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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

USE OF PROJECT METHODS IN TEACHING COMPUTER SCIENCE

Specialty: 5801.01 - Theory of training and education and methodology (Methodology of teaching computer science)

Field of science: Pedagogy

Applicant: **Aygun Alafsar Azizova**

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The work was performed at the Department of Computer Science of the Azerbaijan State Pedagogical University.

Scientific supervisor: Prof. Dr.of Pedagogy
Abulfat Gulam Palangov

Official opponents: Corresponding member of ANAS,
Prof. Dr. of technical sciences
Aminaga Bakhman Sadigov

Prof. Dr. of technical sciences
Alekper Aliaga Aliyev

Dr. of pedagogical sciences, assistant professor
Magomed Musaevich Abdulrazakov

Dissertation council BFD 2.15 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan State Pedagogical University

Chairman of the Dissertation council
Prof. Dr. of Historical Sciences
Jafar Mamed Jafarov

Scientific secretary of the Dissertation council
PhD in Pedagogy, assistant professor
Malak Alislam Zamanova

Chairman of the scientific seminar:
Prof. Dr. of Pedagogy
Timur Gadjievich Vezirov

GENERAL CHARACTERISTICS OF THE STUDY

The actuality of the subject. The government of Azerbaijan is deeply aware that mastering information technology has become an important attribute of the day, and has not been content with general education laws, but has made decisions that directly reflect only this area. One of such decisions is the Order of the President of the Republic of Azerbaijan dated August 21, 2004 “On approval of the Program of provision of general education schools in the Republic of Azerbaijan with information and communication technologies (2005-2007)”. The main purpose of the program is clearly stated here: “In order to ensure the informatization of the education system, it is planned to implement targeted measures in the following areas: - establishment of a single information space of the education system; - Ensuring the mastery of new information technologies based on computer technology and the use of all its capabilities; - ensuring effective management of the country's education system; - increasing the efficiency of scientific and methodological work; - Establishment of effective relations with educational institutions of the world through international information networks ”. Specific tasks have also been identified to achieve the above goals. These are: - provision of general education schools with modern computer equipment; - teaching people working in this field to use new information and communication technologies in their fields of activity; - creation and development of normative and methodical base in this field:

- Dissemination and application of electronic resources, electronic libraries, digital educational resources to be used in the educational process; application of distance education.

- Establishment of information infrastructure on the education system in the Republic of Azerbaijan (scientific-methodical, scientific-research, professional development at all levels, including resource and information systems):

- Development of methodology of modern education on the basis of information technologies, scientific-methodical support of informatization process;

- creation of distance education service for students;

- creation of educational portals and websites for students;

- Development and introduction of terminology on information and communication technologies in educational and scientific-methodical publications.

The "State Strategy for the Development of Education" signed by the President on October 24, 2013 has a special role in the overall development of our education.

The strategy recommends increasing the number of indicators in the country for the number of students per 100,000 people. It was stressed that a lot of work needs to be done to address the accumulated problems related to vocational education. The State Strategy for the Development of Education notes with concern that the level of involvement in preschool education is very low. Thus, in 2019, the coverage of preschool education was 23.4 percent in cities, 8.7 percent in rural areas, and 16.5 percent in general, but in 2020 it is already 65%.

The above statistics are a cause for concern, as the foundation for success at all levels of education depends on the success of preschool education. Unfortunately, despite the relative expansion of the scope of preschool education in recent years, it is far below the level of today's requirements. The lack of pre-school education in more than 70 percent of the country's settlements is a cause for alarm. Strategic directions have been identified in accordance with the purpose of the strategy. These include:

1. Creation of competency-based personality-oriented educational content.

2. Modernization of human resources in the field of education.

3. Establish accountable, transparent and effective management mechanisms for learning outcomes.

4. Creation of educational infrastructure that meets modern requirements and provides lifelong learning.

5. Establishment of a model of financing the education system in our country, which is economically sustainable and can be at the same level as the standards of the world's leading education systems.

