

**REPUBLIC OF AZERBAIJAN**

*On the rights of the manuscript*

**ABSTRACT**

of the dissertation for the degree of Doctor of Philosophy

**METHODS OF USING NEW EDUCATIONAL  
TECHNOLOGIES IN TEACHING MATHEMATICS IN 5<sup>th</sup>-6<sup>th</sup>  
GRADES**

Speciality: 5801.01 - Theory and methodology of training and  
education (methods of teaching mathematics)

Field of science: Pedagogy

Applicant: **Aynura Mirmahmud gizi Seyidova**

**Nakhchivan – 2021**

The work was performed at the department of "Methods of teaching subjects and technology teaching" of Nakhchivan State University.

**Scientific supervisors (consultant):**

Doctor of Pedagogical Sciences, Professor  
**Rufat Latif oglu Huseynzade**

PhD in Pedagogy, Associate Professor  
**Azad Sevindik oglu Novruzov**

**Official opponents:**

Doctor of Pedagogical sciences, Professor  
**Azadkhan Safarkhan oglu Adigozalov**

PhD in Pedagogy, Associate Professor  
**Khumar Tofig gizi Novruzova**

PhD in Pedagogy, Associate Professor  
**Khalida Sidgali gizi Hasanova**

Dissertation council FD 2.40 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at the Nakhchivan Teachers' Institute

Chairman of the Dissertation council:

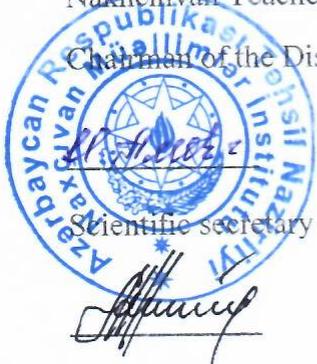
Doctor of Pedagogical sciences, Professor  
**İsmayil İsrafil oglu Aliyev**

Scientific secretary of the Dissertation council:

PhD in Pedagogy, Associate Professor  
**Giziltaj Tarverdi gizi Shahbazova**

Chairman of the scientific seminar:

Doctor of Pedagogical Sciences, Professor  
**Mudafia Jamil oglu Mahmudov**



## GENERAL CHARACTERISTICS OF THE DISSERTATION

**Relevance and currency of the topic.** The "Reform Program on education of the Republic of Azerbaijan" <sup>1</sup>signed by great leader Heydar Aliyev in 1999 paved the way for further reforms as a foundation for the development of education and it created the need for the application of new pedagogical technologies and innovations in the process of teaching subjects in the period of increasing information, the rapid development of techniques and technologies.

The letter of the president of the Republic of Azerbaijan Ilham Aliyev to the participants of the 13th congress of teachers reads: *"The information society we are entering today and the formation of a new type of knowledge-based economy, the challenges of globalization set new tasks to the entire world education system. The 21st century, which gained the name<sup>2</sup> "Education age", requires the renewal and modernization of Azerbaijani education".* "The task set for the education sector - "Restoration and modernization of education in Azerbaijan" - makes it necessary to comprehensively informatize education, the use of ICT and new pedagogical technologies in this system. Today it is difficult to imagine the educational, teaching and pedagogical process without techniques and technology. The recent modernization of the education system in both content and form, and extensive reforms have led to the emergence of new forms and methods in the process of training. Distance education, virtual education, innovative education, electronic lessons, electronic boards, electronic textbooks and teaching aids, multimedia, automated teaching systems have made the learning process more developing and educating and raised it to a new level of development.

---

<sup>1</sup> Reform Program on education of the Republic of Azerbaijan, June 15, 1999.

<sup>2</sup> 13<sup>th</sup> Congress of Azerbaijani Teachers / General Consultant. M.Mardanov. - Baku: Çashioghlu, - 2009. - p. 5

The advanced countries of the world have set the main goal of increasing their scientific potential day by day with the development of technology. The education system in our country also tries not to lag behind the important steps taken in the developed countries. This is evidenced by the "Education Reform Program of the Republic of Azerbaijan" approved on June 15, 1999. Article 33 of the Education Law of the Republic of Azerbaijan that the main task is to form a person who has deep and comprehensive knowledge, skill, practical training, high culture, sense of responsibility, progressive outlook and strives to constantly develop it, who can stand at the level of citizens of the most advanced countries in the world for their knowledge, high moral and spiritual qualities states: *"The task of educators ... is to form an active position of citizenship in students, to educate them in the spirit of patriotism and Azerbaijanism, to prepare them for independent life and work"*<sup>3</sup>. The role of mathematics is as great as the role of all subjects in the formation of students as individuals. The solution of mathematical problems, examples, logical issues instills not only the algorithms of solving these tasks, but also the ability to choose the most suitable options, listening culture and presentation. For this reason, one of the main goals is to increase students' interest in the exact sciences in secondary schools. If we have to express our opinion in another way, our students focus on mathematics, which is the world science. In general, students' love of mathematics and their future activities in relation to this science depend on the mathematics teacher who teaches them in the lower grades and his (her) learning technologies in math classes. All this also gives grounds to the urgency of the study.

5<sup>th</sup>-6<sup>th</sup> grades in secondary schools are an important stage for students. We are right in calling this stage a trampoline for the materials to be studied in the upper class. Professor F. Sadigov and O. Hasanli wrote in the book "Didactics": *"In the 5<sup>th</sup>-6<sup>th</sup> grades of Secondary School, students study a systematic course of general education. At this stage of the training, students are already*

---

<sup>3</sup> Law of the Republic of Azerbaijan "On Education" // Adopted on June 19, 2009.  
- Baku: 2009.

*preparing to continue their education in the secondary school, as well as in the upper classes of secondary vocational education institutions by acquiring certain knowledge”<sup>4</sup>. Based on the above, we consider it urgent to dedicate the dissertation to the teaching of mathematics of 5<sup>th</sup>-6<sup>th</sup> grades.*

The immediate adaptation of students to creative and technological development in the secondary school period, when their personality and character are formed, is closely connected with the continuous and qualitative mathematical program taught to them during this period. The various sections of the dissertation explore ways to take our students to the required level, that is, experienced, creative educators, well-motivated students, interrelated subjects, the use of the most modern teaching methods - in short, ways to choose the most appropriate learning technologies for the moment.

One of the important issues is the adaptation of the mathematics course as a teaching subject to the requirements of life, practical reality, as well as the modeling of mathematical methods in science and technology at the present time. These factors are essential for the training of high-level specialists. The general education level has an irreplaceable place and role in the training of high-level personnel. After 5<sup>th</sup>-6<sup>th</sup> grades, which is an important stage of general education, students already choose their "favorite subjects". From this point of view, we considered the dedication of the research work to 5<sup>th</sup>-6<sup>th</sup> grades as urgent.

