant ecological consequences of the war for the environment of Ukraine. Therefore, the provision and receipt of *state grants* is updated. Therefore, it is worth acquiring the skills of the right application through the preparation of application forms for funding to state or international funds that provide grants for the implementation of projects in the field of ecology and restoration of natural resources. *Sponsorship support* also becomes significant, according to which organizations, enterprises or private individuals can provide financial support for the implementation of an environmental project by high school students. In this regard, non-formal and informal education, as well as social relations with non-state institutions of environmental orientation, begins to play an important role. The role of charitable contributions from residents of territorial communities and all those interested

in attracting funds through the collection of charitable contributions, in particular from the public or the business community, is growing.

This process is critical for the successful implementation of the project, since the efficiency and effectiveness of solving environmental problems related to the consequences of the war in a specific region depends on the volume and quality of the resources involved.

6. Implementation of activities to overcome the environmental consequences of the war.

Carrying out practical actions in accordance with the developed strategy, in particular, it can be the cleaning of territories (for the creation of appropriate safe conditions and available opportunities for high school students), restoration of natural ecosystems, conducting information campaigns, etc. Thus, it is advisable to start the cleaning of the territories with the analysis of the situation through the assessment of the degree of contamination of the territories by the consequences of the war, the determination of the most critical areas for cleaning in the conditions of the possible implementation of such activities (to ensure the health of high school students and the absence of any threat). The next step is to develop a plan with the definition of cleaning methods, establishing the sequence of actions and the distribution of tasks among team members.

The implementation of activity on the possible **restoration of natural ecosystems** should begin with the planning of work on the definition of zones for restoration, the selection of species of plants and animals that need to be restored, and the development of a scheme for putting plants. The next action is the implementation itself, i.e., carrying out work on planting trees, bushes, grassy vegetation, restoration of water bodies and other natural objects.

Information campaigns play an important role, so the development of an information plan, in particular the definition of the target audience, the selection of means and communication channels for the dissemination of information, becomes significant. It is also necessary to create materials, namely: the development of information brochures, posters, videos, press releases, etc. And, of course, in the end – conducting campaigns and distributing informational materials through educational events, popular science lectures, seminars, etc.

7. Monitoring and evaluation of project activity results.

After performing the work, it is necessary to evaluate the results. This will help to determine the effectiveness of the measures, identify the successes achieved and problematic issues that require additional solutions. We will present a possible algorithm for carrying out the specified activity:

1. **Determination of success criteria and development of indicators.** It is advisable to clearly define the specific indicators, by which the project results will be evaluated, in particular, the amount of pollution removed, the area of the restored natural territory, changes in ecological indicators, etc.

2. **Data collection and analysis and process monitoring.** Systematic data collection should be carried out during the execution of activities, which will allow monitoring progress and identifying possible problems. The evaluation of the results should be carried out by analyzing the obtained data to assess the compliance of the achieved results with the defined success criteria.

3. Identification of successes and problems, assessment of achievements. Determination of the positive results and achievements of the project based on the collected data is important for evaluating the results of project activities of high school students. In addition, identifying problems, i.e. identifying possible problematic issues or shortcomings in project implementation, which require additional attention and resolution, becomes more important.

4. Improvement of the strategy and correction of further actions. Correction of identified deficiencies and development of new strategies for further improvement of the project. Planning of future activities: taking into account the obtained results for planning further steps in the implementation of the project.

Monitoring and evaluation of results is an important stage in project management, as it allows timely identification of problems and achievements, taking them into account during further planning and project management. This process helps to ensure the effectiveness and success of project activities of high school students in the difficult conditions of the consequences of the war in a specific region.

8. Reporting to the community and sharing the experience of successful project activities.

It is important to present the obtained results to the public and relevant institutions. This will contribute to the dissemination of experience, motivation of other citizens to similar initiatives and draw attention to the problem of environmental consequences of the war. In our opinion, the specified activity should be concretized through a number of specific stages, namely: preparation of the report, collection and systematization of data; drawing up a report and structuring information; dissemination of experience and publication of the report. We detail them in the text:

1. Preparation of the report, collection and systematization of data are carried out through the review of all the results obtained and the information that was collected during the implementation of the project. The analysis of the results helps to determine the key conclusions, achievements, to single out the problems and shortcomings of the project.