6. Modern education in our country should provide the

following:

1) preservation, expansion and development of the historical tradition of generations, national culture;

2) patriots in Azerbaijan; upbringing of citizens of a legal, democratic and social state of high moral quality, respecting the rights and freedoms of the individual;

3) comprehensive and timely development of children and youth, formation of self-education and self-realization skills;

4) the ability of children and youth to understand the world as a whole and to form a modern worldview, intra-ethnic culture;

5) systematic renewal of all aspects of education in the field of culture, economy, science, engineering and technology;

6) continuity of education throughout human life;

7) diversity of types and forms of educational institutions, diversity of educational programs providing individualization of education;

8) continuation of the levels and stages of education in the form of tradition;

9) development of distance education, creation of programs implementing information technologies in education;

10) academic mobility of students;

11) to develop the national tradition when working with talented youth, participation of pedagogical workers in scientific activity;

12) training of highly educated people and highly qualified specialists distinguished by professional mobility in the process of informatization of society and development of new scientific technologies;

13) inculcation of ecological education for the population to be careful with natural resources.

Cognitive interest is very important for the implementation of the project method. The problem of cognitive interest Belkin A.S., Taneyeva X.J., Kusev V.A., Kruteskiy V.A., I.Yu.Lanina, L.M.Fridman, Q.I. This is reflected in the scientific works of scientists such as Shchukin. It is an important teaching motive and a powerful educational tool. Cognitive curiosity also contributes to the formation of volitional qualities, because in the process of

understanding the student inevitably encounters difficulties, and, overcoming these difficulties, voluntary qualities are formed in him. However, the student gains self-confidence, which plays a positive role in his future activities. Using various aspects of the project methodology G.V.Golub, V.A.Dalinger, K.Dewey, P.F.Kapterov, V.H.Kilpatrick, E.Collings, M.V.Krupenina, V.Matyash, N.Yu.Pakhomova, E.S.Polat, V.D.Simonenko, I. This is reflected in the scientific works of D.Chechel, S.T.Shatskiy and V.N.Shulga. Our psychological, pedagogical and methodological analysis allows us to draw the following conclusions:

1. There are many interpretations of cognitive interest by scholars. As a rule, they consider it important to focus on only one aspect. Therefore, there are various recommendations for developing cognitive interest. So, there is a need for a single recommendation.

2. There is no developed mechanism for using the project method to develop students' cognitive interest in the learning process when teaching computer science. The lack of sufficient scientific and methodological research on the problem, the failure to use all the opportunities necessary for the development of students' cognitive abilities when teaching computer science, actualizes the research.

The problem of the research is aimed at resolving the contradiction between the breadth of potential of the project method and the need to develop the cognitive interests of schoolchildren. Especially if we are talking about the teaching of computer science, the issue becomes even more relevant, because computer science is one of the key subjects for the teaching of all subjects.

The object of research is the process of teaching computer science in secondary schools.

The subject of the research is the use of the project method to develop students' comprehension skills when teaching computer science. The aim of the research is to develop the content and procedural components of the learning process using the project method to develop students' cognitive interest in the teaching of computer science.

The hypothesis of the research The hypothesis of the research is that the systematic use of the project methodology when teaching

computer science students will make them an active subject of cognitive activity, which will increase the effectiveness of students' cognitive interest. The problem, goal and hypothesis determine the following specific research objectives: 1. To determine the psychological and pedagogical foundations of the project method for the development of students' cognitive interests in teaching and studying computer science.

2. Determine the role and place of the project method for the development of students' cognitive interests in teaching and learning computer science. 3. Develop a structural and functional model of the project. 4. To develop a methodology for organizing project activities of students in teaching computer science. This contributes to the development of cognitive interest and ensures its effectiveness in pedagogical experiments. The methodological basis of the research is: - a personal-activity approach to the learning process (P.Yu.Galperin, A.S.Adgozalov, A.G.Palangov, A.M.Gasimova, G.I.Bashirova, S.K.Mamedov and etc.); - Competent approach to the study and understanding of learning processes (T.G.Vezirov, N.V.Chekaleva, etc.). The theoretical basis of the research is as follows: - The concept of personality development (L.S.Vygotsky, A.N.Leontiev, etc.); - The concept of humanization and humanization of mathematical education (G.F.Dorofeev, T.A.Ivanova, and others); - Psychological and pedagogical theory of educational activity of students (Yu.K.Babansky, V.V.Davydov and others); - The theory of cognitive interest (B.G.Ananiev, G.I.Lanina and others); - The theory of developmental education (V.V.Davydov, L.V.Zankov, etc.);

- The role of the individual as a subject in joint activities and personal development in learning (Sh.A.Amonashvili); - Methodological foundations of teaching mathematics (S.S.Gamidov, A.S.Adgozalov, etc.).

