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ABSTRACT

of the dissertation submitted for the degree of Doctor of
Philosophy

**CREATION OF NEW COMPETENCY-ORIENTED
CONTENT AS AN IMPORTANT PROBLEM OF
MATHEMATICS TEACHING METHODOLOGY
(GRADES I-IV)**

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GENERAL CHARACTERISTIC OF THE STUDY

Relevance of the problem. The reforms carried out in the field of education in the Republic of Azerbaijan cover all stages and levels of education, where the primary education level attracts attention with its importance. For this reason, the process of modernization in the field of primary education was started before other levels of education. In the training process at the primary education level, which is an important and main link of the general education stage, successful work has been done in the field of application of innovations, pedagogical technologies, active learning method, competence-oriented and personality-oriented approach has been applied. Conflicts and crises in the field of education in the world made the competence-oriented approach in education relevant. Because the contradictions between the content of the educational program presented by the state, the demand of the society and the educational needs of the individual were becoming acute. In order to overcome these contradictions, a normative-legal framework related to education was created in Azerbaijan, trainings, seminars and trainings were organized for the purpose of creating competence-oriented content of primary education, foreign experience was learned and it was started to be applied in schools as an experiment. The reforms in the field of education founded by the great leader H. Aliyev in 1998 turned into a major movement in the early 2000s.) and important educational documents entitled "State Strategy for the Development of Education in the Republic of Azerbaijan" (2013) were adopted.

In an information society, in an era of widespread social networks and electronic means, formal knowledge of a person loses the essence of being an important capital. Although it is necessary to have knowledge, skills and habits in the modern information society, these are not enough, education should create new value as a result. In addition to having the ability to manage informative information, master new technologies, learn independently, search for necessary knowledge and use it effectively, people should have qualities such as universality of thinking, dynamism, mobility.

In the "*State Strategy for the Development of Education in the Republic of Azerbaijan*" it is stated that "*competencies are knowledge, skills and values acquired in the pedagogical process*"¹.

There are various classifications related to these competencies. The classification of education levels in the strategy is more elaborate. According to that classification, competencies are divided into 3 types: 1) competencies related to thinking (creativity, critical thinking, problem solving, independent learning; decision-making); 2) competences related to activity (communication, digital literacy, cooperation, financial literacy; information literacy); 3) values (a sense of national pride, personal and social responsibility, active citizenship, tolerance, multiculturalism).

The idea of a skills-based approach to education determines which learning outcomes are necessary for an individual. Improving efficiency and quality in education is related to the formation of students' competencies in one way or another. This does not require increasing the amount of information in the training process in the traditional way, but requires a competency-based approach, that is, the creation of new competency-oriented content. In recent studies, competence is presented as a unit of measurement of human competence. Competence is not a set of memorized knowledge, skills and habits, but the ability to act in various problem situations.

The concepts of skill-based education, competence-oriented education, personality-oriented education began to be actively discussed by Azerbaijani educators after the adoption of new normative and legal documents related to education in the country. In the discussions, formation of necessary skills (values) in the generation growing up in general education schools was justified. At that time, there was no serious study of the theoretical and methodological foundations of the competence-oriented approach in Azerbaijan. Most of the research conducted in Russia (L.F. Ivanova, A.G. Kasprjak, A.V. Khutorsky, P.P. Borisov, N.S. Veselovskaya, A.N. Dakhin, T.B. Tabardanova, I.A. Zimnyaya, I.D. Frumin, N.A.

¹ State Strategy for the Development of Education in the Republic of Azerbaijan. <https://president.az/az/articles/view/9779>

Perelomova) and Europe (R.B. Arnett, J. Raven (Great Britain), V. Vestera (Netherlands), K. Rogers (USA)) was cited. In the "Concept of general education in the Republic of Azerbaijan (National Curriculum)" (2006), the importance of forming basic competencies at the primary level of general education was highlighted. There has been considerable research on the competencies that elementary school students should acquire. M.C. Mardanov, A.A. Alizadeh, A.O. Mehrabov, F.A. Rustamov, H.A. Alizadeh, A.M. Abbasov, M.I. Ilyasov, L.N. Gasimova, I.H. Jabrayilov, A.A. Ahmadov and others. published books and articles on content creation technology.