The modern theory and practice of education necessitated the inclusion of interactive methods in the teaching process in order to eliminate the inactivity of students, to form the necessary thinking characteristics, creative abilities and to improve the quality of training. In various sections of the research, learning technologies have been studied to increase student activity, motivate them, form their creative abilities, in short, to improve the quality of teaching in 5<sup>th</sup>-6<sup>th</sup> grades.

---

<sup>4</sup> Sadigov F.B. Didactics / F.B. Sadigov, O.Q. Hasanli. - Baku: Elm ve Tehsil, - 2015. - p. 161

The “State Standards of General Education in the Republic of Azerbaijan” (previous name "State standard and program (curriculum) of general education")<sup>5</sup> applied from the 2021/2022 academic year defines standards that reflect the quality indicators of educators and the unified state requirements for the level of knowledge, skills and habits of students. The assessment system, which is a necessary part of education, allows to assess the activities of teachers and students, who are the main elements of the educational process, to ensure their development in accordance with the established standards. In other words, the system of assessment is quality management in education. The quality of school education depends on the skillful use of this mechanism. Each teacher should not forget that the efficiency and quality of his activity is reflected in the results of this mechanism. From this point of view, the work of the modern teacher model can be considered as actual.

In general, in the 21<sup>st</sup> century, when our independent state is moving forward confidently, special attention is paid to the development of students who have acquired knowledge better, more accurately and comprehensively. Scientific and technical revolution, wide relations with the countries of the world made it necessary to improve the quality of teaching in Azerbaijani schools, to apply active training and curriculum. The development and preservation of intellectual potential is the main goal of each state.

A number of researches and studies have been conducted in our republic on the studied problem. As an example, along with the works of valuable pedagogues such as S. Hamidov<sup>6</sup>, A.Palangov<sup>7</sup>,

---

<sup>5</sup> State standards of general education in the Republic of Azerbaijan”/ - Baku: 2020, September 29.

<sup>6</sup> Hamidov. S.S. Methods of teaching problem solving in primary school / S.S. Hamidov. - Baku: Nurlan, - 2003. - 151 p.

<sup>7</sup> Palangov A.G. General issues of the use of computer technology in the study of geometry course in secondary school / A.G Palangov. - Baku: Elm, - 2009. - 248 p.

M.Mahmudov<sup>8</sup>, A.Adigozalov<sup>9</sup>, Y.Kerimov<sup>10</sup>, R.Huseynzade<sup>11</sup>, A.Novruzov<sup>12</sup>, M.Alishov<sup>13</sup>, Z.Veysova<sup>14</sup>, A.Nazarov<sup>15</sup>, it is worth mentioning the researches of T. Mammadov<sup>16</sup>, S.Badiyev<sup>17</sup>, A.Gasimova<sup>18</sup>, R.Bagirova<sup>19</sup>, H.Alizade<sup>20</sup> and other scientists.

---

<sup>8</sup> Mahmudov, M.C. Ways and means of improving the teaching of mathematics in theoretical and practical directions in higher technical schools: (abstract of the doctoral thesis on pedagogy) / - Baku: 2009. - 43 p.

<sup>9</sup> Adigozalov. A.S. Application of interdisciplinary relations in the process of teaching mathematics, (methodical aids) / A.S. Adigozalov. - Baku: Maarif, - 1993. - 168 p.

<sup>10</sup> Karimov. Y.S Training methods. Textbook / Y.S.Kerimov. - Baku: RS Polygraph, 2009. - 279 p

<sup>11</sup> Huseynzade R.L., Akbarov, N. Organization of pedagogical process in school. Methodical aids. / R.L. Huseynzade, N. Akbarov. - Baku: Active agency, - 2013. - 271 p.

<sup>12</sup> Novruzov. A.S. Scientific-methodical bases of interaction between the course "Mathematical analysis" of higher pedagogical schools and the course "Algebra and the beginning of analysis" of secondary school: / abstract of the doctoral thesis on pedagogy / - Baku: 2000. - 26 p.

<sup>13</sup> Alishov. M.A. Activation of cognitive activity in students with the help of computer technology (for X-XI grades): / abstract of the doctoral thesis on pedagogy. / - Baku, 2001. - 21 p.

<sup>14</sup> Veysova Z.A.. Active interactive training (Teacher's guide) / Z.A.Veysova. - Baku: UNICEF, - 2007. - 156 p. pdf

<sup>15</sup> Nazarov A.M.. Modern learning technologies. Textbook / A.M. Nazarov. - Baku: ADPU-publishing house, - 2012. - 103 p.

<sup>16</sup> Mammadov T.A.. Information and communication technologies, theoretical bases and practical work in education. Textbook / T.A. Mammadov. - Nakhchivan: Ajami, 2014. - 208 p

<sup>17</sup> Bediyev. S.R. Use of new learning technologies in the development of creative abilities of students: / PhD in Pedagogy, abstract of the thesis. / - Baku: 2008. - 26 p.

<sup>18</sup> Gasimova, A.M. The use of ICT in the related teaching of mathematics and computer science in secondary schools (V-XI grades): (Doctoral thesis on pedagogy) / - Baku: 2015. - 160 p.

<sup>19</sup> Bagirova, R.E. Effective ways of teaching geometric figures and quantities in I grades: / (Doctoral thesis on pedagogy) / -Nakhchivan, 2012. - 175 p.

<sup>20</sup> Alizadeh, H.S. The use of interactive teaching methods in the teaching of mathematics in primary school: / (abstract of the doctoral thesis on pedagogy) / - Baku: 2018. - 26 p.

However, the learning technologies used in the teaching of mathematics in 5<sup>th</sup>-6<sup>th</sup> grades on the basis of the curriculum have not yet been fully studied. Many studies have been conducted in Russia on our research. Among such studies, in particular, Y.N.Kashichina's<sup>21</sup> study can be noted that the ways of using new technologies of mathematics teacher who started new pedagogical activity in the research work were investigated, as well as the preference for using active and interactive methods. The pedagogical bases of the use of new technologies in the teaching of subjects were studied in dissertations on the issues of integrative approach to the teaching of mathematics by A.L. Chekin<sup>22</sup>, and on the pedagogical basis of the use of new pedagogical technologies by K.Y. Vazina<sup>23</sup>.

**Object and subject of the research;** The object of research is the process of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades. The subject of the research is modern learning technologies used in the process of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades.