The following research methods were used to achieve the set goal: - Study and analysis of philosophical, psychological-pedagogical, informatics and methodical literature on the research topic; documents on educational issues (schoolanalysis of programs, teaching and teaching aids); study of materials and articles related to

the problem raised;

- empirical: questionnaire, observation, survey, testing, conversation with teachers and students; modeling of pedagogical situations; conducting a pedagogical experiment to determine the effectiveness of the project method. Statistical processing of the results of experimental work.

Experimental organization of research: Experimental research was conducted from 2015 to 2020 in three stages. Adequate research methods were used at each stage to verify the validity of the hypothesis.

In the first stage (2015-2016), a descriptive experiment was conducted and the psychological-pedagogical, as well as methodological literature related to the research was analyzed, the problem of the research was clarified, the state of information preparation of students and the level of their cognitive interests were studied. In the second stage (2016-2018) in the form of a search experiment, the initial parameters, its subject, hypothesis, research objectives, methodology, scientific apparatus were determined. The project method was selected as an effective tool for the development of students 'cognitive interests. In the third stage (2018-2020), the project method was tested to teach students computer science in order to develop students' cognitive interests as a result of project activities. In this case, the results of the identifying and search stages were taken into account; a teaching experiment was conducted. VII-XI grades of school No. 251 in Baku were taken as the experimental basis of the research. The “Algorithmics” digital skills project for grades V-VI in 2019-2020 is approved as a pilot. Experimental and theoretical results are summarized and a concrete conclusion is drawn.

Scientific novelty of the research: it has been scientifically proven that the project method is an appropriate tool in the development of students' cognitive interests. The effective role of the project method in teaching computer science at all stages of students' cognitive-learning activities has been shown.

The theoretical significance of the research is as follows:

- Features of the project method in the development of students'

cognitive interests enriched with information on the methodology of computer science;

- functional model aimed at developing students' cognitive interests has been developed.

- it is aimed at the development of students' cognitive activity; Psychological-pedagogical and methodological bases of management and organization of students' project activities were explained;

- Features of the teacher's teaching activity, students' learning-cognitive activity are described at each stage when teaching computer science to schoolchildren. This allows the results obtained to be used in other special methods.

The practical significance of the research is as follows:

- A methodology for using the project method to develop students' cognitive activity has been developed;

- Methodical recommendations on the use of the project method in the teaching of computer science in secondary schools were developed;

- a set of projects, including network projects has been developed. One of the main tasks of this complex is to develop students' cognitive activity at each stage of teaching computer science. These materials can be used to develop teaching aids on computer science and to use them in practical work with teachers and students in pedagogical educational institutions. The validity of the research and the substantiation of the results are conditioned by the theoretical provisions on the methods of teaching psychology, pedagogy and computer science; Research methods in accordance with the set goals, the results of the pedagogical experiment and the quantitative and qualitative validity of the results of this experiment were used. The results of the research were tested in Baku Lyceum No. 251, No. 282, No. 20 and the Republican Lyceum of Physics, Mathematics and Informatics, Lyceum named after Academician Zarifa Aliyeva, Progress Lyceum and others. In addition, we have presented papers at a number of national and international conferences on the issue. The following provisions are included in the defense:

1. Realization of structural-functional model of project method.

If we take into account the psychological-pedagogical and methodological bases in the management and organization of project activities of schoolchildren, it combines purposeful, motivational, organizational-procedural, assessment-result components and ensures the effectiveness of the development of the cognitive process.

2. Methods aimed at developing students' cognitive activity in the teaching of computer science should be consistent with the research skills of learners and the nature of the mastery methods inherent in project activities.

