REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Science

WAYS TO ENHANCE THE EFFECTIVENESS OF MATHEMATICS TRAINING IN PRIMARY SCHOOLS BASED ON THE MODERN ASSESSMENT CONCEPT

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SHORT SURVEY OF RESEARCH

Relevance and degree of elaboration of the subject. Azerbaijan was on the threshold of major changes in education at the end of the 20th century. There are global challenges facing education today, such as different forms of modern approaches to education. The problem of education in the 21st century is one of the main challenges for development of future generations.

To ensure its dynamic development, the independent Republic of Azerbaijan is primarily focused on bringing education to the level in advanced countries. Transition to the new education system will allow to meet the needs of our country in highly qualified personnel. Establishing the teaching of mathematics in secondary schools on scientific and methodological grounds, linking the structure and essence of the learning process to new tasks – is a program character duty that pedagogical community faces implementation of the new education system.

Features of the new education system – updating and improving contents and methods, forming the learning process on the democratic principles of the learning process, regarding the student as a subject of process. The establishment of teacher-student relationships on modern requirements has necessitated the renewal of the contents and forms of education.

Today, the education system of Azerbaijan is developing under a large-scale reform program. Education plays an important role in the formation of human capital, the driving force of the future development of our country. Today, in Azerbaijan and around the world, special attention is paid to strengthening and development of human capital, which has become the most important social and cultural factor of the modern economyformation. In this sense, the social and economic reforms in our country are aimed at improving the welfare of every Azerbaijani citizen. As the President Ilham Aliyev stressed, "The human factor is the main target of multilateral reforms for the

improvement of the socio-economic well-being of its citizens, Azerbaijan's entry into the list of highly developed countries.

Our future depends on today's children, the knowledge they gain from how they prepare for public life, and their skills and values. The contents of the reformed education serve to foster pupils analyzing and thinking skills.

Maths is the most important one of the sciences that develops students' mental development and cognitive activity.

Elaboration of a methodic system serving to develop mathematical speech, logical thinking, independent cognitive activity in mathematics training in secondary schools, to study new methods and means for assessment of training results especially of formative assessment, to determine its role functions in formation of mathematical logic, skills and habits of pupils is one of the problems that helps increase the quality and efficiently of mathematics training and has not been solved scientifically.

All the ways and means of doing this prove the relevance of research.

Not considering preschool education, the foundation of math is laid on elementary school students, starting with elementary school. The primary school teacher's job is to teach students math and its delicacy, to confront the fact that it is a subject we are constantly encountering in our lives. To achieve this, the teacher must explore ways to teach math, to be acquainted with numerous methods, approaches, recommendations, articles, books. Each teacher should have his own ideas about elementary school math contents and teaching methodology.

Qualitative changes have occurred in the contents of education over the past decade: the main purpose of the knowledge, skills and habits that students acquire is focused on the development and formation of the general competence of students.

A number of problems have arisen in the traditional training assessment system:

- The sole function of the traditional system of assessment was the checking student achievement by teachers and school principals.

- self-esteem was not allowed to be formed,

- The teacher had a hard time individually comparing each student's previous results and positively evaluating and registering their real achievements,

- The assessment was formal and could not determine the true knowledge of the student in terms of the criteria being confidential,

- The scope of the work required to develop your student, and the direction of the work were unkown,

- being in the power of the assessment system, the teacher turned into a psychological weapon on the student and the parent,

- assessment became a social and managerial connection between the student and the teacher, instead of improving student performance and learning its outcomes

- instead of the quality of the student's achievement, the form and volume of training were evaluated,

- more emphasis was placed on comparing students with each other, this also reduced the motivation and activity of the weaker student, preventing the full development of successful students.

The divergent aspects of “Every activity must be evaluated” motto and the phrases "assesment", "evaluation", "valuation" have changed the views on modern assessment. New areas of research have been created. Based on the concept of modern assessment in elementary school exploring ways to increase the effectiveness of math training, implementation of various projects organized by the Ministry of Education of the Republic of Azerbaijan on assessment; Carrying out National Assessment in the Republic, creation of text-book experts, and improvement of elementary grades' math standards the development of professionalstandards should be the primary task for the education sector.

The object of the research - is the process of teaching mathematics in elementary school.

Subject of the research - the use of new pedagogical technologies necessary to ensure the effectiveness of math training based on the modern assessment concept in the elementary grades.

The purpose of the study citing the traditional learning technologies tested, is based on the use of modern pedagogical technologies in accordance with the requirements of the time, the creation of a new methodological system to improve the quality of math training based on the modern assessment concept in the elementary grades.

We consider it necessary to carry out the following tasks to achieve our goals:

1) to study the state of mathematics training in the elementary grades in terms of the studied problem;

2) study of existing scientific and methodological literature on problem solving, analysis, drawing conclusions and author's version of the new methodological system;

3) increasing the abilities of abstract mathematical concepts for younger students and thus starting from the initial stage of mathematical education, an explanation of the formation and gradual development of concepts;

4) the interpretation of the level of mathematical training of students in elementary school through the formation of mathematical concepts;

5) increasing attention to the terminological aspects of concepts specification of, pedagog ical especially of math terms that enters our speech about related to innovations;

6) content of mathematical education Methods of teaching mathematics and using a culture of independent thinking in children, formation of elements of educational activity;

7) the use of visual illustrative materials and information communication technologies in transfer of knowledge and skills on mathematics;

8) do determine the factors affecting the effectiveness mathematical training and correct use of scientific and methodological issues;

9) referring to the modern concept of benchmarking in examining mathematical knowledge, skills and habits;

10) identification of methods for assessing student learning outcomes in math training means and forms of their organization;

11) determining the knowledge of students in mathematics teaching, the impact of assessment of knowledge and skills on improving the effectiveness of training;

12) determining the impact of didactic principles and psychological aspects on the evaluation process in math training;

13) checking the effectiveness of the new methodological system in school practice;

14) development of the methodical system in the form of teaching materials, developed in accordance with all components of the new training system.

Research hypothesis

If a new way of learning to develop creative and critical thinking and where resources are used effectively of pupils in grades I-IV;

2) If more emphasis is placed on logical issues to enhance cognitive activity of students in the learning process and when modern forms of training are used thought-provoking in the math learning process,;

3) If elementary school teachers demonstrating their planning skills systematically build math training and knowledge of students if they can identify alternative ways to achieve full assimilation;

4) If modern teaching methods, assessments for primary school teachers to improve the effectiveness of math training f they have sufficient information about the tools and their use in the math learning process;

5) If student learning outcomes are evaluated in an objective and operative way based on modern method for assessing;

6) If didactic and scientific principles in improving the effectiveness of math training are followed, then the effectiveness of trai-

ning will be achieved, the methodological issues raised are highly solved and the learning outcomes are high.

Presented for defense:

- ways to increase the effectiveness of math training in primary school, theoretical, insufficient training of primary school teachers on scientific and historical issues;
- from the principles of training in improving the efficiency of mathematics training in elementary grades and the need to use thinking processes as a method;
- consideration of scientific, psychological and pedagogical features in the application of modern types of assessment;
- evaluation of training results and purposeful organization of the analysis process;
- a new method used in elementary school mathematics training and the quality of training on the use of tools, especially assessment technologies, influence on the overall development of students.

Methodical basis of the research is suggestions and thesis of psychological – educations, mathematician-methodists of the Republic of Azerbaijan and foreign countries on increasing the efficiency of the cognitive theory of philosophy and teaching.

Research methods

Historic, comparative, statistical and other methods and ways were used in the dissertation:

- Analysis of the scientific literature on the problem and recording the facts necessary for the pedagogical process;
- analysis of teaching and methodological literature on mathematics of elementary grades;
- study of the working system of primary school teachers – familiarity with methodical documents, as well as student education documents;
- Observations of primary school teachers' lessons;
- oral survey of pupils in the primary grades, detection of characteristic deficiencies in students' knowledge, grouping and summarizing results;

- oral questionnaires and survey requests questionnaires with primary school teachers;

- conducting the pedagogical experiments in three stages – defining, training and testing;

- summarizing the results of the pedagogical experiment conducted in the schools and classrooms identified by research on the basis of mathematical statistical elements.