**Aims and objectives of the research;** The aim of the research is to identify the problems in the mathematics curriculum in 5<sup>th</sup>-6<sup>th</sup> grades and the learning technologies that can be used to solve these problems. To achieve this goal, the following tasks have been set.

- to learn the pedagogical, psychological and methodological literature relevant to the research, to study the subject program, textbooks and teaching aids intended for teaching mathematics for 5<sup>th</sup>-6<sup>th</sup> grades of secondary schools;

---

<sup>21</sup> Kashitsyna.Y.N. Innovative technologies in the methodological work of a novice mathematics teacher: / abstract of the thesis, candidate of pedagogical sciences. / Moscow: - 2006. -- 28 p.

<sup>22</sup> Chekin. A.L. Professional training of primary school teachers for teaching mathematics on the basis of an integrative approach: / abstract of the thesis, candidate of pedagogical sciences. / - Moscow: - 2005. -- 27 p.

<sup>23</sup> Vazina. K.Y. Pedagogical foundations of developing technologies in professional educational institutions of innovative type: / abstract of the doctoral thesis on pedagogical sciences. / - Yekaterinburg: - 1998. -- 38 p.

- to study the school experience on the researched problem, to identify the shortcomings in the teaching of the mathematics curriculum in 5<sup>th</sup>-6<sup>th</sup> grades;
- to determine the learning technologies that are suitable for teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades of secondary schools;
- to experimentally test the learning technologies to be useful in teaching mathematics for 5<sup>th</sup>-6<sup>th</sup> grades of secondary schools;
- to determine the main principles of the educational process with the application of new technologies, interactive methods;

**Research methods;** Pedagogical research methods were used: observation, interview, questionnaire, comparison, generalization, acquaintance with school documents, study of advanced school experience, analysis of pedagogical-psychological and methodical literature, active teaching methods and pedagogical experiment.

**Thesis defence rules;** - Substantiation of the need to implement the teaching of mathematics in 5<sup>th</sup>-6<sup>th</sup> grades through modern learning technologies;

- Substantiation of increasing students' interest in this subject and the special place and role of modern learning technologies in their development as individuals (able to meet the requirements of modern times) when subjects of mathematics in 5<sup>th</sup>-6<sup>th</sup> grades are taught through modern teaching methods;

- Substantiation of the possibility of achieving solutions to the problems of students get poor marks in learning, especially in mathematics, through modern learning technologies;

- Scientific confirmation of the problem statement, purpose, task, content and achievements in accordance with the requirements of modern learning technologies;

- Substantiation of the need for changes in the textbooks and programs of mathematics of 5<sup>th</sup>-6<sup>th</sup> grades of researches and analyzes conducted in the research process, generalized results and proposals.

**Scientific innovation of the research;** The scientific innovation of the research consists of the following.

- opportunities for the use of learning technologies in the teaching of mathematics subjects in 5<sup>th</sup>-6<sup>th</sup> grades of secondary

schools have been identified;

- it has been shown that mathematics in 5<sup>th</sup>-6<sup>th</sup> grades has a special place in teaching mathematics with the use of modern educational technologies, increasing students' interest in this science and their upbringing as a personality (able to meet the requirements of modern times);

- it has been shown that it is possible to solve the problems of students who get poor marks in mathematics or do not like mathematics at all through modern educational technologies;

- fundamental facts were revealed that necessitated the change of textbooks currently used by students of 5<sup>th</sup>-6<sup>th</sup> grades;

Also, the problem has not been studied specifically for 5<sup>th</sup> -6<sup>th</sup> grades during the application of the new education system. This is the scientific innovation of the research in general.

**Theoretical and practical significance of the research;** The theoretical significance of the research is that by studying the relevant literature, best practices, using new learning technologies in the teaching of mathematics in 5<sup>th</sup>-6<sup>th</sup> grades, or rather using teaching methods and techniques in place and correctly, creating interest in students in mathematics, expecting the principle of coherence in teaching subjects efficiency can be increased.

The practical significance of the research is that in order to arouse interest in mathematics in the students, it can be used in the work experience of mathematics teachers of secondary schools, young educators, final year undergraduate students in the specialty of Mathematics and Mathematics and Informatics, as well as in the teaching of mathematics in those specialties and in the preparation of methodological recommendations. Young teachers can also use the presented lesson examples.

**Approbation and application of the research;** The topic of the thesis was discussed and approved at the meeting of the Scientific Council of Nakhchivan State University on January 24, 2014 and the meeting of the Scientific Council on Pedagogy and Psychology of the Republican Council for Coordination of Scientific Research on June 28, 2016. The research work was repeatedly discussed at the

departments of "General Mathematics", "Methods of teaching subjects and technology teaching", "Pedagogy and Psychology" of Nakhchivan State University. Reports on the research were presented at the seminars of the departments of "General Mathematics", "Methods of teaching subjects and technology teaching" and "Pedagogy and Psychology" of Nakhchivan State University. Also, the main results of the dissertation were reflected in the form of scientific articles, 6 of which in the scientific journals recommended by the Higher Attestation Commission and 1 is abroad (Ukraine). In addition, reports were made at two international (Turkey 2016, Ukraine 2021), one republican (Nakhchivan 2015) conferences, and the full text of the reports was published in the relevant conference materials. The results of the study and the recommendations were applied in several secondary schools. Also, some parts of the dissertation were applied in the recommendations given to students before the pedagogical practice during the teaching of the subject "Methods of teaching mathematics" in the specialties of Mathematics teaching and Teaching of Mathematics and Informatics of the Faculty of Physics and Mathematics of Nakhchivan State University.

**Organization in which the dissertation work was written;**

The dissertation was performed out at the department of "Methods of teaching subjects and technology teaching" of Nakhchivan State University.

**Structure and scope of the dissertation;** The dissertation consists of an introduction, two chapters, a section on the experiment, the results and a list of references. It consists of 163 pages and 254,576 characters. The title page 491 characters, contents 1,898 characters, The introduction includes 13 pages, 25,181 characters, Chapter I 54 pages, 102,467 characters, Chapter II 58 pages, 111,506 characters, pedagogical experiment 17 pages, 9306 characters and the result 2 pages, 3,727 characters.

## MAIN CONTENT OF THE DISSERTATION

In the "**Introduction**" part of the thesis, the relevance and use of the problem are substantiated, object and subject, goals and objectives, scientific innovation and practical significance are defined, and the methodological basis and the defense rules are analyzed.

