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# IS IT THE ECOLOGICAL PROBLEM WITH THE ARAL SEA REALLY INEVITABLE? – PROJECT-BASED LEARNING

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**Abstract:** This study is based on the project approach and includes the problematic of educational matter, cognitive activity and practically oriented action of the students; the reference of the education with the game, work and life of the children; contemplation and reflection.The fundamental of the education is cooperation which allows conditions of common and active learning and also there is opportunity for individuality and differentiation.

The Aral Sea is heavily polluted, mostly as a result of biological weapons attempts at the former Soviet base of Vozrozhdenie Island, also industrial project and fertilizer drainage before the collapse of the Soviet Union. Parts of the water of the two big rivers are diverter for watering of the Sarykamishlake which is located between Uzbekistan and Turkmenistan. Through the great Karakum Canal, the waters of the Amu Darya River serve a significant portion of the rapidly expanding Turkmenistan population, including the capital Ashgabat.

Prior to the construction of the irrigation facilities in the lake, about 60 $km^3$ of water per year were needed to maintain it, but then the amount was significantly reduced. This is the main reason for the ecological disaster in this region. Many experts cannot find or offer an effective solution to restore the sea level from the pre-ecological disaster.

Is there any possibility for solution of this ecological problem at the Aral Sea?

This article presents a model of project-based training with 9th grade students. They have to organize the way of working and manage the actual working process. Emphasis is placed on interdisciplinary learning activities that are realized by learners in the long term. Different groups of skills are formed in the process: reflexive, research, self-seeking skills from different fields; finding several options for solving the problem; to raise hypotheses; to establish causal links; ability to work in team; technological skills and also managerial skills.

Motivation for studying has always been an invariable part of research demand over the years. The motivated student is working on his or her own development with ease, feeling responsive to the set objectives, as certain learning experiences contribute to this. One way to motivate students is to apply multidisciplinary project-based learning.

Project-based learning was created in the twenties of the last century by American philosophers and pedagogues J. Dewey and V. Kilpatrick, and this type of training is seen as the training of the 21st Century (Todorova *et al.,* 2012).

One of the key priorities of the middle education of the field of natural science is the development of scientific literacy. The acquisition of the necessary knowledge of the nature that students have to acquire is a mission of the teacher. To achieve this goal, the student must scometimes be put into a real situation that develops his potential and mental activity.This can be achieved through the so-called "interactive learning methods." Interactive training is a complex system that includes interactive strategies interactive technologies and interactive techniques. The aim of interactive learning is to develop students' communication skills (Vladimirova, 2012). They also aim at the active subject being a student. One of the methods for this purpose is the project-based training (Yotovska and Asenova, 2012). It makes a relation between the duration of the activity and the durability of the knowledge, a connection between subject areas and real life problems (Project-based training "Biological diversity in Bulgarian symbols and traditions") is realized. This can provoke the creation of adequate and innovative pedagogical approaches to the realization of knowledge in the active subject (Yotovska and Asenova, 2012).

**Project-based learning as a person-centered developmental training**

Project-based learning is a comprehensive type of personalized developmental training based on creative learning of knowledge in the process of self-seeking and the idea of knowledge, design, research and evaluation of the results of a completed project. (Yotovska and Necheva, 2018).

**Characteristics of the project-based training**

Project-based Learning (PBL) is a teaching method in which students acquire knowledge and skills by working for a long period of time to explore and respond to an authentic real-life issue, issue or challenge. There is a change in the roles of students and teachers in the PBL process. Students play the role of individuals who actively solve problems. They are responsible for their learning, motivated and with a sense of satisfaction from completing something useful, become active participants and creators of meaning. The teacher as a coach / manager manages group dynamics, supports the advancement of the process, advises and evaluates, helps to improve interpersonal relationships. (Yotovska and Asenova, 2012). The motives for choosing the topic are that the Aral Sea is one of the

biggest environmental problems worldwide . In other words, how does a lake without water go to dryness? Thanks to Geography (6th grade) and Biology (7th grade), this environmental problem of early learning is posed by the students. The model we built (Table 1) aims not only to apply in extracurricular activities, but also in real time in geography and biology (Yotovska *et al.,* 2010, Yotovska and Asenova, 2011).