Scientific novelty of the research. Carrying out Scientific and practical investigations on increasing efficiency of mathematical training in elementary grades from different aspects in Azerbaijan, the study of this problem inst based on modern assessment concepts shows novelty of this research, and makes necessary do create new methodical system based on application of modern pedagogical technologies in accordance with the requirements of the time.

Theoretical significance of the research includes ways to increase the effectiveness of math training in grades I-IV and developing a theoretical framework for tools.

In recent years various scientific articles on this problem have been published. The dissertation explored the possibilities of using the thoughts and ideas of those engaged in this field.

Practical significance of the research is the head the methodology system, designed to fit all the components of the new training system, is an affordable educational tool for elementary school teachers. Improvement of the content of mathematics training in elementary grades, compilation of math textbooks for elementary grades, didactic material in the development of guidelines and recommendations for teachers can be used to compile visual aids.

Approval of research results

3 monographs, 43 papers (13 abroad), 14 conferense material (12 abroad) and 14 books (teaching and methodological materials), 2 programs were published.

Application of research results. The published recommendations for the research were used in the pedagogical experiment, the results have been improved in the work experime, corrected,

supplemented with recommendations and delivered to primary school teachers.

The total volume of the dissertation with a sign indicating the volume of the structural sections of the dissertation separately. The dissertation consists of 18 paragraphs, 4 chapters covering 15 points, conclusions and proposals, and a list of references.

Introduction – 17141 marks, 10 pages, Chapter I 59192 marks, 32 pages (1.1. – 9299 marks, 5 pages; 1.2. – 9645 marks, 5 pages; 1.3. – 5053 marks, 3 pages; 1.4. – 21695 marks, 12 page; 1.5. – 13500 signs, 7 pages), chapter II 116458 signs, 68 pages; 2.2. – 10812 signs, 6 pages; 2.3. – 20781 signs, 12 pages – 13837 marks, – 8 pages); 2.4. – 61960 marks, 37 pages; 2.4.2 – 10586 marks, 6 pages; 2.4.3 – 25748 marks, 15 pages. 4 – 11234 characters, 8 pages), Chapter III – 108832 signs, 62 pages (3.1. – 34502 signs, 19 pages (3.1.1 – 14554 signs, 8 pages; 3.1.2 – 8248 signs, 5 pages; 3.1.3 – 11700 signs, 6 pages;); 3.2. – 35749 marks, 27 pages (3.2.1 – 4884 marks, 2 pages; 3.2.2 – 19827 marks, 12 pages) 3.3. – 29913 marks, 17 pages (3.3.1 – 8291 marks, 5 pages) 2 – 3324 marks, 2 pages), 3.4. – 8668 marks, 5 pages, Chapter IV – 112001 marks, 71 pages (4.1 – 14936 marks, 8 pages; 4.2 – 28113 marks, 14 pages (4.2.1 – 9846 marks, 6 pages; 4.2.2 – 7191 marks, 4 pages; 4.3 – 8117 marks, 21 pages; 4.5 – 28781 marks, 21 pages Conclusions and proposals are 14500 characters, 8 pages, the list of used literature is 12 pages, and the dissertation is 428124 characters, 281 pages in total.

SUMMARY OF DISSERTATION

The relevance of the problem under investigation were clarified in the introduction was justified, goals and objectives, provisions for defense, and other issues.

Chapter I is called "New content of elementary mathematical education and its pedagogical issues". This chapter is divided into 5 sub chapters.

Subchapter I deal with importance of mathematical science in society and formation of a human as a personality. The values belonging to the progression of outstanding thinkers, pedagogues who have done a great job in teaching mathematics, the persons who control development and execution of culture have not come to life as another spiritual value, they have been gained gradually. These values were formed depending on social, political and economical relations informing on development of pedagogy and teaching experience in society. The features of pedagogical values in terms of professional pedagogical activity include:

1. The values that define the role of the educator in his or her social and professional life;
2. The values of educator that satifisty the ones around his by communication and reputation;
3. The values that a teacher creates as himself a creative personality;
4. Self-sustaining values of the educator;
5. Values that enable the educator to meet the pragmatic needs.

Subchapter 2 talks about important state measures being implemented in the development and improvement of mathematical education.

Our national leader Heydar Aliyev paid special attention to the development of education, he described this as an important part of public policy. Dignity of President Ilham Aliyev's succession traditions, adaptation of Azerbaijani schools to the requirements of time, construction of new educational institutions, strengthening of material and technical base, a program aimed at high education development and the implementation of projects reflects the care of a respected president[2].Today, each of us is proud of the authority that our country has gained internationally and the development of our economy.

Thanks of the attention to the education system of the President of the Republic of Azerbaijan, Mr. Ilham Aliyev, many important development programs have been implemented accoding of the educational system: “Active Training and School Leadership Program”,

State Program on Informatization of Education System (2008-2012)", "Concept and strategy of continuous pedagogical education and teacher training", "Program for Developing Creative Capacity of Children (Youth) with Special Talents (2006-2010)", "Concept of Education in the Republic of Azerbaijan (National Curriculum)", approved in 2006, "Textbook policy in general education system", "Establishment of the Best High School and Best Teacher Awards (2007)", "State Program on Modernization of Preschool Education in the Republic of Azerbaijan (2007-2010)". State program on major renovation of existing schools and provision of modern educational equipment (2003-2007)", Development Program for Supply of Secondary Schools of the Republic of Azerbaijan (2005-2009)" "ICT Program for Secondary Schools of the Republic of Azerbaijan (2005-2007)", "Textbook Program (2006-2015)", "New School for Renewable Azerbaijan" Program of the Heydar Aliyev Foundation (2007), "Development Program for the Organization of Education of Children with Special Needs (Health) in the Republic of Azerbaijan (2005-2009)", "Development Program for the Organization of Education of Children with Special Needs (Health) in the Republic of Azerbaijan (2005-2009)", "Development Program of Pedagogical Staffing in the Network of Secondary Schools for 2005-2009 (2005-2009)", "Education Sector Development Project (2003-2007)", "State Program on Education of Azerbaijani Youth Abroad 2007-2015", "State Program for Development of Vocational Education in the Republic of Azerbaijan (2007-2012)", "Evaluation Concept in the General Education System of the Republic of Azerbaijan (2008)", Law of the Republic of Azerbaijan "On Education" (2009), "State Strategy for Education Development in the Republic of Azerbaijan (2013)".

All these and other important government education measures - documents, programs and projects are large-scale steps to promote education in Azerbaijan.

Subchapters 3 and 4 were dedicated to the revival of elementary mathematical education and the new concept of education, here the content lines for the elementary math course and their characteristics

have been explained New concepts in Statistics and Probability, a new content line in mathematics training, the content of mathematical statistics, and its implication in the curriculum has been revealed. The topics of how to implement methodological training of teachers in this area and the issue of pedagogical and methodological training of teachers in higher education institutions are revised.

Subchapters 5 the psycho-pedagogical aspects of modern learning technologies in the process of mathematics training were reviewed.

Training technology is a systematic planning method that improves the application and evaluation of the entire learning process, access to knowledge through human and technical resources, and promotes education more effectively. Educational institutions all over the world choose theoretical and methodologically based learning technologies and use them in the work system. Training technologies are aimed at the psychological state of the student and are designed for specific purposes, suitable for any teacher in any educational institution, plan the learning process and realize the learning objectives at a high level.

Here is a brief description of several learning technologies:[1]

• Waldorf School Technology[2] - the purpose of which is to prepare students for new experiences;

• The purpose of self-development technology (M.Montessori)[3] is to develop a child's comprehensive development, independent upbringing, understanding the world, the formation of intellectual and practical activities.