The first chapter of the thesis is called "**Scientific and methodological problems of teaching mathematics in 5<sup>th</sup> -6<sup>th</sup> grades of secondary schools**". This chapter consists of four sub-chapters. The first subchapter is called "**Problem-based analysis of educational literature and programs (curricula)**". Issues related to training technologies, emerging problems have made some researchers think. For this reason, a number of studies have been conducted on this issue. Research has shown that lessons conducted with the application of appropriate learning technologies, learned topics develop students' thinking, develops the ability to approach different problems, instills the ability to choose the most suitable option by comparing between different solution options. This sub-chapter examines teaching-methodical literature, research works and methodical aids, programs and mainly textbooks intended for teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades were involved in the research.

Syllabuses have an exceptional role for the consistent, systematic implementation of the teaching process. For systematic and consistent implementation of the educational process, programs are developed by professional specialists for each subject individually. Subjects are taught according to the hours set in the programs developed on the basis of the curriculum. In general, we are not mistaken in describing the syllabus as a document in which the total hours are divided according to the subject topics, summarizing tasks, and assessment.

The textbook is one of the main components of the learning process. Textbooks play an important role in the purposeful organization of the learning process. The introduction of a modern education system has necessitated the development of new textbooks. Preparing textbooks is a process that requires extreme attention and

professionalism, as well as responsibility, but also not easy. Mathematics textbooks of 5<sup>th</sup>-6<sup>th</sup> grades were studied as the object of research and it was concluded that some points were taken into account in their design.

The second section is called **"The place and role of the mathematics course of 5<sup>th</sup>-6<sup>th</sup> grades in mathematics education program (curriculum) of the secondary school"**. In order to know the current state of mathematics teaching, we must first know at what level and when we need this science. Based on the answers known to us, we need to clarify our goal and find different ways to achieve it. In general, school mathematics should be able to provide students with the necessary level of mathematical culture, instill the ability to think mathematically, and finally educate scientists who are needed by society. That is, in secondary schools, all students must have a certain level of mathematical knowledge and skills, so they can understand the technology that has already become part of our lives. From this point of view, 5<sup>th</sup>-6<sup>th</sup> grades are an important stage in mathematical training. Because at this stage, the foundation of the material to be taught in 7<sup>th</sup>-11<sup>th</sup> grades is laid with reference to the materials of 1<sup>st</sup>-4<sup>th</sup> grades. Any student who has mastered the topics in the mathematics textbooks of 5<sup>th</sup>-6<sup>th</sup> grades at a normal level and meets the standards will easily master the mathematical skills listed above. There are mathematical skills that are necessary for everyone, regardless of their specialty. These skills, which are mainly intended to be mastered in 5<sup>th</sup>-6<sup>th</sup> grades, have been extensively analyzed in this sub-chapter. Also, the role of the topics in the mathematics program of 5<sup>th</sup>-6<sup>th</sup> grades on the topics to be mastered in the upper grades has been widely explained. Thus, we have tried to show with some examples the importance of the topics covered in the mathematics textbooks in 5<sup>th</sup>-6<sup>th</sup> grades on the upper grades (7<sup>th</sup>-11<sup>th</sup>). The mathematical skills to be mastered by each student graduating from secondary schools are properly reflected in the curriculum of secondary schools of the Republic of Azerbaijan (1<sup>st</sup>-11<sup>th</sup> grades). Looking at the same program, one can clearly see the importance and significance of the sub-standards to be implemented in 5<sup>th</sup>-6<sup>th</sup> grades

for general mathematical knowledge.

The third section of the research is called "**Possibilities of relation and inheritance between the course of mathematics of 5<sup>th</sup>-6<sup>th</sup> grades and the course of" primary school mathematics**". The mathematical knowledge in the upper grades (7<sup>th</sup>-11<sup>th</sup> grades) is mainly based on the knowledge in 5<sup>th</sup>-6<sup>th</sup> grades. This subchapter discusses the place and role of inheritance in mathematical learning. Inheritance is connected with the pedagogical process, and serves to improve the quality of training. Inheritance and relation are more systematic in mathematics than in other subjects. In mathematics teaching, this sequence is applied from primary school to the end of the teaching process, and it is difficult to think of teaching mathematics without it. In the subject curriculum of mathematics, the results of general training are defined as the levels of primary education, general secondary education and full secondary education. When we look at all three levels, we see that inheritance and connection are skillfully observed. That is, when we focus on content lines, the inheritance and relation between the training results and the sub-standards is clearly visible. In the research work, the issue of relation and inheritance between primary grades and 5<sup>th</sup>-6<sup>th</sup> grades is explained, and the provision of inheritance is shown on concrete examples. In the sub-chapter, it has been noted that the content of mathematical knowledge learned in 5<sup>th</sup>-6<sup>th</sup> grades is based on the knowledge gained in primary school, and the mathematics course of 5<sup>th</sup>-6<sup>th</sup> grades is a wider, deeper and more complex continuation of primary mathematics course. Because inheritance in training also provides developmental repetition. Thus, new ones are included in the list of repetitive concepts, and thus a spiral development is ensured in the learning process.

The fourth section is called "**Ways of realization of interdisciplinary relations in the process of teaching the mathematics of 5<sup>th</sup>-6<sup>th</sup> grades**". One of the main goals of the modern education system is to train students with a high level of life skills. These skills can be at a high level only if students have sufficient knowledge in all subjects, understand the role and

importance of this or that material in a different subject, and are able to apply the acquired knowledge. Of course, this is possible if there is integration between the subjects taught at different stages of education and the topics. For these, as in all areas, there is a need for greater integration in education. There is a need for the Azerbaijani education system to integrate into world and European education, to continue and develop global educational trends. Integration has been adopted as an important principle and has been the basis of activities in the field of education. The role of integration is to interest the student not in one science, but in several sciences, to attract his attention and to motivate him to active learning activities. Otherwise, there is no talk of a successful result. This sub-chapter discusses the positive results that will affect the quality of teaching if the topics related to mathematics in 5<sup>th</sup>-6<sup>th</sup> grades are combined with knowledge related to other subjects. There is no doubt that good results will be achieved if the teaching of both mathematics and other subjects is based on integration. If the teacher creates a successful, appropriate connection between different subjects, it will be easier for students to master, and systematic knowledge will be "built" in students. Therefore, the main key to establishing a connection between subjects is to connect subjects with life.