3. The application of the developed project complex to the process of teaching computer science, which includes research, practical direction, creative, interdisciplinary, individual and group projects, activates students' cognitive-learning activities, raises the level of cognitive process and thus creates a situation for success. This helps students to realize their skills.

The structure and content of the research work corresponds to the logic of scientific pedagogical research. The dissertation consists of an introduction, two chapters, a conclusion and a list of bibliographic literature used.

The introduction substantiates the relevance of the research, identifies the problem of scientific research, considers theoretical and experimental tasks, opens the research methodology, demonstrates scientific innovation, emphasizes the theoretical and practical significance of the work and highlights the provisions to be defended.

MAIN CONTENT OF THE STUDY

The introduction substantiates the topicality of the topic, the object of research, Subject, purpose, scientific hypothesis, tasks, methodological basis, stages, scientific, theoretical and practical significance are indicated, provisions submitted for defense are given, application and approbation of research results are explained. Chapter I is entitled "Theoretical foundations of the use of the project method in the teaching of computer science." This chapter consists of four sub-chapters. The first half-chapter is called "Problems of

modern computer science teaching in secondary schools and universities".

The application rules have been clarified by analyzing the sections. Currently, the structural field of computer science consists of four sections:

- Theoretical informatics, means of informatization, information technologies, social informatics. L.Rubinstein emphasized that training did not appear suddenly and connected it with the history of human labor. As a result of the historical process, the form of labor has gradually improved. School informatics serves the relevant problems of teaching informatics at school. It is a branch of informatics that deals with the study of computer software in the learning process, software development, technical, training and organizational issues. It is also used to teach modern information and communication technologies. The second half is called "Psychological and pedagogical bases in the development of students' cognitive interests." Here, analyzes are given for the development of students' interests by overcoming psychological and pedagogical problems. The formation of cognitive interest has attracted the attention of famous educators due to its practical importance. Thoughts about the developmental trend of cognitive interest date back to ancient times. The great Czech pedagogue and thinker Y.A.Komensky noted the special importance of cognitive interest in the formation of personality in the early seventeenth century. He wrote: “... youth must receive a real education, not an imaginary one, that is, a mental being - a person must learn to lead with his own mind, not someone else's. Based on the ideas of Y.A.Comenius, the English philosopher and educator J.Locke developed the theoretical basis for the purposeful work of teachers and educators in the development of students' cognitive processes. In the third sub-chapter, entitled “Analysis of the project method and its dominant role in the learning process”, the Projects method is analyzed and its objectives for improving the quality of teaching are explained. They are:

- to acquire the lacking knowledge enthusiastically and independently from various sources;

- learn to use the knowledge acquired during the performance of cognitive and practical tasks;

- be able to acquire communication skills by working in different groups;

- be able to develop their research skills (problem detection, data collection, observation, experimentation, analysis, hypothesis and generalization);

- be able to develop system thinking;

- be able to acquire basic competencies.

Chapter four "Analysis of scientific and methodological literature close to research"

It is important to study student psychology in depth in order to successfully build the learning process in school. To do this, there is a need to learn more about the development of high mental function in general. LS Vygotsky is one of the well-known scientists who studied the developmental problems of the psyche. According to him, this is one of the least studied areas of psychology, because not all the boundaries in the study of student personality are described. The author states that the issue is very complicated and emphasizes the importance of changing traditional views on the solution of the problem. The one-sidedness of traditional views on the development of children's mental functions is explained, first of all, by the fact that there have been fundamental errors in the understanding of the events studied. "There are a number of private studies and beautiful monographs on the development of the child's mental function. Children's speech, mastery of writing and reading, children's logic and worldview, the development of operations on numbers, and even the psychology of algebra. However, all these processes and events, all mental functions and forms of behavior, have been studied, first of all, by their nature. not submitted; they are incorporated into the processes in a more elementary way and are shown as a subordinate side of the whole structure. Here is an analysis of the problem through schemesThe second chapter is called "Development of projects in the teaching of computer science and methods of its use." This chapter consists of four sub-chapters. The first half of the chapter is entitled "Using the project method in the teaching of the