• The goal of Dalton's technology[4] is to provide students with the skills and knowledge necessary to nurture responsibility, independence, and to develop communication skills.[5]

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[1] Heidebrand K. Free Waldroy School Curriculum // Private School, 1997, No. 2 President Ilham Alyev and development of educational of Azarbaijan. B.: 2008

[2] Steiner R. Methods of teaching and premise of education. M.: Pasifal, 1994

[3] G. Kornetov Method of Montessori // Private School, 1995, No. 4

[4] Шамова Т. Dalton Technology // Zawuch, 2001, No. 1

• Personal Learning Technology[6] The goal is to maintain and protect the student's individual abilities during the next stages of training, formation of general skills and habits, implementation of individual training program by each student, to enhance learning motivation and intellectual curiosity, to build independence, diligence and creativity in the performance of individual work.[7]

• The purpose of computer (information) technology[8] is to develop gain knowledge of students, having the skills and habits, mental activities, and their ability to work with information.

• The purpose of developmental learning technology (V.Davydov)[9] is to form theoretical understanding and thinking, teaching students not only knowledge, but also intellectual activities, their logical achievement of scientific succeses.

The introduction of modern of learning technologies in education has a positive impact on the development of students' personality and helps them to identify their professional skills. Because the identification and development of creative and intellectual abilities of the student as a subject of the educational process should be carried out at all stages of education.

Chapter II is entitled **"Principles and Criteria for Measuring the Effectiveness of Mathematics Teaching Process in Elementary Schools".** This chapter consists of 4 subchapters.

Subchapter 1 is devoted to the psychological and methodological issues of mathematics education in the elementary grades.

It is important to take into account the psychological and pedagogical features of teaching mathematics in school. Teaching and learning mathematics is closely linked to human thinking, and it is important to begin with what object we begin with. As a form of thin-

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[5] Yu. Dalton-Oriented Technology Dalton. MN: ASAR, 1998

[6] UNT I.I. Personalization and Differentiation. M.: 1990

[7] Granitskaya A. Start dum and dive. Adaptive system to connect to the school. M.: 1991

[8] New pedagogical and information technologies in the field of education. M.: 1999

[9] Davydov V.V. Theory is a divisive phenomenon. M.: INTOR, 1996, 544 p.

king in the scientific-methodological literature: 1) cognition 2) Confirmation (or Help to Understand) 3) The to draw a conclusion. The cognition is and is divided into two parts. The basic indefinite and definite in the first case, the main role is played by observation, comparison and visualization. In explaining certain concepts, prior knowledge plays an important role, and one concept is explained by another notion that is known in advance. Cognition itself is one of the most difficult concepts to understand: cognition is the product of the brain, and the brain is the supreme form of matter or the material carrier of the mind. Any event that takes place in the environment and is understood by a person is modeled as a structure in the cerebral cortex. It is assumed that there is a compatibility between real objects and the model of the nervous system, that is, its code. This is one of the objective conditions for learning the world.

Psychologists have identified two types of structure: space and time. These structures play an important role in mastering mathematical concepts. Thus, the printed book or the presented text - the structure of the space, and the reading of the text or book refers to the structure of the time. The model is the processing of any information in the brain. The movement of awakening and braking constitutes the material basis of their thinking. Meeting these models is the real content of the idea.

This section presents real-life examples for explaining the psychological and methodological issues of mathematics training.

In subchapter 2 the content and the basic principles of the system of teaching activities are explained.

Studies on education have yet were carried out by Y.A.Kamenski, J.J.Russo, I.Q.Pestalotski, A.Disterveg, K.D.Ushinski and later developed by L.J.Vigotski, A.N.Lyontev, P.Y.Galperin, D.Dui, M.Montessori, L.V.Zankov and V.V.Davydov. The mass implementation of pedagogical concepts in schools is the most important issue facing modern education.

The teacher relied on his pedagogical experience and knowledge, must think about how to teach and organize pupils in new condi-

tions and new educational requirements, the overall structure of teaching activities, technology and didactic system of teaching activities.

The didactic system allows a teacher to engage students in a systematic teaching activity. The lessons may be divided into types according to the motivation process, the definition and correction of the activity (action), the implementation of norms and reflexes feedback, self-control and self-esteem, the implementation of communicative relationships, etc.

The educational environment is based on a system of didactic principles based on the technology of the teaching process.[10] The system of didactic principles considered in the study is entirely consistent with the implementation of traditional didactic principles. It should be noted that modern training has leading directions. For example, the principles of activity of V.V.Davydov, sinimax principle of L.V.Zankov, Amanashvili's principle of psychological comfort, etc.

Subchapter 3. Comments the classification and selection criteria for mathematical training methods were commented.

Training is a two-way process, and the teacher tries to ensure that, within a certain time, the students acquire skills and habits under of their guidance and instruction, In pedagogical language it is called effective training. There are various resources to enhance the effectiveness of training. The most important of these are training methods.

Training methods for providing and receiving information are divided into 1) theoretical, 2) visual, and 3) practical. (N.M.Kazymov, Y.P.Talibov, F.A.Rustamov, S.I.Petrovski, Y.Y.Kalant, Y.Kolyagin, etc.)

Classification of training methods for didactic tasks to be implemented in the learning process belongs to B.A.Aliyev, M.A.Danilov,V.P. Yesipov and others.

[10] Peterson L.G. and others. Active teaching methods in education system: "School 2000" / Monograph. M.: 2007

Classification of teaching methods related to students' cognitive activity belongs to M.N.Skatkin, I.Y.Lerner, A.A.Stolyar, B.M.Ahmadov, S.S.Hamidov and others.

A.S.Psyolko, A.M.Pishkalo, M.I.Moro, S.S.Hamidov, A.A.Bantova and other mathematicians Methodists have proposed different classification methods.

Proper selection of training methods ensures the effectiveness of the course, because the most important of the components of the concept of “efficiency” is the acquisition of comprehensive and well-grounded knowledge by spending less time.

For this purpose, the teacher should be familiar with the rules and regulations concerning the content of his / her activities when preparing the course and should focus their work on that content. This means that the quality of teaching begins with the teacher's pedagogical skills. One of the main issues is the choice of training method.

Subchapter 4 educational activities, which are one of the key factors determining the effectiveness of training, its essence, criteria for measuring the effectiveness of educational activities and theoretical basis for modern types and forms of organization of the learning process as an activity are explained.

Teaching and learning activities in didactics are based on the role of the teacher and the student in the learning process. Hence, these activities are considered at the scientific and empirical level of didactics. If we move from specific forms of teaching and learning to abstracting, we can then enter a new field of activity - the field of educational activity.

Work oraction includes at least two activities: teaching and learning. Both are combined and become interdependent, creating an important element of learning activity. It is then that teaching activity is a didactic concept.

The types of activities are directly related to the fact that training is effective.

The concept of teaching purpose combines three objectives related to three activities: 1) teaching, 2) learning, and 3) teaching activities.

It is well known that each outcome can act as a goal, and, on the contrary, in some circumstances, the goal may be the result. For all training activities, public purpose is always considered ideal. Because the ideal goal is connected with the end product of training. This ideal can be reflected in every activity differently. Here are the following factors:

- the ideal knowledge of a student - his/her preparation,
- ideally organized educational process;
- optimal ratio of activities.

These factors allow us to draw conclusions about the learning process as a whole.

From a theoretical point of view, at least three types of activities should be distinguished in didactics: training activities, teaching activities and education activities. Each of these activities differs from the other by its content, structure, purpose and results.

Systematic activity is one of the possible methods of theoretical analysis of learning. The main task is to determine the criteria for measuring the effectiveness of educational activities.

There are issues in the pedagogical process that require the adoption of new concepts and terms. One of these is the effectiveness of training. In a number of studies, this concept is understood as the search for criteria and does not fully meet the definition of effectiveness in training. According to V.M.Blinov, the selection of the training effectiveness criterion should be followed by a general approach to determining efficiency[11]. The effecttiveness of training is largely driven by the need for quantitative measurement, because the issue of measurement plays a special role in determining the overall efficiency problem. Determination of efficiency means comparing the results of audited or evaluated results with the optimal and acceptable results.