The second chapter of the thesis is called "**Pedagogical and psychological issues of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades**" and is explained in four sub-chapters. The first half of the second chapter is called "**Pedagogical and psychological bases of the process of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades**". Since 2008-2009 academic year, self-oriented and result-oriented curriculums have been applied in secondary schools of the Republic. It can be said that this work is carried out with great diligence by the devotees of education. According to research scientist R.Aghayev: *"Advanced teachers call lessons a window to the world for students. This window should be so bright and clear that the understanding of the reality seen from there creates a scientific worldview, the evidence and proofs appear in a complete and coherent way, as if the vital*

*facts and events are on a real basis*"<sup>24</sup>. The role of mathematics in the formation of students as a comprehensive, modern personality is important. A math teacher needs to know that math is not just a process of imparting knowledge to a student and helping him or her score high on entrance exams, but also of raising people who are able to behave properly in society and solve problems in a timely and positive manner. Moral education is also carried out in the process of teaching mathematics. By mastering the science of mathematics, students are brought up hardworking, honest, and disciplined. Increasing the focus on teaching mathematics in secondary school, especially in 5<sup>th</sup>-6<sup>th</sup> grades, or rather teaching quality mathematics, will have a positive impact on our students and will help them to set new goals in the future instead of using ready-made technology.

During the training, it is necessary not only to acquire knowledge and skills, but also to develop emotional sphere, creative abilities in the child, to create values and relationships that are important for an active and responsible citizen. The most important factors that contribute to improving the quality of education in the learning process are the changes required in the professional and pedagogical activity of the teacher. In general, as in other grades, teachers have responsibilities in mathematics lessons of 5<sup>th</sup>-6<sup>th</sup> grades. Thus, a teacher should not simply teach students certain mathematical concepts. In the process of teaching mathematics, students should be informed about the position of mathematics in the history of culture, its place in the system of sciences, its application areas and teachers should draw their attention to issues of technical and practical importance.

The second section of the second chapter is called **"Opportunities to use modern teaching methods in the process of teaching mathematics to 5<sup>th</sup>-6<sup>th</sup> grades"**. Today, the main goal of Azerbaijani education and those working in the field of education is to reach the world education meridian, to achieve the creation of a more perfect system against the background of the educational

---

<sup>24</sup>.Agayev. R.A. Training the importance of teaching students by thinking in improving the efficiency of teaching. Methodical aids / R.A. Agayev. - Baku: Murtajim, - 1999. - p. 27

experience of developed countries. This sub-chapter discusses the role of modern teaching methods in the effectiveness of teaching, as well as the teaching methods used in the process of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades. The training method is a complex, multi-parameter concept and is used to effectively implement the purpose, content, regularities and principles of training. The more the methods applied in the training create conditions for development, the higher the effectiveness of the training. In this sense, interactive teaching methods prevail. However, using modern teaching methods does not mean drawing a line under traditional teaching methods. Of course, traditional teaching methods also have advantages. If the material of the new lesson does not correspond to the application of the modern teaching method, or, the teacher considers the application of the traditional teaching method to be more appropriate for the current topic, then he is free to use it. However, it is impossible for students to meet the requirements of the modern world by constructing basic lessons on the traditional method that it takes a long time to fulfill the requirements of the active lesson, noise during the active lesson and even not knowing new technologies.

Using the advantages of traditional methods to develop the pedagogical and psychological foundations of new approaches, new learning technologies, innovations and the scientific basis of result-oriented, student-oriented educational process in accordance with modern requirements is considered the most pressing problem in the education system.

The choice of new learning technologies in accordance with the nature of the subject of mathematics creates in students a desire to learn mathematics. The late professor Oruj Hasanli wrote: "*The form and content of training should be chosen in such a way that it stimulates students to think, self-understanding, creative activity*"<sup>25</sup>.

The third section of the second chapter is called "**Mechanisms of motivation in the process of teaching mathematics**". The level

---

<sup>25</sup> Hasanli. O.G. Cognitive essence of personality-oriented curricula // Priorities of education building in Azerbaijan: modern approaches, - Nakhchivan: Murtajim, June 5-6, 2015, - 2015, - p. 20-22.

of motivation in learning mathematics is an important factor influencing a student's success. The course of the lesson, the achievement of the teacher's goal, mastering the subject of the students depends on how they are motivated. There are reasons for each student's success. However, these reasons vary according to the methods of learning and teaching in the school. Although the concept of "motivation" is often used, it has different definitions for different places. In the field of education, students' motivation is understood as "the desire to solve a problem as an individual, to clarify ways to solve a problem, to deal with such a problem closely, to be patient to complete the solution of a problem"<sup>26</sup>. In scientific literature, the concept of motivation is divided into two-internal and external motivation. Externally motivated students usually learn mathematics to get external assessment. In addition to the reasons mentioned above, internally motivated students also take math classes because they are interested, have fun doing math, and want to increase their knowledge. This sub-chapter discusses the need and role of motivating students in a subject and topic for effective learning.

Finally, the last section of the second chapter is called **"Examples of the use of" active teaching "methods in the process of teaching mathematics in 5<sup>th</sup>-6<sup>th</sup> grades"**. The basis of this sub-chapter is the presentation of lesson samples that reflect the stages of an active lesson on several topics in both the 5<sup>th</sup> and 6<sup>th</sup> grade textbooks. As in other subjects, mathematics in grades 5<sup>th</sup>-6<sup>th</sup> is conducted in accordance with established standards. The role of the use of active learning methods in the implementation of the results-oriented and student-oriented reflected in these standards is invaluable. The student corporates with other friends or the teacher, working with the team, in groups, in pairs, and sometimes individually during active learning. Active learning is based on

---

<sup>26</sup> Lord Pippa and Sharon O'Donnell with Ruth Brown and Hilary Grayson. International Review of Curriculum and Assessment Frameworks. Thematic Probe Learner Motivation 3-19: an International Perspective // National Foundation for Educational Research. – 2005, – p.89.

students' cognitive activity. The main advantage of active learning is the emergence of real cognitive motivation (desire to acquire knowledge). Cognitive skills are of great importance in the application of new educational curriculums. We must create the basis for the formation of national and human values in students by developing their life skills based on cognition, communication and psychomotor activities. Thus, the form and content of training should be chosen in such a way that it stimulates students to think, self-understanding, creative activity. Students are better able to remember the information they have acquired during their cognitive activity than the ready information presented to them. Researcher M.Gasimova writes based on F.I. Yankovich: *"In the learning process, the teacher must focus on the student's thinking rather than memory, based on the student's understanding rather than keeping in mind"*<sup>27</sup>. The theoretical features of mathematics in 5<sup>th</sup>-6<sup>th</sup> grades encourage students to think, calculate and analyze. During the teaching of mathematics in these classes, the teacher should not impart knowledge to the students in a ready way, but should help the students. In other words, he should teach ways to learn. Everyone living in the modern world must be able to solve problems in a timely manner, make quick decisions, be a manager, be a researcher, organize their lives properly, be useful to society, realize their skills, and constantly develop.