| **Steps in organizing of PBL** | **Activity** |
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| 1. Stage of advance research and planning.<br><br>1. Analysis of the situation.<br><br>2. What learning content will be selected?<br><br>3. What goals will be realized through it?<br><br>4. What will the projects look like?<br><br>5. What previous experience do students have?<br>6. What knowledge and skills do they have? | • Topic: Is the environmental problem with the Aral Sea really inevitable?<br>• Formation of an active life position on environmental issues;<br>• Formation of a culture for conservation and reasonable use of the resources of the environment;<br>• Development of social skills: self-defense, teamwork skills and communication, presentation to the audience;<br>• Increasing students' interest in ecology, pollutionproblems<br>• Objectives are discussed with the class. Students are given complete freedom for hypotheses and theories related to the subject. |
| Example time distribution Create Schedule :<br><br>1. What will be the duration of the project?<br>2. When will the debates be held with the teams? | • It is pre-scheduled by the teacher for which the students should participate in the project.<br>• Within a 1-hour or 2-hour study (depending on the student's program), views related to the project are expressed. |

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| Planning of activities. | |
| 1. What activities will be organized? | • Activities are identified according to the students' scientific capabilities at this stage of their education. |
| 2. What literature will students use? | • Students will use their textbooks, atlases of geography, a natural map of Asia, a political map of Asia. The condition of the task is given. The teams will be formed according to their location in the classroom and by their number. |
| 3. How will the teams be formed? | • Your task is to enter the role of people who live in the lands around the Aral Sea. Assess the environmental problem and whether it really is inevitable. Find out the importance and seriousness of the problem. You have total freedom of action. You can draw up a general .<br><br>I will divide you into 6 groups, each of which will defend a particular thesis.<br>- 1 group - you will defend the view that the diversion of Amu Darya is a crucial necessity for the supply of agricultural land and the drinking needs of the growing population of Uzbekistan. Give facts, opinions. You can use atlases, maps.<br>- Group 2 - You will oppose your classmates from the first group. Look for information that will help you reinforce your thesis.<br>- Group 3 - You will defend the view and the view that the diversion of Sardar is a crucial necessity for the supply of domestic and drinking water, the rapidly growing population of Turkmenistan and Kazakhstan. Give facts, opinions. Use tools that can prove your opinion and thesis. |

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| | - Group 4 you will be able to oppose your classmates from the first group. Look for information that will help you reinforce your thesis.<br>- Group 5 You will support the view that while all countries are arguing, the problem is obvious and it is in the people.<br>- Group 6 You will look for a solution to the situation with facts and opinions. Try to find a balance between countries and nature in terms of the problem that has arisen |
| **Planning the evaluation**<br>What are the goals of assessment?<br>What is the rating system?<br>What evaluation tool will be used?<br>When and who will evaluate the theses? | For evaluation purposes, an evaluation card may be used. Criteria,<br>included in it are general and applicable,<br>regardless of the type of product presented by the students.<br>Criteria for evaluating the following:<br>**I. Content Criteria**<br>1. Clear layout of selected thesis defense.<br>2. Appropriateness, Conformity and Conformity Assessment<br>relevance of the selected thesis defense.<br>3. Assessment of the team's scientific knowledge in the field<br>the chosen thesis defense.<br>4. Assessment of the Exposition of the Scientific Plan /<br>layout / model - logic, layout, etc.<br>**II. Language-style criteria**<br>5. Emotionality in two aspects<br>6. Clear language, exact terms.<br>7. Presentation skills of the team and the presenter himself.<br>**III. Technical criteria of shaping**<br>8. Structure maintained.<br>9. Aesthetic performance<br>10. Original Illustration |
| **2. Stage of practical implementation. Teamwork** | According to schedule, teams collect, select, structure and represent information |