[11] Blinov V.M. Learning Effectiveness. M. Pedagogy, 1976

Let us denote the number of teachers' teaching activities (impact on the learner) in one series by n. Let us point out the optimal number of students' activities by n_{opt} Optimal average value of time spent in a series of counter-links by $T_{ort.opt}$ (n_{opt} in feedback series). $T_{ort} - n$ is the average time spent on n number multiple replies or feedback.

$$T = \sum_{u=1}^{n} T_u$$

time spent on answer feedback.

Then the average time spent to replies (feedback) is expressed as: $T_{ort} = T/n$ və $T_{ort.opt} = T_{opt} / n_{opt}$.

T_{opt} represents the optimum total time spent in feedbacks in a series. If we denote the effectiveness of training by η, then

$$\eta = \frac{T_{ort.opt} \cdot n}{T_{or} \cdot n_{or}} \quad \frac{T_{opt} / n_{opt} \cdot n}{T / n \cdot n_{opt}} \quad \frac{T_{opt} \cdot n^2}{T \cdot n_{opt}^2}$$

Effectiveness criteria optimal time and optimal accuracy of training are used. In determining the Optimal settings can be obtained with certain accuracy[12].

Training is thus a complex multidisciplinary pedagogical process based on its content, methods and forms of implementation. The effectiveness of the training is determined by the educational activities of the teacher and the student and the results of the training. The extent to which training outcomes are optimal can be determined by the modern assessment concept.

It is well known from the history of teaching that the concepts of teaching and training have been used as equivalents for a long time. The emergence of didactic principles (most of which belong to Y.Komensky) laid the beginning of a change in the content and form

[12] Blonsky P.P. Memory and Thinking. M.: Nauka, 1935, 214 p

of the training. The training was divided into practical activities and theory, not only as a form of activity.

One of the components of the methodology that ensures the effectiveness of math training is the forms of training organization.

The most important of these forms is the form of lesson. In the words of N.M.Verzilli, "Lesson is the sun with all the other curriculum revolving planets".[13] The modern lesson is a new form of training that does not erase its connection with the past, in a word, it is a current process.

One of the most important issues in setting up and implementing a lesson is to create an environment of special comfort for students. Achievement of the expected results at the elementary level of the "Technology Card" used in the lessonmodeling, is a new methodical product for the complete mastering of the program material, effective and qualitative training process.

Technological card

- systematical implementation of training outcomes for teachers, planning quarterly, half yearly analyze diagnostics of the expected outcomes at each stage of the lesson;
- provide methodological support to teachers for school management, to enhance motivation for teaching activities, to establish communication between teachers and students, provides students with the right motivation to acquire knowledge, skills and habits within the material studied.

The dissertation widely describes the characteristics and stages of the active lesson and shows examples.

Chapter III is entitled **"Ways and Means to Increase the Efficiency of Mathematics Teaching in Elementary Schools".** This chapter consists of 4 subchapters.

In the first and second subchapters, the content of the primary school teaching profession, problems of readiness, the working sys-

[13] Karabanova O.A. Formation of universal educational activities of elementary school puples // Upravleniye nachalnoy shkoloy, 2009

tem of the elementary school teacher in the math class in modern conditions, and the importance of the teacher factor in the effectiveness of the lesson were revealed.

A modern elementary school teacher should be distinguished by the following qualities:

1) high erudition and be able to see tomorrow's problems of education,

2) have high scientific and methodological training in mathematics;

3) be able to investigate problems of secondary mathematical education;

4) be able to use modern teaching methods and forms of training in an integrated and dynamic manner;

5) follow the pedagogical press and get acquainted with the positive developments in world education.

What qualities and characteristics can provide information about a teacher's personality, advanced public beliefs, spiritual enrichment, profound knowledge and pedagogical mastery?

General requirements (teacher identity requirements) play a leading role and include the ideological orientation of the personality (outlook and belief, socio-political activity, respect for the laws of the state, citizenship responsibility, national dignity and patriotism, public debt awareness); professional-pedagogical orientation (professionalism, ability to work in a team, love for children, principality, pedagogical imagination, high aesthetic pleasure, justice, ethical norms, firm will, patience and tolerance, self-discipline, healthy lifestyle); combines cognitive orientation (mental activity, scientific function, spiritual interests and needs, spiritual culture, preparation for pedagogical self-education).

Specific requirements (ie requirements for psychological and pedagogical training of teachers) include knowledge and skills (constructive, communicative, organizational, gnostic, creative)

Pedagogical skills are a flow of psychological processes that affect the success of teacher work, applying specific pedagogical

knowledge with specific skill and creativity based on ethical requirements, to succed high successes in training and education.

If it is convenient for a teacher to work in the classroom, it means that he has worked hard at home and after school and has established a system of work for himself. The study considered the stages involved in the content of the teacher's teaching activities and the requirements for the teacher's performance during these stages. Important principles related to the teacher's working system in teaching math have been explained, and ways to achieve an effective solution to the problem of teacher training, which is currently the leading force in improving the quality of teaching in general education schools, are explained.

In Azerbaijan on training of pedagogical staff. H.M.Ahmadov, A.A.Alizadeh, M.C.Mardanov, M.S.Cabrayilov, N.M.Kazimov, S.S.Hamidov, F.A.Rustamov, A.H.Pashayev and others, in foreign coentivies L.V.Zankov, V.I.Zagvyazinski, B.T.Lihachov, P.I.Pidkasisty, I.F.Kharlamov and others. have done research.

Modern pedagogical technology is based on the development of personality-oriented training. Technology of L.V.Zankov (focused on general and complete development of the student's personality) related to such technologies; Development of V.B.Davydov, D.B.Elkonin technology (intellectual development), creative development of personality, development of self-management mechanism, social orientation for quality content, moral orientation and psychology, psychology/ Z.Veysova's of interactive learning can be shown as an example..

Analyzes were conducted in 25 countries, including the 10 most developed countries, to identify ways to achieve a high-quality trainingin education[14].

The focus of the analysis as a comparison object is not on how classroom teaching is conducted a lesson in the classroom, but on the level of education system and the quality of education.

[14] Barber M., Mursheд M. How To Active stabli high School // Voprosy Obrazovania, 2008, №3, p. 7 – 60

Almost every country in the world has taken bold steps to establish new education systems. For example, all the leading systems in the UK have been tested, but despite 50 years of reform, the elementary grades have only undergone small changes in the writing and accounting standards. In other countries, we face the same picture. Even in the US-centric school environment, the results have not been encouraging. It is worth noting that the achievements of students in private schools with special programs have been increased.

In New Zealand, structural changes have been made to improve the quality of education. The of control system to pupiles here has resulted in lower student achievement. “It is impossible to improve student achievement transfer without improving the quality of training authority”.

The main reasons for how to achieve a high level of training to enhance the effectiveness of training include:

- to meet the social needs of teachers to provide quality education to each student;
- improving the knowledge of each student individually for improving the quality of the education system;
- mainstreaming of the teacher factor.

In order to increase the effectiveness of training in education reform, the focus is on the development and implementation of a successful strategy. A reformer from Boston said: “Reform is based on three whales: professional development, professional development and yet professional development. We have used everything to provide professional development - financial and organizational resources, people and equipment”. In this regard, the National Institute of Education was established in Singapore for this purpose. “If you have the best program, the high level of infrastructure, the best management, even if you do not have the perfect teacher, all your work is in vain. We provide our teachers with a 100-hour training course every year to help them develop their skills. But unless you have a teacher who loves his art, you will not be student who loves to study”.

The study considered pedagogical conditions for the implementation of technologies for the full development of students' knowledge.

Subchapter 2 focuses on the mathematical training requirements of primary school students, the impact of succession in math training, the interdisciplinary relationship, and the increasing efficiency of the use of information and communication technologies in math training. Positive dynamics have been achieved in providing secondary schools with information and communication technologies, and in general, attention has been paid to the establishment of the education system on the basis of information and communication technologies. At present, the schools are successfully provided with technical equipment. The main objective is to develop and present to teachers the methodical system of teaching mathematics using modern information and communication technologies.