A pedagogical experiment was conducted to test the effectiveness of the proposed methodological system in the research. The experiment conducted in three stages covers 2016-2019. These stages are divided into years as follows. The first stage – in 2016-2017 (determining stage), The second stage – in 2017-2018 (educational stage), The third stage - 2018-2019 (control stage).

The first stage is called the determining experiment. At this stage, first of all, the work done to increase the mathematical activity of students in the fifth and sixth grades of secondary schools, the

---

<sup>27</sup> Gasimova, M. New teaching methods are a requirement of the time // Education problems. - 2012, October 16-23, - p. 15

recommended active learning methods, the application of active learning methods, positive results, shortcomings, the causes of these shortcomings were studied in detail. Then, the current situation in the selected schools on the issue we raised, the concrete work done to eliminate the problems was studied. In particular, we have tried to find out what is being done with students who are not interested in mathematics, who are afraid of this subject, and who get poor mark, and the problems faced by math teachers during the application of the intended work. Also, the selection of experimental and control classes, the use of modern teaching technologies in the selected classes, the study of the pedagogical activity and pedagogical achievements of teachers of mathematics in these classes are among the initial work. During the experiment, our goal is to increase the interest in mathematics in the intended classes, to increase the number of students interested in mathematical knowledge, to reduce the number of students who have anxiety for this subject. The aim is to identify and eliminate the cause of the problem in students with poor performance in this subject, to create interdisciplinary integration, to identify learning technologies that are successful in mastering the subject, as well as the reasons that have a negative impact on mastering, important points in the selection of teaching methods, to investigate the problems that arise in the implementation of active learning technologies. For this purpose, a survey was conducted with teachers who teach in the designated experimental and control classes. Pre-prepared inquiry form was filled out. By the way, it should be noted that the level of knowledge of students in the selected classes and the scientific and methodological level of teachers in these classes is kept to be equal. City and village schools in the Nakhchivan Autonomous Republic took part in the experiment. Students of the following schools were involved in the pedagogical experiment: Nakhchivan city secondary school No. 2, No. 4, No. 5, No. 7, No. 8, No.11, No.15, Khok village secondary school of Kangarli district, Jahri village secondary school No. 2 of Babek district.

We were able to test the mathematical knowledge and skills of the fifth-grade students at the initial stage of the experiment, which

was the determining stage of the experiment. During the test, preference was given to questions that provide general mathematical knowledge and logic. Separate questions were developed for each grade to test the lower grade math knowledge of fifth and sixth grades. When we looked at the results of the experiment, we saw that there was no sharp difference between the mathematical levels of 5<sup>th</sup>-6<sup>th</sup> grades (the mathematical knowledge they learned in the lower grades). Then we conducted an examination in the experimental and control classes in accordance with the mathematics program of the fifth and sixth grades, respectively, and decided to show the result with a specific mark. 760 students participated in the determining experiment. Of these, 385 students participated in the experimental and 375 students in the control classes. In the tables showing the results, the experimental classes were indicated by the letter E, and the control classes by the letter N.

The second stage, called the educational stage, covers 2017-2018. At this stage, we mainly worked on specific topics in the fifth and sixth grades. Thus, research was conducted to ensure the activity of students with the help of active learning methods, to increase their interest in the topic, in particular, the importance of the topic taught, the role of this topic in their future activities, building motivation to master the topic, creating appropriate integration in the teaching of the topic, selection of training methods and forms of training according to the topics, lesson examples and methodological system reflecting all this were developed. Each teacher in the experimental classes was acquainted with this system. Each teacher was also informed about the purpose of the experiment, the goals we set, the work to be done and provided with the necessary resources. By the way, it should be noted that the existing textbooks and teaching aids for the teacher were used in the developed methodological system and lesson examples. As mentioned above, a survey was also conducted with teachers who teach in the experimental and control classes selected at this stage. The survey included questions about what form of teaching and what teaching methods teachers prefer, what teaching method they use the most, teaching methods that are more successful in math classes, work

with students with poor mathematical knowledge, points they take into account during the assessment, which training technologies they know, which training technology they prefer and so on. By the way, at the beginning of this stage, a general inquiry was conducted to check the mathematical level of students. There were interesting answers during the inquiry. We would like to pay special attention to one of them. So, we asked the students about the professions they want to have and the relationship of mathematical knowledge with those professions. Unfortunately, it should be noted that those wishing to become doctors, engineers, lawyers among the students stated that they did not need mathematical knowledge. There were also glad moments. For example, one of the reasons for students' love of mathematics was subject teachers. One of the best things to be achieved for a teacher is to be able to make their students love their subject. Topics covered by the established methodological system were summarized at the end of certain sections with a survey.

The third stage of the pedagogical experiment is called the control experiment. At this stage, the same questions were prepared in both the control and experimental classes, respectively. After the students answered the questions, the results were compared. If the proposed methodological system, the training technology we used has positive results, its application was allowed. As a result of surveys conducted during the control stage, some adjustments were made and the presented methodological system was improved. The initial and final results of the pedagogical experiment were shown in Table 1 and Table 2, respectively. We followed the results of the experiment by comparing the average values.

**Table 1**

Schools	Classes	Number of students	Marks				Success rate in %	Quality rate in %	Average score
			5	4	3	2			
Nakhchivan city secondary school No. 8	E-V <sup>a</sup>	26	5	6	11	4	84,6	42,3	3,46
	N-V <sup>b</sup>	22	4	6	9	3	86,3	45,5	3,5
	E-VI <sup>c</sup>	23	4	7	9	3	86,9	47,8	3,52
	N-VI <sup>c</sup>	24	6	6	8	4	83,3	50	3,58
Nakhchivan city secondary school No. 2	E-V <sup>a</sup>	20	4	5	8	3	85	45	3,5
	N-V <sup>b</sup>	22	3	5	9	5	77,2	36,3	3,27
	E-VI <sup>a</sup>	20	3	4	8	5	75	35	3,25
	N-VI <sup>b</sup>	21	4	5	9	3	85,7	42,8	3,47
Nakhchivan city secondary school No. 4	E-V <sup>a</sup>	19	3	4	7	5	73,6	36,8	3,26
	N-V <sup>b</sup>	18	3	6	6	3	83,3	50	3,5
	E-VI <sup>a</sup>	22	5	5	8	4	81,8	45,4	3,5
	N-VI <sup>c</sup>	20	3	4	10	3	85	35	3,35
Nakhchivan city secondary school No. 5	E-V <sup>d</sup>	22	6	5	7	4	81,8	50	3,59
	N-V <sup>e</sup>	23	5	5	8	5	78,2	43,4	3,43
	E-VI <sup>b</sup>	22	4	6	8	4	81,8	45,4	3,45
	N-VI <sup>c</sup>	20	5	6	6	3	85	55	3,65
Nakhchivan city secondary school No. 7	E-V <sup>a</sup>	23	4	5	9	5	78,2	39,1	3,34
	N-V <sup>b</sup>	23	6	5	8	4	82,6	47,8	3,56
	E-VI <sup>a</sup>	21	4	4	8	5	76,1	38,1	3,33
	N-VI <sup>b</sup>	20	2	6	7	5	75	40	3,25