second content line of computer science", where the project method in the teaching of computer science allows to use all educational and didactic opportunities and explains its specific application. The second half of this chapter is called "Development of training projects for mastering some topics of the computer science course." Here, the methodology of project preparation is explained and examples are explained. Students need to be prepared to discuss the situations that may arise when working on a project. The game must be stopped by a timer according to the time specified in the program. Here the issues are summarized through various projects. The third sub-chapter is called "Project method in schools where computer science and mathematics are taught in depth". This subchapter discusses the development and use of such projects. The project of the course is the implementation of such a training project related to the orientation of the subjects. The course project is implemented either during the whole academic year or during half of the academic year. In this project, students' independent creative activity is carried out. At the end of the course, students become more active, their previous knowledge is updated, and the practical skills of the future specialist are strengthened. The project method is one of the active methods of training. This is not possible with passive methods of training. Unlike passive methods, the project method engages children in active activities, because the purpose of these activities is a very important outcome for thestudent.In most cases, when working with traditionnal teaching methods, the student is unaware of the specific nature of the activity, does not know why he or she performs this or that task. and the teacher's assessment of the ability to cope with hard work becomes a more important stimulus for the student. Developing Education and self-education are of great importance for the individual. The fourth half of this chapter is "Pedagogical experiment and analysis of its results". The experiment and its results are explained here. Forms of training activities carry out subject activities. By subject activity we mean learning activity in a specific subject area. A systematic approach to solving problems in computer science means learning skills and habits discovered in the teaching process. Thus, a system approach is important for building

algorithms for different executors. If the executor is a computer, then we are talking about a system approach in programming, structural programming. This approach - programming style is studied in the section "Elements of programming" in computer science. The use of the project method in the teaching of computer science means, first of all, the organization of training in groups. During the method of creative projects, students interact in groups, which facilitates the development of important social qualities of the individual. We consider it to teach the content of a specific subject or unit of study. This applies to the study of the subject in depth and within the course project. If the school does not have such conditions, extracurricular activities can be conducted in the computer room and turned into a media library after school. A computer science teacher, the head of the computer science office, temporarily becomes a media specialist. She collects information for students using a computer. In this case, the role of the project leader is the teacher who uses it for training. The same person can speak when using the project for the subject of information The effectiveness of the study was determined through a pedagogical experiment. The pedagogical experiment was conducted in the Republican Lyceum No. 251 of Nizami district of Baku, No. 282 of Surakhani district, the Republican Lyceum of Physics, Mathematics and Informatics and the Lyceum named after Academician Zarifa Aliyeva. An initial check was performed to identify the experimental and control classes, and the levels were expected to be generally equal. In the second stage of the pedagogical experiment called teaching (2016/2017 academic years) To study and master the programs, textbooks, curriculum documents, integration and planning schedules, ICT tools to be used, as well as the developed methodological system for their use in working with projects in the teaching of computer science subjects of VIII-XI grades teaching and research work was carried out. Thus, the characteristics of various projects that will be used in the computer science course of VIII-XI grades on topics and increase the activity of students, ways to apply these projects to the solution of mathematical problems are shown. Experimental trials were conducted to determine the effect of the new methodology on student

activity. Samples of projects on teaching computer science topics, for this purpose, the content of several projects were distributed to the subject teachers participating in the experiment, and the goals and objectives of the experiment were clarified to them. During the testing phase of the experiment, five intermediate tests were first conducted, and their results were checked and analyzed. In the end, the final inspection was conducted and the results were analyzed. The results obtained at each stage of the pedagogical experiment were analyzed statistically. Statistical analysis of the results was carried out by the following method: The first results of the inspection were obtained. The results of the first inspection - K1, the result of the second inspection - K2, etc. We called the final result Ky. With Ks, we indicated the ratio of the results of the control classes to the results of the experiment on each test. We also calculated the numerical average of the school mastery as the numerical average of the average grades obtained by grades.