In subchapters 3 and 4 we speak about influence of thinking methods, training problem of technology, differential heuristic training, the use of logical and combinatorial problems on increasing efficiency in mathematics lessons.

As society develops, the tasks that the school faces are changing. Modern teaching methods are chosen according to the specifics of the subjects. Modern teaching methods in mathematics must meet the requirements of modern life, and their application should take into account the peculiarities of mathematics and science.

There are various methods and approaches in pedagogical science to enhance students' cognitive activity in the training process. An heuristic method or heuristic approach is to find a new knowledge to a student, relying on old knowledge.

In the training, interpretive forms such as monologue and dialogue are used depending on the nature of the topic. Individual approach and individual-heuristic activity play an important role in developing students' creative abilities.

Studies (A.A.Allizade, I.J.Lerner, A.Obuhova, etc.) and the pedagogical experiment show that the involvement of students in tea-

ching - research work is a real worldview and plays an important role in shaping personality.

The use of active training techniques in math lessons, the selection of thought-provoking didactic materials, the timely and objective assessment of learning in the training process are factors that will benefit the lesson as a whole.

Various methods and tools are used to improve the effectiveness of math training in elementary school. Problem-based learning technology can be considered such a methodical priori.

In the field of the application of problem-based learning technologies M.I. Mahmudov, I.Y.Lerner, Qanelin I.R., Ogorodnikov sh.i. P.İ.Pitkasistıy, B.Əkhmedov, N.M.Kazımov conducted research.

The factor of problem in development in mathematics training was reflected in the study A.A.Stolyar, V.V.Davydov, N.V.Metelski, S.S.Hamidov and others. Teaching in primary school is the best tool for a student to solve small problems and plays an important role in problem training.

M.I.Makhmudov, one of the founders of the problem-based training, describes this training as: didactic learning is determined as a didactic system of developmental training, the consequences of which are to strengthen knowledge, specific creative thinking, depth or reasoning, creative application, search and initiative. The first researchers of this problem were A.V.Brushlinski, Ch.Dui, T.A.Ilina, T.V.Kudryavtsev, .A.M.Matuishkin, M.I.Makhmudov, V.Okun.

School experience shows that problem-based learning in math in elementary schools develops students' reasoning, thinking, and creative abilities, and the knowledge and skills gained during this process are the result of active and independent activities.

It is impossible to develop a student's knowledge, skills, habits and abilities without knowing the needs, interests, level of preparation, mental abilities of the student. By using differentiated tasks, it is possible to maximize the development of students with different levels of knowledge. Differential training individually develops a high level of attention, perception, memory and thinking of each student.

Increases student activity in the lesson, interest in the subject and strives for independent work.

Analyzing the psycho-pedagogical and didactic basis[15], we conclude that differentiated learning is an effective tool for improving the quality of education, developing the abilities, interests, and intellectual activities of students.

Combinatorics is a tool for studying maths and combinations. Since the advent of computer technology, its role has grown, and has found its extensive development directly in the application of mathematics. We believe it is important to inform students with combinatorial elements through the use of purposeful work in the elementary grades. Combinatorial issues require students to choose the desired outcome or the variety of options that meet the condition of the issue. Therefore, their use in the process of teaching mathematics makes the subject more interesting.

Chapter IV is entitled **"Assessment of Learning Outcomes as a Means of Increasing Efficiency in Primary Mathematics Teaching"** and consists of 5 subchapters.

In subchapters 1, we will talk about the evaluation of learning outcomes, the importance of motivation, stimulation, and assessment of student achievement in elementary school mathematics.

Each activity should be evaluated. Therefore, assessment is used to increase students' interest and motivation in the course. Assessment should not only be a factor that reflects a student's level of knowledge, performance, or achievement, but should also encourage him or her to develop and work hard.

It is the desire of every teacher that his students approach the course responsibly. It is possible to introduce M.Ratter's tactics to increase the responsibility of students who have difficulty in educational.

[15] Klevchenya M.S. The problem of psychologically differentiated haining. Minsk: Narodnaya Asveta, 1992

This tactic has several stages. During the research phase, the teacher communicates with a child who is not interested in the course, then the lesson is of interest and this is the child's progress and success, along with the gradual process. Thus, positive motivation is the basis of a good course, encourages each student's self-development in the lesson, and acts as a driving force of interest.

According to modern assessment, personality-based training incorporates the following key components:

- student familiarity with training objectives and evaluation criteria,
- involvement of a student in the process of self-assessment based on criteria;
- Establish a feedback link that helps identify and implement the student's future steps.

Subchapter 2 of the book describes the methods and tools used to assess student achievement. In the elementary grades, pedagogical issues of examining math students' knowledge, skills and habits were explained.

Knowledge is the core of the content of the training. Only based on knowledge, skills and habits, intellectual and practical activities are formed in the students, and the acquired knowledge is applied in practice. Thus, the knowledge gained is vital.

L.M.Friedman analyzes the definitions of the concept of "knowledge" and gives the following definition: "Knowledge is the result of our cognitive activity, regardless of the form of this activity: feeling or feelingles; directly or indirectly; heard as a result of reading the text or from someone else; is the information received as a result of watching a movie or TV, etc."[16]

Often the stages of knowledge formation are considered as a criterion for assessing knowledge. It is well-known that complete mastering of knowledge goes through the following stages: "perception - imagination - understanding - development of understanding".

[16] Friedman L.M. Logical and psychological analysis of the school system. M. Pedagogy, 1977, 208 p.

In psycho-logistics, they say: perception→imagination →formation→understanding→application

In order to assess student learning outcomes in the pedagogical process, especially in the school, a system of work that answers the questions “what?”, “How?” and “why” needs to be developed.

There is extensive research result in pedagogical and methodical literature to test students' level of math knowledge, skills and habits.

Most psychologists and educators believe that skill is a higher psychological category than habit. Practical educators, however, take the opposite position. They believe that habits have a higher role in mastering the student's (individual's) physical and work component. That is why habits advance.

Skills exists in the level of knowledge (rule, theorem, problem, problem solving methods, etc.) gained at the initial stage.

The habit is to be fully functional, and intermediate steps are mechanically implemented. For example, when a man reads a human book, letters and words are automatically spelled out because the purpose is content. However, when checking the accuracy of any text, every word, letter, punctuation mark is there.

Thus, skill is the intermediate step in the development of a new ability to work based on any discipline.

Skills - At the initial stage, knowledge is gained at the level of knowledge (rule, theorem, problem solving, etc.).

Habit is an automated component of the conscious activity of a person and occurs in the process of execution. The habit consciously occurs in the form of automation and is then used as an automated method. The stage of habit formation is consciously implemented first, and at the next stage the activity becomes more automated.[17]

Methodological issues of checking knowledge, skills and habits are handled in different ways. One of the forms of math training is the independent work of students, and one of them is homework.

[17] Talzalina N.F. Educational Psychology. In: Proceedings, 1998, 213 p.

The methods and prerequisites for examining homework performance depend primarily on the nature of the task. Different forms of inquiry are used to assess student's home performance.

The Homework Inspection process should serve at least one of two purposes, being part of the lesson:

- readiness to learn new material,
- reinforcing the previous material.

Examination of homework, as well as classroom work in a variety of ways, encourages students' mathematical readiness to form independent creative thinking.[18]

Conducting independent math work in elementary school has proven itself as a form of training. Although math independent work is meant to be done without the help of a teacher, it does not deny the teacher's leading role in the lesson. Because by doing independent work, the teacher aims at this or that other didactic task.

Different classifications of independent work are considered in didactics (B.P.Yesipov, P.E.Pedkasisty): 1) by level, 2) by differentiation and level of individuality, 3) by didactic purposes, 4) by sources of knowledge, etc.[19]

It is not possible to solve the problem of forming independent skills of students in elementary school mathematics without problem solving. Methods and ways of solving this problem are from the leading scientists in the field of pedagogy, psychology and methodics B.P.Yesipov, M.A.Dilov, I.T.Ogorodnikova, M.I.Mahmutov, N.G.Dayri, P.E.Pedkasisty, L.V.Zankov, I.A.Menchinskaya, P.Y.Galperin, E.N.Kabanova-Miller, N.F.Talizina, L.M.Fridman, Y.M.Kolyagin, Y.Zubaidov, M.Niguinov and others.