**Continuation of Table 1**

Schools	Classes	Number of students	Marks				Success rate in %	Quality rate in %	Average score
			5	4	3	2			
Nakhchivan city secondary school No. 11	E-V <sup>a</sup>	20	4	5	7	4	80	45	3,45
	N-V <sup>c</sup>	19	3	6	5	5	73,6	47,3	3,36
	E-VI <sup>b</sup>	20	5	6	6	3	85	55	3,65
	N-VI <sup>c</sup>	23	6	5	7	5	78,2	47,8	3,52
Nakhchivan city secondary school No. 15	E-V <sup>c</sup>	19	4	4	7	4	78,9	42,1	3,42
	N-V <sup>b</sup>	20	5	4	8	3	85	45	3,55
	E-VI <sup>a</sup>	20	4	6	6	4	80	50	3,5
	N-VI <sup>c</sup>	18	3	4	5	6	66,6	38,8	3,22
Khok village secondary school	E-V <sup>a</sup>	22	-	6	9	7	68,1	27,2	1,95
	N-V <sup>b</sup>	20	2	5	8	5	75	50	3,2
	E-VI <sup>a</sup>	22	4	5	7	6	72,7	40,9	3,31
	N-VI <sup>b</sup>	22	3	5	7	7	68,1	36,3	2,54
Jahri village secondary school No. 2	E-V <sup>a</sup>	22	3	5	8	6	72,7	36,3	3,22
	N-V <sup>b</sup>	20	2	6	7	5	75	40	3,25
	E-VI <sup>a</sup>	22	3	5	7	7	68,1	36,3	3,18
	N-VI <sup>b</sup>	20	2	7	6	5	75	45	2,95
Total		760	136	189	273	162	78,8	43,1	3,39

**Table 2**

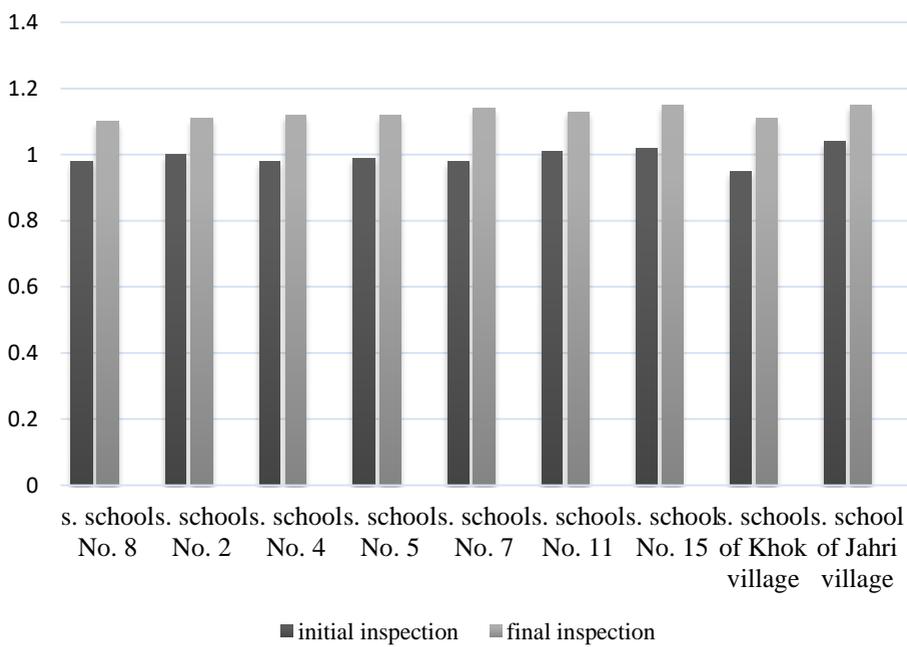
Schools	Classes	Initial stage	I examination	II examination	III examination	Final stage	Learning	
							By difference	By percentage
Nakhchivan city secondary school No. 8	$V_E/V_N$	0,98	0,98	1,05	1,07	1,12	0,14	14%
	$VI_E/VI_N$	0,98	1,05	1,03	1,03	1,07	0,09	9%
Nakhchivan city secondary school No. 2	$V_E/V_N$	1,07	1,09	1,12	1,13	1,15	0,08	8%
	$VI_E/VI_N$	0,93	0,95	1,00	1,02	1,07	0,14	14%
Nakhchivan city secondary school No. 4	$V_E/V_N$	0,93	0,92	0,95	0,99	1,06	0,13	13%
	$VI_E/VI_N$	1,04	1,08	1,05	1,05	1,18	0,14	14%
Nakhchivan city secondary school No. 5	$V_E/V_N$	1,04	1,03	1,08	1,10	1,17	0,13	13%
	$VI_E/VI_N$	0,94	0,97	0,98	1,03	1,08	0,14	14%
Nakhchivan city secondary school No. 7	$V_E/V_N$	0,93	0,96	0,97	1,03	1,11	0,18	18%
	$VI_E/VI_N$	1,02	1,04	1,06	1,12	1,17	0,15	15%
Nakhchivan city secondary school No. 11	$V_E/V_N$	1,02	0,98	1,08	1,14	1,17	0,15	15%
	$VI_E/VI_N$	1,03	0,99	1,07	1,03	1,09	0,06	6%

**Continuation of Table 2**

Schools	Classes	Initial stage	I examination	II examination	III examination	Final stage	Learning	
							By difference	By difference
Nakhchivan city secondary school No. 15	$V_E/V_N$	0,96	1,00	1,05	1,09	1,11	0,15	15%
	$VI_E/VI_N$	1,08	1,10	1,12	1,15	1,20	0,12	12%
Khok village secondary school of Kangarli region	$V_E/V_N$	0,60	0,61	0,64	0,73	0,75	0,15	15%
	$VI_E/VI_N$	1,30	1,31	1,42	1,42	1,48	0,18	18%
Jahri village secondary school No. 2 of Babek region	$V_E/V_N$	0,99	1,03	1,05	1,06	1,10	0,11	11%
	$VI_E/VI_N$	1,08	1,09	1,12	1,18	1,19	0,11	11%

The information presented in Table 1 is the result of the initial examination. Note that we followed the results by comparing the arithmetic mean of the experimental and control classes. Finally, the ratios of the arithmetic mean values obtained in the experimental and control classes were calculated and the results were shown in Table

2. The increase in the rate of learning to 18% indicated that positive results were achieved from the experiment. This gave reason to say that the methodological system proposed in the mathematics lessons of 5<sup>th</sup>-6<sup>th</sup> grades was quite effective. The results of the initial and final stages for schools were also reflected in the diagram below.