Table 1

Results of the initial inspection

Schools	**Classes**	**Number of students**	**Marks**				**5 & 4, %**	**Assimilation, %**	**Nume-rical average value**
			5	**4**	**3**	**2**			
Baku city № 251	Experimental – VIII	25	4	5	8	8	36	68	3,2
	Control-VIII	24	5	6	6	7	46	71	3,38
	Experimental – IX	21	3	5	8	5	38	76	3,28
	Control-IX	20	3	7	6	4	50	80	3,45
	Experimental – X	20	4	7	5	4	55	80	3,55
	Control-X	24	5	8	9	2	54	92	3,66

Republican lyceum of physics, mathematics and computer science	Experimental – VIII	33	6	8	8	11	42	67	3,27
	Control-VIII	22	3	6	8	5	41	77	3,31
	Experimental - IX	39	7	9	15	8	41	79	3,38
	Control-IX	19	4	4	8	3	42	84	3,47
	Experimental -X	28	4	9	7	8	46	71	3,32
	Control-X	25	4	8	7	6	48	76	3,4
	Control-X	20	5	4	6	5	45	75	3,45
	Experimental - XI	26	4	8	7	7	46	73	3,35
Lyceum named after Academician Zarifa Aliyeva	Experimental – VII	33	6	8	8	11	42	67	3,27
	Control-VIII	22	3	6	8	5	41	77	3,31
	Experimental – IX	39	7	9	15	8	41	79	3,38
	Control-IX	19	4	4	8	3	42	84	3,47
	Experimental -X	28	4	9	7	8	46	71	3,32
	Control-X	25	4	8	7	6	48	76	3,4
	Control-XI	20	5	4	6	5	45	75	3,45
	Experimental -X	26	4	8	7	7	46	73	3,35

Here, Ki (in the initial test) = (numerical mean of the experimental class) / (numerical mean of the control class)

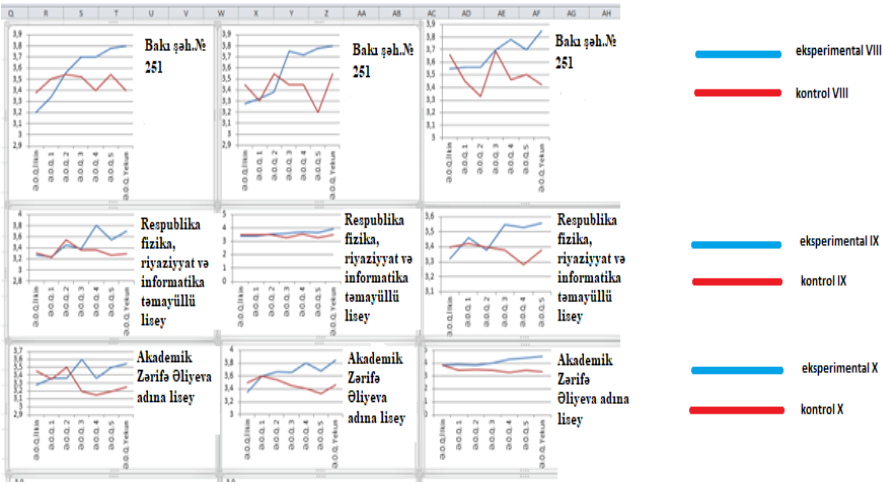
Here, K2 (in the initial test) = (numerical mean of the experimental class) / (numerical mean of the control class)

Here, K_Y (in the initial test) = (numerical mean of the experimental class) / (numerical mean of the control class)

Table 2

Numerical average value of mastery by schools

Schools	**Classe**	N.A.V. begin.	N.A.V. 1	N.A.V. 2	N.A.V. 3	N.A.V. 4	N.A.V. 5	N.A.V. total
Baku city № 251	Experimental -VIII	3,2	3,34	3,56	3,7	3,7	3,78	3,8
	Control-VIIII	3,38	3,5	3,54	3,52	3,4	3,54	3,4
	Experimental -IX	3,28	3,32	3,38	3,75	3,72	3,78	3,8
	Control-IX	3,45	3,3	3,55	3,45	3,45	3,2	3,55
	Experimental -X	3,55	3,56	3,56	3,7	3,78	3,7	3,85
	Control-X	3,66	3,45	3,33	3,69	3,46	3,5	3,42
Republican lyceum of physics, mathe-matics and computer science	Exprim -VIII	3,27	3,24	3,45	3,39	3,81	3,54	3,7
	Control-VIII	3,31	3,23	3,55	3,36	3,36	3,27	3,3
	Experimental -IX	3,38	3,4	3,53	3,58	3,69	3,68	3,95
	Control-IX	3,47	3,47	3,5	3,26	3,52	3,26	3,47
	Experimental -X	3,3	3,46	3,38	3,55	3,53	3,56	3,83