In addition to the written test of students' knowledge and skills, oral examination is also important. The verbal examination of know-

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[18] Notes by N. Methods of teaching mathematics in elementary classes. M.: LINKA-PRESS, 2003, 221 p.

[19] Davydov V.V. On the concept of developmental learning. Digest of articles. Tomsk: PELENG, 1995, 144 p.,

ledge, skills, and habits is selected from other forms and is effective because the teacher is in direct contact with the student during the examination. This also allows the teacher to observe the student's live speech, knowledge, thinking, characteristic errors, and formulate specific feedback and decisions about the student's knowledge. Studies show that systematic use of various forms of math training can increase the effectiveness of teaching and improve students' knowledge.

In subchapters 3. Personality training in education means understanding two concepts: training and knowledge (teaching and learning, teaching and learning, teaching and training). The purpose of the training is reflected in the teacher's plan, and the training is a type of process of self-awareness and reinforcement in the individual's activities, which is related to the student's own strength. The result of the training is the elements of personal experience – knowledge, skills and habits. Knowledge is an internal process that takes into account the strength of a student and has individual needs and motivations.[20]

At present, assessment in the system of secondary schools is used as different definitions.

Assessment is a process of tracking students' academic and thinking activities and recording or collecting information about student in order to improve the quality of training.

Valuation is the result of the evaluation process, the evaluation activity or movement, and the quality of the feedback.

Mark is a conventional symbol of student achievement in a formally, numerical, alphabetical or otherform.

The study considered the basic principles[21] for assessing student achievement. A.Volkov, Y.Kuzmin, I.Remorenko, I.Frumini's comment on L.Yakobson's report “Models of Modern Economy:

[20] Davydov V.V. About the annoying annoyance. State of the art. Tomsk: PELENG, 1995,144 p.

[21] Shakirov R.H. and others. Expanded Flying Paths / Methodology, Kyrgyz Academy of Education. Bishkek: Education, 2012, 80 p

Russian Education – 2020" is interpreted as "New image of the teacher: researcher, educator, consultant, project manager".

In sub chapter 4 psycho-pedagogical features of assessment and evaluation of student's mathematical results in accordance with modern requirements were considered. In connection with the adoption of a new assessment concept in the education system, teachers apply new forms of assessment.

Assessment in the world education system has always been a "assessment cycle" or an algorithm for conducting the assessment process, which is of research nature and has some controversy. Although Ralph Tayler's article on the subject was debated in the UK in 1949, his simple "Purpose - Content - Organization – Assessment" formula, called "Tayler's Commentary", was adopted as a rule developing quality of teaching in the countries that applied assessment for the first time.

Assessent is a complex activity. Complex Organization of Assessment is characterized by the following quations: "When do we evaluate?" "What activities do we evaluate?". American scientist David Jenkins compared the stages of complex assessment (diagnostic, formative and summative assessment) to climbers' climbing. The climber is determined to conquer the peak (final evaluation). How does it go through the preparation phase (diagnostic evaluation)? It is very important to learn how to overcome the next stages (small summatical assessment). The climbers (formative assessment) climbed one by one, already crossing a certain path (the end of the first half), passing the next phase (the second half), if he needs to climb the peak, he can make the make preparations (diagnostics) and then continue on his way. The peak is conquered. A climber report to find out how the process went and, as a result, the final evaluation phase of the work (the most recent diagnostic evaluation).[22]

If we look at the evaluation process from different perspectives, we can see that this process of research is not only controversial but also a more realistic activity.

[22] Maksimova V.N. AE Maron et al. Systematic Diagnosis of Medium Microsurgery, M .: 2000.

The characteristics of diagnostic and summative types of assessment coincide with the characteristics of the types of assessment we use in traditional training, but formative assessment is characterized by new features, such as modern assessment, with a positive modern approach, and in subject matter learning, especially in improving the effectiveness of math training. As this type of assessment is new, its meaning, purpose, role and function, the issues of organizational forms, use algorithms and tools are reflected in the dissertation.

In subchabter 5, the main features of formative assessment in the elementary school mathematics learning process have been extensively reviewed.

The leading strategy for formative assessment is the motto of the English education system: “Take control of the learning process!”[23]

In the 1990s, innovative scholars were trying to find answers to two questions in the education system: “How well do children read study?”, “How well do teachers work effectively?”

The answers to these questions can only be achieved by formative assessment of student learning achievements. Let's explore the features that distinguish formative assessment from traditional assessments.

Formative assessment is focused on improving the quality of training, not the teaching. Provides information to teachers and students on how to improve and enhance learning.

Formative assessment is a purposeful and continuous process of student learning. Formative assessment is an assessment of non-formal education and more is the valuation without works.

Let's give an interesting example of R.Steyk. It presents a two-stage analogue of the soup evaluation: the chef's taste of the soap is a formative assessment. Assessment of soup eating or soup expert evaluation is summative assessment. In other words, while the formative assessment reflects internal quality control, the summatical

[23] Pinskaya M.A. Assessment for training. M .: 2001

evaluation shows the final result in the real world.

Feedback is the process of providing and receiving commentary, information during specific situations, events, and conflicting questions. Creating effective feedback is a key element of the elementary school student's learning process. Feedback is a leading tool in the learning process, informing the teacher about the students' achievements and challenges. Informs students about how to achieve the expected goals and outcomes in the learning process. Feedback is made with mutual respect and care. The teacher helps the students in their mistakes, guides them to correct thinking and action.

"Help me!" It's called a little copybook on a teacher's desk. Each student can make notes about the difficulties they face in this copybook and the questions they are interested in. Information on this interesting technique was taken from the Pervoe September newspaper, February 22, 1983.

Assessment criteria for teachers and students also have their own merits. Using the Criteria-Based Assessment Form,[24] the study covered materials for teachers and students that helped them build their work.

High achievement in the learning process is impossible without adhering to the success algorithm. The success algorithm is the steps taken by teachers and students to achieve high results. Members of the Association of Teachers of Natural Sciences at the University of Wisconsin-Madison built the learning process entirely on the Roadmap's success algorithm. This map accurately describes whether the teacher achieved the intended goal. The roadmap shows the direction of the learning process with precise details. Here it is required to set the initial goal and take the next steps.[25]

One of the main requirements for assessment activities is to develop students' ability to identify their mistakes and evaluate their

[24] Krasnoborova A.A. Criticism of grading in the school. Perm: 2010

[25] Dudkina O.I. and others. Formative schooling in the Higher School Bishkek: 2012, 89 c.

results. To achieve this, it is necessary to use methods of mutual evaluation and self-evaluation.

Demonstrates the ability to use analytical tools to measure the level of mastering through formative assessment techniques, and the ability to track students' progress in the learning process. Evaluation results from these techniques lead to increased training.[26]

Evaluation scale is a mechanism for assessing achievement levels (points). Rubric is a special type of evaluation scale that describes the activity or outcome in an increasing quality continuum. It answers two key questions: “What should I evaluate (object, content, aspects, parties, features)?” and “How to know the characteristics of low, medium and high achievement levels?” With the help of rubrics, the students' knowledge levels are identified and converted into an appropriate assessment system.[27] The study highlights the advantages of rubrics for teachers and students.

One of the special tools that play a motivating role in the student's personality is portfolios.

Portfolios are more interesting in elementary school. The portfolio reflects the achievements of the primary school student in various fields - in the learning process, in the creative, social, and communicative field. A student should not be assessed with a "dry" mark set in the diary. His portfolio should reflect the "success story" to track a student's personal development.

Pedagogical experiments.

We considered it necessary to verify the facts gained from long-term experience of studying the scientific and pedagogical and methodical literature in the elementary grades in the pedagogical experiment.