In this regard, the book "Standards and curricula: theoretical and practical issues"² attracts more attention due to its practical importance. In this book created by a collective of authors, general issues of education (the concept of education, stages and levels of education, forms of education and education, state education system, integration in the education system, etc.), psychopedagogical issues of education (taxonomy and its types, A. Alizade's ³taxonomy, about education theories and b), educational standards (technology of standards development, activity and its types and b), educational curricula (characteristics, types of national curricula, subject curricula, purpose of training and b), purpose of training (pedagogical process, organization of the training process, standard and non-standard lesson, integrative methods, tools and resources used in the learning process, etc.) and evaluation of student achievements (essence, types, principles of evaluation, etc.) are reflected.

At the same time, teaching resources were prepared by individual authors based on the programs of the Ministry of Science and Education of the Republic of Azerbaijan on the recruitment and certification of teachers.

In the researches of mathematical methodologists (S.S. Hamidov, A.S. Adigozelov, A.G. Palangov, M.Kh. Asadov, M.A.

² Standards and curricula: theoretical and practical issues / scientific editor. A. Abbasov. Baku: 2016, 499 s.

³ Alizadeh, A.A. Theory and practice of taxonomy: the bright path of the modern school/A. Alizade, I.H. Sultanova. – Baku: ADPU, – 2008. – 173 s.

Alishov, T.M. Aliyeva, N.R. Abbasov, B.S. Jabrayilov, R.Y. Shukurov, Z.F. Kazimov, etc.) programs (curricula)" were reflected in the theoretical and practical issues related to the formation of the following learning outcomes in mathematics at the elementary education level.⁴ During the teaching of mathematics at the primary education level, students should perform simple calculations on numbers, use quantities (area, volume, length, time, mass) according to their purpose, perform measurements and calculations on plane figures, collect and analyze data, and mathematical modeling of the results. should be able to express with, and be able to state his probabilities regarding life events.

In the dissertation, we have reviewed the directions for improving the content of mathematics textbooks for grades I-IV by examining the textbooks and teaching aids prepared for the subject of mathematics at the elementary education level in Azerbaijan since the 90s of the XX century.

The problem of personalized education was also partially touched upon in the doctoral theses defended on the methodology of teaching mathematics in primary classes. In this regard, N.R. Abbasov, Sh.B. Binnetova, S.R. Badiyev, F.F. Mustafayeva, T.A. Mammadov, M.T. Rzayevin, Kh.Sh. In one way or another, the content of mathematics education at the primary education level was also touched upon in the dissertations defended by Alizade at different times.

In general, the problem of the content of education has always been one of the most important issues of didactics, and it still is. From year to year, the amount of knowledge is increasing rapidly, and what to choose from them to teach the growing generation, taking into account their age and individual characteristics, is one of the issues that concern didacts. If earlier at the primary education level, the main focus was on teaching and mastering the content of the program, now the approach and technology have changed. In

⁴ On amending Decision No. 103 of the Cabinet of Ministers of the Republic of Azerbaijan dated June 3, 2010, "On the approval of the state standard and programs (curricula)" of the general education level. <https://e-qanun.az/framework/46052>

modern times, it is believed that the content of education forms the expected results in the pedagogical process. The standards are defined in such a way that both the knowledge that students should learn and the activity that they should master are reflected here. Therefore, the content of education at the level of primary education is expressed in the form of results. One of the main goals in the "State Strategy for the Development of Education in the Republic of Azerbaijan" is related to the creation of new content. Here, "content creation of competency-based personalized education"⁵ is defined as the first strategic direction. The essence of this is that it differs from the traditional definition of the content of education (that is, the declarative description of materials). That is, competences that ensure the development and formation of the student's personality are given in the new content. These determined results are formed as a result of the pedagogical process. These standards, expressed as skills, attract attention with their integrative nature.

In the conducted studies, the creation of new competence-oriented content of mathematics education at the primary education level has not become the subject of scientific-pedagogical and methodical studies.

For this reason, we considered it important to write a PhD thesis on "Creation of new competence-oriented content as an important problem of mathematics teaching methodology (grades I-IV)".

The object of the study is the process of teaching mathematics at the primary education level.

The subject of the study is the problem of creating new competency-oriented content in mathematics education at the primary education level.