2. Compilation of the report and structuring of information is ensured by the preparation of a structured report with a clear sequence of information about the performed work, achieved results, costs and recommendations. Linguistic competence is updated, namely the use of accessible language, as the report must be receptive to the general public, without the use of technical language that may be incomprehensible to the public, i.e. communication without limitations.

3. Dissemination of experience and publication of the report takes place through posting the report on platforms for free access, including websites, social media, electronic libraries, etc.

The process of organizing press conferences and presentations of project activity results by high school students is important. It will be appropriate to hold a set of events with the active involvement of the educational and scientific community, representatives of public organizations and movements, active citizens – residents of territorial communities.

In our opinion, the defined process should start with the creation of educational materials, namely: the development of training manuals that contain information about the experience of project implementation, the methods and techniques, used in the process, and the results obtained.

Audio-visual support through the preparation of educational presentations, video materials or webinars is indispensable for more effective reproduction of the acquired experience. In addition, the presentation and defense of an ecological project is possible through the use of scientific report, business game, video film demonstration, excursion, TV show, scientific conference, staging, dramatization, game with an audience, defense at a symposium, workshop, networking, dialogues of historical or literary characters, performance, travel, advertising, press conference, etc.

It is important to organize and conduct educational events: trainings, seminars or master classes for education seekers, teachers, representatives of local authorities and the public with the aim of spreading the acquired experience and teaching others.

The use of information resources due to the placement of information about the project on websites, blogs, and social networks is relevant in the conditions of modern digitalization in order to attract the attention of a wide audience and spread experience. And this is where special media support can be obtained thanks to cooperation with local mass media for the publication of articles, interviews or reports about the project.

Participation in conferences and forums provides unique opportunities to represent the results of project activities, find like-minded people, and form interschool project groups. Scientific and practical conferences, symposia for sharing experience, discussion panels, etc. also contribute to drawing attention to the raised issues of relevant institutions and experts, attracting potential sponsors to finance environmental projects. Therefore, a possible result of the specified activity will be the conclusion of partnership agreements or cooperation with other organizations, engaged in similar initiatives, for the exchange of experience and mutual support.

9. The process of monitoring the implementation of project activities.

In order to achieve the goal of the project activity of high school students in the conditions of overcoming the environmental consequences of the war in the represented sequence of operations, the process of monitoring the implementation of the project activity will play a significant role. This process involves the project manager making a decision to achieve the set goals, identifying the reasons for the destabilization of the work execution process, and justifying the adoption of managerial decisions regarding the adjustment of the execution of tasks before the possible damage to the execution of the project (failure to meet deadlines, exceeding the use of resources and cost, low quality, etc.). Analysis and regulation of project execution is a comparison of the actual execution with the planned, analysis of deviations, assessment of possible alternatives and adoption of corrective actions if necessary to eliminate undesirable deviations from the base level of indicators.

Therefore, it is worth starting with determining the correctness of identifying the specific goals and tasks of the project, which must be achieved in the process of carrying out project-research activities, their possible adjustment. It is also appropriate to establish success criteria for evaluating the performance of project tasks.

Planning of actions related to the realization of the process of control over the implementation of project activities should begin with the development of a detailed action plan, which includes the sequence of tasks and the distribution of responsibilities between experts.

Systematic monitoring of the progress of the implementation of project tasks in accordance with the action plan contributes to the implementation of control. In addition, it is important to monitor the performance of work in accordance with established quality and safety standards.

The intermediate result of the project activity control process is the data, obtained after systematic monitoring of project progress and results. It is necessary to prepare regular reports on the status of project implementation and achieved results. Risk correction and management is possible due to the identification of possible risks and the adoption of measures to prevent them or reduce their consequences. Timely correction of the action plan and project strategy based on the results of monitoring and evaluation enables better and more effective implementation.

The process of monitoring the implementation of project activities can become more effective under the condition of ensuring active interaction and communication with project participants, stakeholders and other interested parties.

And finally, an assessment of project results is carried out at the final stage in order to identify achievements and learn important lessons for future initiatives.

Control over the implementation of project activities helps to ensure effective performance of tasks, timely identification of problems and ways to solve them, as well as increasing the chances of achieving success in an environmental project.