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[26] Shakirov R.H. and others. Expanded Flying Paths / Methodology, Kyrgyz Academy of Education. Bishkek: Education, 2012, 80 p

[27] National Institute for Educational Assessment, Hans Kuhlemeier, The Netherlands (Cito), 48 p.

The aim of the pedagogical experiment was to test the effecttiveness of the methodological system created to ensure the mathematical and general development of primary school students, and how it affects the quality and quality of training.

It was possible to summarize the research without mass experimentation, because the synthesis of theory and practice was reflected in my work experience and many times in my personal experience I had experimented in my classroom and in the educational institution where I worked. However, we took into account the pedagogical experience in terms of how it would be more interesting and accurate to consider how the results might be changed, with the possibility of possible situations in different situations.

In our research, we sought to provide methodological solutions to the development and improvement of primary school mathematics teaching efficiency. Scientific and methodological literature on the issues raised was studied, comparative analysis was conducted, and the proposed proposals were scientifically justified.

Pedagogical experiment was organized in three stages.

Phase I, called determinant, identified the schools where the pedagogical experiment on the problem would be conducted, and the experimental and control classes, taking into account the fact that pupils, classrooms and teachers as a whole were of equal level. The city, high school, district, village and village schools were used to bring the results of the pedagogical experiment closer to reality.

A survey was conducted with teachers, pupils and parents to study the situation in the schools.

Not only a questionnaire survey for primary school teachers' work systems, but also the theoretical training of teachers involved in the lessons, Pedagogical and psychological skills, methodological skills, communication with students, speech, agility, and the status of classroom provision were studies.

In order to determine the level of students' readiness, teachers conducted a diagnostic evaluation in the classroom and conducted an oral survey.

Mathematics training has been studied and appropriate teaching material has been developed, and questions and tasks have been developed to identify general mathematical readiness to test the knowledge, skills and abilities of elementary school students in accordance with the elementary math program. Inspection materials, which are thought-provoking, logical, and simple, are designed for grades I-IV based on existing curriculum.

In order to study the baseline, the control works were conducted both control and experimental classes.

The study of the effectiveness of math training in elementary school is based on a whole process. Despite how effective the principles and methods of teaching are used in this process, the students still make a number of characteristic mistakes for a long time. As a result of the analysis, the character gaps in the students' knowledge were identified, grouped and summarized.

Pupils' interest in learning math is decreasing. Students have difficulty in mastering program material. The main reason for these shortcomings is that teacher is inexperienced.

In the course of the training, the reasons for this error were first identified in order to eliminate errors related to methodical errors committed by students, including teachers.

Phase II, called the pedagogical experiment, is based on the assumption of the study. The main objective of the training phase is to prove the effectiveness of the new methodological system.

At this stage, primary school teachers participating in the experimental classes were introduced with the necessary teaching material, familiarized with the content, teaching methodology and features of the new methodology (Prepared case studies with theoretical and didactic materials, validation studies, separate classrooms, with a description of the purpose, content, teaching methods, tools and form of teaching material for each course or several similar lessons) provided information on the types and content of the intended tasks.

The teachers were acquainted with the characteristics of the assessment system in the self-directed learning, its purpose and role

in the assessment, the principles for assessing student achievement and how to motivate and stimulate student activities in elementary school mathematics lessons.

Developing effective feedback from teachers, which is one of the most effective tools used to conduct formative assessments based on the modern assessment concept, familiarity with the design and significance of portfolios, mutual evaluation, self-evaluation, rubrics, methodology for their preparation and use, formative evaluation technologies, and the theories for their use.

In the phase III of the pedagogical experiment called the controller, the test case recorded in the deterministic experiment was partially changed and the results obtained in the control and experimental classes were compared.

In the experimental classes, the content of the test material for each class was determined, and a system of classroom activities was developed to check the students' knowledge, skills and abilities, and results were analyzed.

At this stage of the pedagogical experiment the following objectives are set:

1) How the students mastered the materials of the new methodology;

2) As a result of the introduction of the new methodology, the development process is slow or rapid;

3) How the assessment of students' knowledge based on the modern assessment concept influences their interest and motivation in the learning process;

4) Whether teachers' use of information and communication technologies and interactive learning methods to achieve high-quality training in math lessons has influenced the effectiveness of the training;

5) Have students improved their computational, geometric, graphical-measuring, combinator, and logic issues;

6) Does interdisciplinary communication and heuristic dialogue in math teaching improve students' creative thinking and creative abilities as a means of enhancing classroom effectiveness?

7) Can students independently use elements of statistics and probability theory that are new content lines?

The results for each phase of the pedagogical experiment were based on mathematical statistics elements and were presented in tabular form.

Comparing the performance of experimental and control classes based on the numerical facts in the tables, it becomes clear that students in the I-IV grade math learning process are using spatial imagination when teachers use the modern methodology of assessment, develops mathematical and logical thinking, mathematical speeches, developing and using statistical tables, solving various life-related problems and acquiring knowledge independently.

Our research allows us to draw the following conclusions:

The new educational policy of the independent Republic of Azerbaijan was defined by our great leader Heydar Aliyev in the words “Education is the future of the nation” and its essence is expressed in three important points:

- study of the gained experience and the basics of progressive traditions;

- dissemination of best practices of developed countries of the world and uferring to them in the years of creation,

-inadmissibility of hurry in the ongoing reforms, the choice of evolution.

The structure of the education system, the material and technical base, the content, strategy and solution of the evaluation problems were the main focus of the study in the development of elementary mathematical education. The new curriculum enables the content of the elementary math course and their justification, ensuring the development and control of the student in the learning process, and the establishment of elementary mathematical education on democratic principles. A new system for assessing student achievement will

increase the effectiveness of training. So, efficiency and evaluation are complementary, and one is a condition for another.

Based on the long-term experience and research work in primary school, the study of scientific and pedagogical and methodological literature, and the results of the pedagogical experiment, we can reach the following conclusions:

1. Innovations in mathematics education - integration and computer technology, the introduction of new learning methods and the concept of modern assessment will make it possible to achieve significant success in elementary school students' mathematical preparation. Realizing the idea of integrating the content of secondary mathematical education form requires new content and new forms of training. In modern times, the school needs not only to "teach" and "teach" to learn students, but also to "formulate a desire to learn". The main focus point should be on the student's self-determination, self-organization and self-development. Under these conditions, to be considered as a dynamic phenomenon in the student, means to realize the goals. Based on the long-term experience and research work in primary school, the study of scientific and pedagogical and methodlogical literature, and the results of the pedagogical experiment, we can reach the following conclusions.

2. The effectiveness of the evaluation of learning outcomes in the maths teaching is determined by its principles, types and forms. Based on the pedagogical experiment we conducted the evaluation technology in accordance with the conditions and educational policies of the Republic, the specifics of existing educational institutions (schools) were taken into account. The use of original assessment technology is a leading factor in the development of students' mathematical knowledge, mathematical creativity and mathematical speech. Determining the level assessment standards and using different assessment tools to measure the levels of these standards will increase the effectiveness of the training.

3. The formation of a new personality in the new curriculum, its adoption as a subject of learning, and the application of this tech-

nology significantly enhanced the math lessons, taking into account the needs of the school to develop an independent creative mind, The mainstreaming of the student-centered learning approach has allowed us to improve a number of features of the curriculum model.

4. The "textbook policy" plays an important role in the general education system. The math textbooks of the elementary grades developed at the national level do not yet fully meet the modern requirements of the student and his level. In the structure and content of mathematics textbooks, the methodological development of individual topics, the observance of mathematical terminology requirements, the use of new "concepts" that are not accepted and not included in the Azerbaijani language, flaws and errors in the sequence of the introduction of mathematical concepts - indicates that the problem of math textbook in our country is not fully resolved.

5. Modern electronic technologies have entered every area of our lives. This also calls for upgrading the methods, forms and means of implementing modern mathematical education. Because mathematics, as a science, differs from other sciences by its abstractions and its wide application in life. These features should be taken into account in the content and relevance of I-IV grades to math.