The purpose of the study is to investigate the theoretical issues of building competency-oriented content in mathematics education at the primary education level, to determine the essence of the concept of the content of competency-oriented education, to

⁵ State Strategy for the Development of Education in the Republic of Azerbaijan. <https://president.az/az/articles/view/9779>

reveal the current state of the content of mathematical education, to summarize the opinion of research scientists on the problem, to systematize the main principles, ways and means of competency-oriented mathematical education, and through experiments is to confirm.

Tasks of the study:

- to investigate the theoretical issues of building competency-oriented content in mathematics education at the primary education level;
- to determine the essence of the concept of the content of competence-oriented education;
- to reveal the current state of the content of mathematical education;
- to analyze the pedagogical-psychological literature related to the problem;
- to define the basic principles, pedagogical conditions, ways and means of competency-oriented mathematical education at the level of primary education;
- to check the effectiveness of the proposed methodology through experiments.

Research methods. The following research methods were used in writing the dissertation: 1) theoretical analysis (theoretical generalization, systematic analysis, modeling); 2) diagnosis (test, interview, etc.); 3) generalization of editorial experience; 4) editorial experiment.

The main provisions defended:

1) that the creation of new competence-oriented content at the primary education level plays an important role in solving the contradictions between the demands of society and the school and the educational needs of the individual;

2) that the improvement of the quality of education depends on the development and preparation of new competency-oriented content, along with knowledge, skills and habits, as well as the formation of relevant competencies in young schoolchildren;

3) that the formation of basic competencies in students at the primary education level depends on certain parameters

(completeness, openness, healthy psychological environment) and principles (humanism, cultural compatibility, freedom of choice, subjectivity) of the content in a specially organized educational environment.

Scientific novelty of the research. In the dissertation, the problems of creating competency-oriented content that ensures the formation of appropriate competencies and the functional mathematical literacy of students at the primary education level were explained, the main principles, pedagogical conditions, ways and means of competency-oriented mathematical education were determined, and the effectiveness of the proposed methodology was checked through experiments.

The theoretical significance of the study. Developing the technology for creating new competency-oriented content of mathematics at the primary education level, defining levels, criteria and principles for creating new content of primary education can enrich the subject of mathematics teaching methodology with theoretical provisions.

Practical significance of the research. Theoretical and applied considerations related to solving the problems of creating new competency-oriented content of mathematics at the primary education level can be used in the teaching of a new set of textbooks, teaching aids, didactic materials, teaching resources, teaching methodology of mathematics in higher education institutions that carry out the training of primary school teachers. The materials of the research are also useful for primary school teachers engaged in pedagogical activities.

Research approval and implementation. The scientific results of the dissertation were published in the number of journals requested by the Supreme Attestation Commission under the President of the Republic of Azerbaijan and 5 articles (including 1 article abroad) and 7 theses (including 1 thesis abroad) in the republic and abroad.

The organization where the dissertation work was performed. The dissertation work was prepared in the Department of "Theory and Methodology of Education" of the Institute of Education

of the Republic of Azerbaijan.

The total volume of the dissertation work. The introductory part of the dissertation consists of 12817, chapter I 109942, chapter II 73340, conclusion 4838 characters.

THE MAIN CONTENT OF THE DISSERTATION

In the introductory part of the dissertation, the relevance of the problem is justified, the object, subject, goals and objectives of the research, hypothesis, methodological basis, research methods, scientific novelty of the research, theoretical and practical significance of the research, the provisions submitted to the defense are interpreted, and brief information about the application of the results is given.

The first chapter of the dissertation is called "**Theoretical and practical problems of building the new competency-oriented content of the primary mathematics course**" and consists of three paragraphs.

In the first paragraph of chapter I entitled "**The essence of the concept of the content of competence-oriented education**", it is mentioned that the main success criterion of educational reforms is based on the demand in any country of the world for every citizen who studies in the relevant field in our country.

Recently, the terms "competency-oriented", "competency", "competency-oriented approach" are used more often. Their wide application can be justified by the need to modernize the content of education. The main results of the activity of the educational institution should not be only the system of knowledge, abilities and achievements. The main issue is the formation of a number of basic competencies in intellectual, legal, information and other fields in students.

Competency-based training methodology allows students to develop some individual skills faster than traditional training. For this reason, the learning process allows the student to acquire more complex individual skills, gain as much experience as they want. The student can then gradually master other skills based on the simple-to-complex principle.

What does it mean to master a competency? Competence acquisition depends on the field of study of any subject and the subject of research. For example, a rule that is repeated every time in a topic related to public safety does not guarantee that rule will always be applied in life.