10. The process of correcting the results of project activities.

The process of correcting the results of project activities is a complex multifactorial combination of construction and analysis of various model options based on a pedagogical experiment, in the process of which the optimal model is determined, which most effectively helps to solve problem situations and the limit of the ratio of positive and negative influences. The specified process is possible by implementing a number of sub-stages, namely: analysis of results, determination of causes of failures and shortcomings, development of corrective measures, implementation of corrective measures, monitoring and evaluation of correction results. Let's dwell in more detail on the interpretation of the isolated stages.

Analysis of the results as the first stage of correction involves the analysis of the results of the completed project activities. This includes assessment of achieved goals, identification of problematic aspects and identification of shortcomings in the performance of tasks.

It is advisable to **determine the causes of failures and shortcomings** after analyzing the results. It can be insufficient preparation, lack of necessary resources, problems in communication or project management.

Development of corrective measures takes place on the basis of identified problems in the form of a plan. This may include changes in the organizational structure of the project, improvement of task performance processes, additional training of participants, or involvement of additional resources.

Implementation of corrective measures continues after the development of a plan of corrections for its implementation. This may include conducting additional trainings, reviewing the distribution of tasks in the group, clarifying project goals, or attracting additional financial resources.

Monitoring and evaluation of correction results is carried out after the implementation of corrective measures in order to clarify their effectiveness. This will make it possible to identify problems in time and make the necessary changes to achieve the success of the project.

In general, the process of correcting the results of the project activities of high school students is an important component of the successful implementation of the project. The path to achieving the set goals can be multiple, and it is important to be able to adapt and make changes in the work process to achieve better results.

Each of these stages is important for the successful implementation of the project and the solution of environmental problems arising from the consequences of the war in a particular region. Implementation of practical actions in accordance with the developed strategy will help to achieve maximum results in restoring nature and improving the ecological situation.

The analysis of project activity as an innovative technology for the formation of the competence of education seekers in terms of the purpose, tasks, forms of manifestation, types, nature of contacts, structure, stages, form of presentation of results, implementation scenarios, criteria for the success of pedagogical efforts is represented in **Table 1.3**.

● **Table 1.3** Analysis of project activity as an innovative technology for forming the competence of education seekers

Signs	Project activity
1	2
Aim	Create conditions for the development of the ability to learn from one's own experience and that of others
Tasks	Create motivation (social importance), define a goal. Create an educational environment. Determine the method of achieving the goal (the sequence of operations that make up the method of action – the activity algorithm). Take into account the individual characteristics of each member of the group (determine roles, create so-called "job descriptions"). To determine what the seekers of education should learn as a result of the work. Be able to use simple examples to explain complex phenomena. Present possible ways of presenting situations to understand the research problem. Organize work (in small groups, individually). To have methods of organizing discussion of research methods, putting forward hypotheses, arguing conclusions, etc. in groups. Advise, monitor and adjust intermediate results. Have objective evaluation criteria and carry out evaluation
Manifestation forms	Quantitative measurability (all costs and benefits must be quantified). Time horizon of action (each project is limited in time). Target orientation (achievement of a specific goal, satisfaction of a specific need). Life cycle (emerges, functions and develops). System functioning (there is a relationship between project elements). Existence in a certain external environment, the elements of which have a significant impact on the project