**Graphic. Initial and final inspection for schools**

In the “conclusion” part of the thesis, the research was summarized; general information on the fulfillment of goals and objectives was provided and concluded. These results include:

1. In mathematics lessons established by using modern educational technologies in 5<sup>th</sup>-6<sup>th</sup> grades of secondary schools, students become more active, their desire for learning increases, their

ability to acquire independent knowledge and skills is formed. This guarantees the longevity of the knowledge gained, as a result, it provides better quality teaching and easier mastery of the material to be taught in the upper grades [7].

2. Teaching topics in mathematics textbooks for 5<sup>th</sup>-6<sup>th</sup> grades through modern learning technologies not only helps students develop as individuals, but also develops students' ability to cooperate, presentation skills, listening culture, critical thinking, decision-making, problem-solving, ability to analyze events and what they have learned, research, observation and comparison skills, ability to use ICT. These are also factors that serve the quality of training.

3. The use of modern teaching technologies in mathematics in 5<sup>th</sup>-6<sup>th</sup> grades causes weak students to be more active [3].

4. Elimination of problems in textbooks, simpler classification of complex concepts has a positive impact on the quality of training.

5. The use of alternative textbooks increases students' interest in mathematics.

6. When motivating information about mathematics is given to students of 5<sup>th</sup>-6<sup>th</sup> grades and their knowledge of other subjects is properly integrated with mathematical knowledge, their interest in the subject increases and they eagerly await mathematics teachers[1].

7. It is observed that young pedagogues who have just started their teaching activities have difficulties in stages such as motivation, interdisciplinary communication, choosing a method of work.

8. Our observations suggest that most of the lessons in mathematics are conducted by traditional methods. This results in failure to solve some tasks in accordance with the modern training system.

9. Determining the pedagogical and psychological basis of the transfer of mathematical knowledge in the process of teaching mathematics in 5<sup>th</sup> -6<sup>th</sup> grades increases the scientific outlook, intellectual level of students, ensures their personality-oriented development [6].

Based on the results obtained in the dissertation, the following suggestions were made:

1. There is a need to improve mathematics textbooks for 5<sup>th</sup> -6<sup>th</sup> grades in secondary schools.

2. There is a need to prepare tasks according to approaches such as listening-understanding.

3. Lessons of experienced mathematics teachers should always be followed by young teachers.

4. In order to increase the effectiveness of mathematics lessons in 5<sup>th</sup>-6<sup>th</sup> grades, since young teachers who are currently teaching and are just starting their careers are educated in a system based on traditional teaching methods, it is inevitable that they will get acquainted with all the documents related to the new education system and have a thorough knowledge of pedagogical and psychological bases.

5. One semester of the subject "Methods of teaching subjects" taught at the university, students should be taught a new education system in the program dedicated to the general methodology. a specialist should develop a unified program for it and indicate the points that are important for the future teacher to learn.

6. There is a need to increase the hours of pedagogical practice of students studying in pedagogical specialties at universities. Pedagogical practices should be led by professional, competent educators who meet the requirements of the modern education system.

7. Students of 5<sup>th</sup> -6<sup>th</sup> grades show weakness in solving logical problems. Adding logical tasks will support the development of students' logical thinking.

The main content of the thesis is reflected in the following published works of the author:

1. The importance of motivation in mathematics lessons // Materials of the republican conference on "Educational curriculums: practical applications"- Nakhchivan: Maktab, April 24, 2015, -2015,- pp.19-24

2. Methodological requirements to the place and teaching of “mathematical analysis” elements in the mathematics curriculum of 5<sup>th</sup>-6<sup>th</sup> grades // - Nakhchivan: News of Nakhchivan Teachers' Institute, - 2015, volume 11, №2, - pp.118-121

3. The Importance of Using Active Education System in Mathematics Lessons of V-VI Grades // In Memory of Hodja Ahmet Yesevi Year, Proceedings of the International Turkish World Educational Sciences and Social Sciences Congress, – Ankara: Matbaacilar, – 2016. Volume I, – pp. 359-365

4. The place and role of the mathematics course of 5<sup>th</sup>-6<sup>th</sup> grades in the secondary school mathematics program (curriculum) // - Nakhchivan: Nakhchivan State University, Scientific works, - 2020, №4 (105), - pp.127-132

5. Relation and inheritance between the elements of algebra taught in the mathematics course of 5<sup>th</sup> -6<sup>th</sup> grades and the corresponding concepts taught in primary school // - Nakhchivan: “Nakhchivan” University, Scientific Works, - 2020, №1 (16), - pp. 247-253

6. Pedagogical-psychological bases of modernization of the process of teaching mathematics in 5<sup>th</sup> -6<sup>th</sup> grades // - Baku: Pedagogy, - 2020 (1), - pp. 62-73

7. The importance of using modern technologies in the training process // - Baku: News of Baku University, Socio-political sciences series. 2020, №3, pp.58-66

8. Ways of realizing interdisciplinary connections (integration) in the process of teaching a course of mathematics of 5<sup>th</sup>-6<sup>th</sup> grades / - Odessa: Science and education, - 2020, 4 / CLXXXV, - pp. 60-65.

9. Using the methods of "active lesson" in the process of teaching mathematics in 5<sup>th</sup> grades // "Actual scientific research in the modern world", took part in the LXXI International Scientific Conference, - Pereiaslav, Ukraine, - March 6, 2021 - pp. 206-211

The defense will be held on January 21, 2022 at 11<sup>00</sup> at the meeting of the Dissertation Council FD 2.40 of the Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at the Nakhchivan Teachers' Institute.

Address: AZ 7003, Nakhchivan city, Heydar Aliyev Avenue 1, Nakhchivan Teachers' Institute

The dissertation is accessible in the library of the Nakhchivan Teachers' Institute.

Electronic versions of the dissertation and its abstract are available on the official website of the Nakhchivan Teachers' Institute

Abstract was sent to the required addresses on 17 December 2021

Signed for print: 13.12.2021

Paper format: 60x90, 16/1

Volume: 37789

Number of hard copies: 100