Competency-oriented education is the acquisition of the behaviors, knowledge, and skills necessary to be successful in a job. The effectiveness of competency models depends on defining the skills expected of the student or learner.

The modern landscape of the world is changing. The fundamentality of education, which is not enriched with practical knowledge and skills, and has a purely theoretical nature, leaves the field. Life requires people to master more practical skills. In order to meet this demand, people should give priority to mastering the skills they have acquired on the basis of their necessary knowledge, they should have more vital skills and abilities to be formed as a personality. For this, first of all, the work of searching for changes in the content of education should be continued, and its modern content consisting of competencies should be created. This is defined as one of the priority directions in the "State Strategy for the Development of Education in the Republic of Azerbaijan". The creation of new competence-based educational content at all levels and levels of Azerbaijani education is set as an important task. Experience shows that as a result of scientific and technical progress, innovations and modernizations, education of a purely theoretical nature, which is not enriched with practical knowledge and skills, is losing its fundamental importance. From this point of view, in the formation of the content of education, along with academic knowledge, the importance of practical skills and competence should be highlighted. The content of education should be developed with technological knowledge, while the comprehensive formation of the personality is a priority in the field of general education, the current and future requirements of the labor market should be taken into account in primary, secondary and higher education, and all subjects offering jobs in the labor market should become stakeholders, regardless of whether they are public or private.

Classical pedagogy shows that the content of education is understood as a system of knowledge, skills and habits. This idea, which was said for the school of memory, is losing its relevance and gaining a new meaning, a new essence. In the "State Strategy for the Development of Education in the Republic of Azerbaijan" approved by the Resident of the Republic of Azerbaijan, the necessary goals for the creation of a new education system in the country were adopted as a continuation of the Education Reforms. One of them is the creation of new content. It is stated in the strategy that "The first strategic direction is aimed at the creation of personality-oriented educational content based on competence and expresses the important goal of developing curricula for all levels of education, including pre-school, general, first-level specialization, secondary specialization and higher". Therefore, the first strategic direction was defined as "creating personality-oriented educational content based on competence".

In the second paragraph of Chapter I of the dissertation, it is called "**The introduction of the problem in the editorial-psychological literature**". It is noted that different ideas about the concept of "competency-oriented education" have been put forward in different periods in the pedagogical literature, and until now there is no universally accepted vegan definition of the concept of "competency-oriented education" in the methodical literature. In the literature, it is shown that several directions are distinguished in the psychological-edagogical characteristics of this concept:

1. Using the concept of "problem situation" as a starting concept;
2. Explaining the concept of "competency-oriented education" as the purpose of the subject's activity within the current conditions;
3. Viewing "competency oriented education" as a logical result of the problem situation;
4. Alignment of the concept of "competency oriented education" with the problem situation.

It is shown that regardless of the fact that there are different views on the concept of "competency-oriented education" in editorial literature, all authors consider it as a complex process, the practical

application of problem solving in the elementary school's management course; in-depth study of theoretical material; they especially appreciate the idea about the development of cognitive activity.

Regarding the research, researches of Azerbaijani scientists B.A. Aghaev, A.S. Adigozelov, S.S. Hamidov, A.A. Guliyev, A.G. Palangov, T.M. Aliyeva, B.S. Jabrayilov, M.M. Ashurov, N.R. Abbasov, S.R. Huseynova, F.S. Suleymanov and others are analyzed and the attitude to them is reported.

The quality of mathematics training is determined not only by the strength and depth of students' assimilation to the system of mathematical knowledge, skills and habits, but also by the level of their independent assimilation to sciences using mathematical knowledge, skills and habits. It is known that the process of solving a specific scientific problem can be divided into the following main stages:

- solving the problem;
- distinguishing the problem from other problems;
- elimination of all cases where the problem is related to other problems;
- planning the search for a solution;
- selection of the most probable hypothesis;
- planning and conducting experiments, if required, for the study of the thesis;
- justification of the obtained results;
- choosing the optimal solution method;
- investigation of the possibility of transferring the obtained results to other situations, etc.

At the same time, it is noted that as a result of many discussions with the editors, competence is considered as educational results that are not combined in a simple combination of information and skills and focus on solving real problems.

Thus, it is clear that the authors have a contradictory understanding of the nature of the content approach to education, its essence is contradictory, and the definitions of its components and components are contradictory.