Continuation of Table 1.3

1	2
Types	Research, creative, adventure (gaming), informative, practically oriented
Kind of contacts	Internal or regional (within one school, between schools (classes) within the region, one country (using telecommunications, the Internet). International (with the participation of representatives of different countries, not always possible due to the lack of necessary information technology facilities in educational institutions)
Structure	Determination of the need. Research (design analysis of existing objects). Designation of requirements for the design object. Development of original ideas, their analysis and selection of one. Planning. Manufacturing. Assessment (reflection)
Stages	Preparatory (content and technological aspect). Planning of project activities (problem formulation, development and planning of a specific action). Researching the problem and choosing a way to solve it; activity (problem solving, action implementation). Presentation of results. Reflective (evaluation and analysis of the obtained results)
Results presentation form	Action plan or program, video film, holiday, expedition, report, scientific journal, exhibition of drawings, booklets, websites, lapbooks
Scenario	Statement of the problem, its relevance. Expression of the hypothesis, argumentation of its provisions. The main part. Stages of work on the project, obtained results, their brief analysis. Conclusions. The results of the reflective evaluation of the project. Answers to other groups' questions (discussion)
Success criteria of pedagogical efforts	Information security – acquaintances, ideas, thesaurus, understanding. Functional literacy – perception of attitudes and explanations, written texts; ability to ask constructive questions, handle technical objects; safe work techniques. Technological skill – the ability to perform operations; manipulation of objects and means of work; achieving a given level of quality; ensuring personal safety. Intellectual readiness – verbalization of the operation; activity reflection; understanding the setting of educational tasks; sufficient amount of memory; the ability to compare objects by size, shape, color, material and purpose; additive perception of new information; the ability to use educational literature for rational planning of activities. Volitional preparedness – the desire to perform the assigned educational tasks; attentive attitude to the teacher's language and to the pedagogical situation; maintenance of work culture, social interaction; desire to perform tasks at a high level; tolerant attitude to comments, wishes and advice; choosing the pace of the task; successful overcoming of psychological and cognitive barriers; the ability to ask for and receive help

Therefore, the significance of project activities lies in accustoming students to independent, practical, planned and systematic work, fostering the desire to create a new or existing but

improved product, forming an idea about the prospects of its application; development of moral and labor qualities, generally valuable motives for choosing a profession and diligence. As it was mentioned earlier, special attention needs to be paid to maintaining interest in the specified process, monitoring intermediate and final results, and bringing intentions to the end.

1.4 PEDAGOGICAL SUPPORT OF THE PROJECT ACTIVITY PROCESS OF HIGH SCHOOL STUDENTS

The main idea behind project-based learning is that solving real-world problems engages learners and encourages serious thinking and action as students acquire and apply new knowledge in a problem-solving context.

During the implementation of project activities, the teacher performs various *role positions*:

- designer with the aim of designing the main provisions of the project activity of education seekers before its implementation;
- facilitator-consultant to encourage independent search for tasks and decision-making by asking research-type questions, creating a friendly atmosphere, encouraging the expression of one's own opinions;
- coordinator regarding the tracking of the search with the combination or opposition of individual statements, the performance of procedural functions.

Academician I. Bekh noted that the main attitude and orientation of the individual in early youth consists precisely in active self-determination, choosing one's own life path and finding equal relationships with adults. That is why such a natural growth of the desire for independence and democracy in communication with adults must necessarily lead the modern teacher to drastic changes in communication and perception of the student's personality. Thus, project-based learning not only encourages intelligently motivated activity in accordance with the age and educational interests of high school students, but also significantly transforms the role of the teacher in leading it. Therefore, the teacher necessarily turns into a consultant, adviser, coordinator, who convinces of his/her own rightness with the power of experience, wisdom, a strong argument, but not an order. By the way, the scope of the teacher's control over the process of personality development is not narrowing, but on the contrary, it is expanding [1].

The role of the facilitator is significant as the teacher works with students to formulate important questions, structure meaningful tasks, promote the development of both knowledge and social skills, and carefully evaluate what learners have learned during the project.

Pedagogical facilitation is a specific type of teacher's pedagogical activity, which aims to help the learner to realize him/herself as a self-worth, to support his/her desire for self-development, self-realization, self-improvement, to promote personal growth, the disclosure of abilities, cognitive capabilities, to actualize the value attitude towards people, nature, national culture based on the organization of auxiliary, humanistic, dialogic, subject-subject communication, partnership pedagogy, an atmosphere of unconditional acceptance, understanding and trust. This is a *multi-functional*

interaction, in which the teacher takes the position of a consultant-facilitator, acting as an "assistant" of those seeking education, a specialist who supports and accompanies the process of creating new experiences for customers of educational services; it is based on the principles of humanism, tolerance, polysubjectivity, trust and ensures the humanization of the entire educational process.

Pedagogical support of the project activity process of high school students includes a number of activities:

1. **Understanding the context.** The teacher must carefully research and understand the specifics of the effects of the war in a particular region, including their impact on the environment and youth. This will allow the teacher to properly adapt the program and approaches to the study and development of high school students.