6. The functions of the teacher in modern education, including in mathematical education and in its implementation, have changed significantly in science and methodology, and this is determined by the tasks of the modern student in the learning process. As a leading figure in elementary school mathematics, the teacher should select appropriate mathematical exercises to activate the students and make extensive use of differentiated learning, taking into account their heuristic features. The contents of this work also include the implementation of interdisciplinary and intradisciplinary relationships and play an important role as a factor in improving the effectiveness of training.

7. The modern elementary teacher should be distinguished by special qualities: be able to see the future problems of high erudition and education; be able to use modern teaching methods and forms of

training in an integrated and dynamic way, be aware of the positive developments in world education by following the pedagogical press. These qualities are based on our research.

8. It is more desirable to establish a modern math structure and a non-standard form of training to enhance the effectiveness of the training. It is in these types of lessons that students' research skills and abilities develop, logical thinking develops, and students learn to summarize and summarize their thinking. Three problems taught by the mathematics teaching methodology: 1) What do we learn? 2) Why do we learn? 3) How do we learn? finds its application in the modern lesson, and in its reflection phase - all stages of the learning process are analyzed again and briefly.

9. The quality of the currently-needed and widely used developmental training is determined by modern principles of effectiveness and forms of evaluation of learning outcomes. The general principles of the system implementing this training should be identified. The common ground is determined by the interconnection of didactic and methodological principles.

10. Proper use of up-to-date training methods and assessments can play an important role in increasing the effectiveness of training. Mathematical learning objectives (theoretical, practical, educational, and general development) involve the development of students as an intellectual, and the realization of these goals requires the application of teaching methods. In pedagogical practice we believed that this was true.

11. The teacher-student attitude and the psycho-pedagogical aspects of the learning process are very important.

The transfer of mathematical knowledge - the development of mathematical understanding - demonstration, perception, imagination, formation and development of understanding - goes through psychological stages. This process is closely related to the individual psychological characteristics of each student. Therefore, the psychological and pedagogical knowledge of each teacher should be united

in the form of unity. The psychological aspect is an integral part of every training.

12. Improving the quality of education depends on three key factors related to teachers: the selection of people who are suitable for profession of a teacher, the preparation of a “good teacher”, and the social needs of teachers.

13. The introduction of computer technology into training is a requirement of the day, development. The use of electronic techniques enhances the students' positive motivation for learning, the intensity of the learning process, and enhances their thinking activity, improves the quality of material assimilation in terms of visual resources, thus saving time, allowing students to master the program material at a high level. Information and communication technologies are a positive influence on improving the quality of the learning process.

14. Comparing the indicators of experimental and control classes based on the numerical facts in the tables as a result of our pedagogical experiment, it becomes apparent that students using the methodology system offered by teachers in the I-IV grades math learning process:

- spatial imagination and thinking of puples develops and this development is relatively rapid;
- Forms and develops mathematical abilities;
- Forms knowledge, skills and abilities to create and use statistical tables;
- Increase and develops the skills of computing, geometry, graphing-measuring, combinatorial and logic-solving;
- the mathematical knowledge they acquire is reflected in real-life situations;

15. Assessment of knowledge on the basis of modern assessment concepts, especially using formative assessment technologies, is of interest in the learning process; The use of information and communication technologies and interactive teaching methods to achieve high-quality teaching in math classes enhances the effectiveness of training. The presented recommendations, electronic, theoretical,

methodological and didactic materials are welcomed by the pedagogical community.

16. Based on the analysis of the results of the pedagogical experiment using mathematical statistical methods, it was found that the methodology we use in mathematics training is effective. The ability to master knowledge increased by 12,6% and quality by 14%.

The following research proposals can be made:

1. Positive motivation is the basis of a good course, encourages each student's self-development in the classroom, especially as a driving force of interest in math. Directing the teacher's work to build the structure and form of the classroom up to modern requirements, with a purposeful and appropriate level of classroom development, to enhance students' interest in the lesson and cognitive activity, it is necessary to use the “Technology Map of the Lesson” scheme, which increases the flexibile and freely planning the course.

2. When comparing the content of the standards of grades I-IV to the content of the mathematics teaching methodology in the elementary grades, it is clear that those requirements do not include a number of important mathematical concepts, information is properly distributed in the classroom. To this end, mathematics standards should be improved, standards of expression should be clarified, and content should be disclosed.

3. Science and methodology of elementary school mathematics textbooks cannot be considered successful due to the following disadvantages:

1) The principles of succession and consistency in the structure of the teaching material are violated;

2) Students' knowledge, skills and habits regarding oral computing methods are incomplete;

3) Problem solving training algorithms for problem solving in each classroom were not given systematically and do not, in some cases, help students to judge. Pupils are not acquainted with specific types of accounting issues;

4) Definitions of arithmetic operations are distorted in calculations;

5) The axiomatics of arithmetic operations over quantity are distorted;

6) A number of accepted mathematical terms are replaced with fictitious words or expressions without any basis;

7) The principle of distribution of mathematical material by classes is violated;

8) Elements of geometric figures are called with fictitious terms.

In general, math textbooks need to be revised and experts should be involved.

4. In the process of learning mathematical concepts in the elementary grades, lessons should be built according to the visual-inductive, generalization and abstracting scheme, in accordance with the process of understanding.

5. Incorporating elements of statistics and probability theory into the elementary school maths course helps to develop the mathematical thinking of younger students and to address various life-related problems. In mathematics, it is necessary to improve the standards regarding statistics and probability content line, and to clarify relevant concepts.

6. Implementation of problem-based learning in the elementary grades is the most effective learning technology that students can acquire in an independent, creative search for knowledge. Successful acquisition of knowledge, development of mathematical speech of students, expansion of opportunities for use of mathematical dialogue between teachers and pupils, development of students' thinking and creative abilities should give priority to problem-based learning technologies.

7. A wide range of extracurricular activities (mathematical games, quizzes, crosswords, Olympics, team competitions), along with a wide range of independent, rich, exciting, entertaining and thought-provoking tasks that are considered to be the most important tools for improving the effectiveness of math.

8. Elementary teachers should use a variety of didactic materials and teaching materials, not just government textbooks, to achieve a high level of learning. To this end, alternative textbooks for the selection of teachers should be published and schools - teachers should be given the freedom to choose these books.

9. Assessment should not only be a factor that reflects a student's level of knowledge, performance, or achievement, but should also encourage him or her to develop and work hard. Formative assessment - enables students to understand and track their own achievements, to plan future steps with the help of a teacher, which in turn has a positive impact on the quality of education. The teacher should use the formative assessment tools provided to track students' independent work in the math classes and control the process of mastering:

10. It is necessary to develop an army of teachers, constantly developing and developing the skills of peers to analyze and summarize, apply effective methods and tools in their own practice, regularly monitor scientific innovations, use them for training purposes, gain methodological creativity and research tasks. It is time to create a pedagogical community to train and develop primary school teachers.

11. People who love music and fine arts take their talents exams when they enter universities. We recommend that future teachers who wish to enter the Pedagogical Universities under the same procedure also pass the Ability Exam. It is important to keep in mind that unless there is a teacher who loves his art, there will be no learner to study.

12. Mathematics is one of the subjects that develops students' mathematical thinking and cognitive activity, and most importantly, mathematics. The content of modern education provides a great opportunity for students to develop their reasoning and thinking. We propose to create an authorized council of experts in the field of mathematics teaching, prominent scientists and methodologists at the national level, to study the state of mathematics training in order to increase the emphasis on mathematics education and the development of mathematical culture.

13. Pedagogy is not scientifically stable, it is constantly evolving. As time goes on, more extensive research is needed to improve the effectiveness of math training.

14. The time has come to construct and present to teachers the methodical system of teaching mathematics teaching using modern information and communication technologies.

The results obtained and the suggestions made in the course of the research are both theoretical and practical in the development of elementary mathematical education.

The content and main provisions of the dissertation are reflected in the following published works of the author:

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