The numerical average value of school acquisition was calculated as follows **(Table 3):** Kio - Numerical average of the ratios of the results of the experimental and control classes in the initial test at school, K1o- In the first test, the numerical average value of the ratios of the results of the experimental and control classes for the school, etc. Kyo = (VKy + VIKy + VIIKy): 3 Here, the final numerical average grade for Kyo-schools, VIIIKy- final numerical average grade for VIII grade in school, IXKy- final numerical average grade for IX grade in school, XKy- final numerical average grade for X grade in school.

Table 3

School	class	Ki	k1	k2	k3	k4	k5	Ky
№ 251	VIII	0,95	0,95	1,01	1,05	1,09	1,07	1,12
	IX	0,95	1,01	0,95	1,09	1,08	1,18	1,07
	X	0,97	1,03	1,07	1,00	1,09	1,06	1,13
Ko		0,96	1,00	1,01	1,05	1,09	1,10	1,10
Lyceum FRITL	VIII	0,99	1,00	0,97	1,01	1,13	1,08	1,12
	IX	0,95	1,01	0,95	1,09	1,08	1,18	1,07
	X	0,97	1,03	1,07	1,00	1,09	1,06	1,13
Ko		0,97	1,01	1,00	1,03	1,10	1,11	1,11

In the course of the experiment, it was also determined that

a) solving mathematical problems increases the responsibility of students, they feel a more serious approach to learning;

b) students' interest in the subject increases, they try to do more programming;

c) students come to class prepared every day, knowing that, as always, their knowledge will be tested today;

d) we receive information about each student in each lesson, monitor the overall learning dynamics of the class, provide the necessary assistance;

e) students are more easily aware of new topics than in the previous period, because they have not learned the previous topics consistently, the gaps in their knowledge have been gradually eliminated, so they are better prepared to understand the next topics;

f) time is used efficiently in the learning process, more students are given knowledge in less time, students' idle time is reduced, they are always active. Our research on "The use of the project method in the teaching of computer science" draws the following general conclusions. The analysis of the scientific, psychological, pedagogical and methodological literature on the research topic allowed to draw the following conclusions:

RESULTS:

Success in using the project method in the teaching of computer science creates the following opportunities:

1) ensures the integrity of the pedagogical process;

2) carries out comprehensive development of students. Creates conditions for the development of both their upbringing and education;

3) ensures the creative activity of students, turns them into active members of the learning process;

4) forms the cognitive motive of learning, because students see the end result of their activity;

5) Students have a desire to improve and develop their knowledge. Thus, the personal qualities of students are formed.

The main results of the dissertation have been published in the following articles:

1. **Palangov A., Azizova, A..** Modern problems of computer science, Institute of Education of the Republic of Azerbaijan, 2017, Volume 84, №6, Pages 74-77

2. **Azizova, A.** The project and its characteristics, the role of the teacher in the implementation of the project, News of Nakhchivan Teachers' Institute, 2017, Volume 13, №14, Pages 18-23

3. **Azizova, A.** Stages of project preparation and the role of students here, Baku Girls University Scientific Works, 2018, № 1 (33), Pages 83-87

4. **Azizova, A.** Project method and views of world pedagogues on it, Institute of Education of the Republic of Azerbaijan Scientific Works, 2018, Volume 85, №2, Pages 6-8

5. **Azizova, A.** Psychological and pedagogical bases of development of students' cognitive interests in computer science., ICT in education Azerbaijan State Pedagogical University, 2018, C-35, №1

6. **Azizova, A.** STEM curricula are being tested, Institute of Education of the Republic of Azerbaijan, 13.11.2018, P.1

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Address: AZ 1000, Baku city, Uzeir Hajibeyli street, 68

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