2. **Creating a safe and stimulating environment.** War conditions can cause stress and anxiety among high school students. Educators must create a safe and supportive environment where high school students can freely express their thoughts and emotions and feel supported in their learning and project endeavors.

3. **Support of psychological well-being.** The teacher must have skills in working with psychological support of students, in particular stress management, development of emotional intelligence and promotion of a positive mental state of high school students.

4. **Learning problem-solving skills.** War can create many complex problems, and the educator must train learners to respond effectively to them. This may include interpersonal skills, conflict management, teamwork and decision making.

5. **Support flexibility and adaptability.** The conditions of war can change rapidly, so the teacher must be flexible and adaptive in his/her approaches to teaching and accompanying students.

6. **Stimulation of public activity.** A teacher can encourage high school students to actively participate in social and environmental initiatives to solve problems, caused by the consequences of the war.

In general, the teacher's support of the process of project activities of high school students in the conditions of the consequences of the war requires responsibility, empathy and flexibility. The teacher must be ready for various challenges and teach students to respond effectively to them in order to achieve success in educational and social processes. We have identified the following stages of the teacher's facilitating activity in the process of ecological design:

1. *Planning and organization* (the teacher must determine the tasks and goals of the project that correspond to the specific environmental problems, caused by the war in the region. He/she plans the steps of project implementation and organizes the work of high school students to achieve these goals).

2. *Conducting training and acquiring skills* (the teacher provides high school students with the necessary knowledge and skills in ecology and project management. He/she can conduct trainings, lectures, practical classes and use other training methods to prepare students for work on the project).

3. *Assistance and support* (the teacher provides support and advice to high school students throughout the entire process of working on the project. He/she solves possible problems that arise during work and stimulates students to achieve better results).

4. *Team coordination* (the teacher is responsible for coordinating the work of the entire team of high school students. He/she distributes tasks among the project participants, monitors their execution and stimulates cooperation and mutual assistance within the group).

5. *Monitoring and evaluation* (the teacher monitors the progress of work on the project and evaluates the results achieved. He/she analyzes the effectiveness of the measures that have been carried out and makes adjustments to the activity, if necessary).

6. *Preparation and presentation of results* (the teacher helps high school students to prepare and present the results of their project activities. This may include preparing presentations, writing reports, organizing exhibitions or other events for public presentation of project results).

Therefore, the teacher's actions in the process of implementing ecologically oriented project activities of high school students in the conditions of liquidation of the consequences of the war include planning, training, support, coordination, monitoring, evaluation, correction and preparation and presentation of the results of the conducted research [20].

The represented sequence of operations will help to structure and organize the work of high school students to successfully overcome the environmental consequences of the war through project activities, to ensure effective team management and the implementation of project tasks with maximum productivity. The defined algorithm is important for the successful implementation of project activities of high school students in the conditions of the consequences of the war in a specific region, as they allow to effectively coordinate the work of the team and to provide reporting to all interested parties.

DISCUSSION OF RESULTS

The presented material makes it possible to conclude about the complexity and responsibility of organizing and implementing an educational project as a didactic technology of learning and education, as it requires the creation and provision of opportunities to perform personally meaningful activities independently, in a team or individually with the maximum use of one's own capabilities. Project activity promotes self-discovery, realization of potentials, application of knowledge, representation of achieved results, feeling of "usefulness" for others.

The psychological-pedagogical possibilities of project technologies are quite high, because the project-research activity optimally ensures the subjective awakening and development of the personality of high school students, as it fully corresponds to their age needs and features.

Carrying out creative projects independently (albeit under the guidance of a teacher) ensures the acquisition of knowledge, its application, the formation of abilities and skills in various subjects/educational disciplines, and their integration. The use and acquisition of one's own experience becomes significant. The scientific research activities of the students also include peer-to-peer counseling. Achieving quality results is possible with the use of explanatory and illustrative, reproductive, problem-based and other teaching methods.

The use of project technology actualizes a person-oriented approach to education, the formation of soft skills in students: independence, responsibility, criticality, demandingness of oneself and others, perseverance in achieving the set goal, the ability to work both individually and collectively [23].

Therefore, the introduction of project-based and innovative pedagogical technologies during the formation of the competence of education seekers allows solving the problems of developmental, personal-oriented learning, differentiation, humanization, and the individual process of self-education.

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