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| **3. Stage of presentation, discussion, control and evaluation of the results of the study.**<br>Presented finished products from each workgroup | At the beginning of the lesson, the course is motivated<br>activity, recalling the project<br>and the assigned task. Organized<br>class discussion:<br>Do we realize that we are the biggest cause of the Earth's environmental problems?<br>Do we realize that she is our home?<br>How can we avoid them?<br>Can we build a symbiosis between us and Earth?<br>Each (6 groups) group has 10 minutes to familiarize with the topic and 4 minutes to present its thesis. After the presentation of the theses, a discussion is organized with the class on "The environmental problem with the Aral Sea - is it really inevitable?" |
| **Discuss the feasibility of the finished product in other learning or extracurricular situations** | Possible ideas for conducting extracurricular situations are, for example, the organizing of a competition for a parade drawing on "The Earth our Home". |
| **Project control and evaluation are carried out in advance parameters** | The control and evaluation of the theses is entirely done by the teacher. He selects the theses and presentational skills as appropriate. |
| **Conclusions of the overall work of students** | The activity of each group is analyzed assessed separately, underlining achievements and weaknesses are done recommendations and suggestions for further<br>activity. |
| **Goals** | • Research and analysis of the environmental problem related to the Aral Sea.<br>• Awareness of the problem and how it really depends on the person.<br>• Solve the problem with clear motives, arguments and ideas. |

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| **Duration** | 1 hour |
| **Methods** | Working in groups, research, presentation, discussion, discussion. |
| **Required materials** | Textbook, school board, markers |

**Expected results**

Students will acquire basic knowledge on one of the global environmental issues on Earth. They will have the opportunity to learn about some of the environmental problems caused by the anthropogenic factor of the planet. By playing the role of countries arguing their rights, they will be exerting themselves to defend these on a particular subject. They will have the opportunity to present facts. Expected to require attention and purposefulness. Through this new type of teaching on a topic, the interest of modern students will be stimulated. There is a tendency that today's students are unwilling to acquire new knowledge. The reason for this is often incorrectly communicated information to learners. Through this project we have the opportunity to launch a new model of teaching, learning, insight and perception in the material.

**Activity**

In front of class students in geography class on Aquatic Water, the discussion of the environmental problem with the Aral Sea is being developed. Within 5-10 minutes, the teacher introduces students to the environmental problem and whether it is really inevitable. The class is divided into groups (6 groups). Each group is tasked with protecting opinions whether positive or negative artificial diversion of the Amu Darya and the Sardar.

**Group 1** - The students defend that the diversion of Amu Darya is a crucial necessity for the supply of agricultural land and the drinking needs of the growing population of Uzbekistan.

**Group 2** - Students are opponents of Group 1 opinion and defend that other alternatives should be sought.

**Group 3** - The students support that the diversion of Sardeira is an absolute necessity for the supply of domestic and drinking water, the sharply growing population of Turkmenistan and Kazakhstan.

**Group 4** - Students are opposed to the opinion of the 3 group, arguing that Sardeira's diversion is a mistake, and this is the cause of an environmental disaster..

**Group 5** - The students support that while all countries are arguing, the problem is obvious and it is in the people.

**Group 6** - Students will look for a solution to the environmental problem with motives for solving it.

## CONCLUSION

Project-based training includes a specific design and philosophy of the learning process. It is related to the organization of a purposeful activity of the student, in accordance with his / her personal needs and interests. It is based on the idea of leading the educational and cognitive activities of students in the process of obtaining results in solving practical and theoretically important problems. (Yotovska and Necheva, 2018).

The PBL functions as a flexible learning environment that is organized around learning, not teaching, which can develop students' potential in an innovative and working model. Through PBL, a relationship can be established between the curriculum and real life. It can sometimes depend on the great success of the professional development of the personality. PBL can also give a person a chance to appear and participate in a discussion, talk about a topic.

DECLARATION OF INTEREST

The authors declare no existing conflict of interest.

AUTHOR CONTRIBUTION STATEMENT

HV and ND designed the experiment. HV analyzed the results and wrote the manuscript.

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