The third paragraph of the first chapter is called "**The current state of the content of mathematics education in primary schools**". It is noted that mathematics occupies a special place among the subjects taught in other schools. Although there have been a lot of recent reforms in mathematics education, and many things have been done in the field of updating the content and methods of education, there are still many problems that are still waiting to be solved.

In the era of information abundance, it is the most difficult and responsible stage to correctly determine what we want to teach our future students. The question "What kind of knowledge can form our future students' achievements that are important for their lives?" has always made us think. Answering this question correctly is an important step in developing a correct, competency-oriented mathematics program. The program should be set up from simple to complex, from easy to difficult, taking into account the age characteristics of students, concentricity.

At the same time, the level of development of abstract thinking of elementary school students must be taken into account according to their age. Anticipating the level of visuality is very important, especially in the design of elementary school mathematics textbooks, according to the age limits of the students. In the school experience, in the process of teaching mathematics, little importance is attached to the development of generalized theoretical (abstract) thinking in students. In some cases, the reasons why students are behind in mathematics education are associated with abstract mathematical knowledge. It is necessary to take into account that the foundation of mathematics is laid in primary classes. The formation of abstract thinking in 6-10-year-old students is educationally sought.

Non-operative concrete thinking is a form of thinking characteristic of preschool children and young school children. Such children have thinking based only on visual images. Researched psychological experiments show that young schoolchildren do not understand concepts and their knowledge of the world around them is at the level of imagination. The importance of oratory concrete thinking in preparing students to understand abstract concepts is invaluable. Practical activity of a young schoolchild plays a crucial

role in the formation of independent mental activity. Therefore, visualization is important in teaching mathematics in lower grades.

When we look at the construction of teaching units (sections) in the current elementary school mathematics textbooks, we witness that the mentioned principles are not taken into account. Analyzing the taught sections, it is determined that the "Geometric figures" section is the one that is more easily understood and mastered by the students, and that they have the most knowledge by school age.

In our current primary school mathematics textbooks, the teaching process begins with the section "Numbers and operations". Number as a concept is abstract to the elementary student, and we load students with abstractions as we begin the school year with this abstract unit. The next section is Algebra and Functions and again abstraction and complexity. Section III is "Geometry", a section that is more understandable and full of visuals. After two difficult and abstract sections, students move on to a more visual and easier section. This creates a gap and violates the principle of easy to difficult and simple to complex.

Those who are educated should be given the knowledge that can be applied in the future life of the person, the acquired knowledge and skills can be turned into competence. If the knowledge given to the student does not play the role of a base and foundation in the creation of new knowledge, or if it is not applied in the fields of practical activity, this knowledge can never serve to think creatively. It has been determined by the studies conducted in the field of education that more than half of the ready theoretical knowledge given to students is not used in their future lives and practical activities. This approach to the content of education has already lost its function. If the student is given ready-made knowledge and this is not applied in practical life, in Western education science, this approach is not considered an act of thinking, but an act of memory.

Since the beginning of the development of human consciousness, "textbook" has been one of the issues of special importance for people. It is the same today, and it will be the same tomorrow. Because the main goal of the textbook is to develop a

personality - a perfect person. Therefore, if we say that "textbook" is a strategic issue of the state, we are probably not wrong. After all, our children, who are our future, get a significant part of the necessary knowledge, skills and habits from these books and are formed on this basis. Textbooks are improved, renewed and perfected from time to time depending on the requirements of the time and the ideals of the society.

Chapter II of the thesis is called "**Technology of realization of the content of competence-oriented mathematical education**". In the first paragraph of the second chapter called "**The main principles of competence-oriented mathematical education in primary grades**", it is noted that didactic principles are taken as the basis when developing the content. Didactic principles are considered as important requirements for the organization of the educational process, its content, forms and methods.

The objectives of mathematics education determine its content. The content of mathematics education in secondary school must meet the following important requirements:

1. General education should be important and form a progressive outlook;
2. Should make the application of mathematics in technology and production;
3. Must ensure completion of secondary education and receive higher education;
4. It should create an opportunity to apply mathematical knowledge when it is solved.

In the methodological literature of mathematics, the following didactic teaching system is accepted:

1. Scientific research in mathematics education;
2. Conscious assimilation, activity and independence in mathematics education;
3. Relevance in mathematics education;
4. Visibility in mathematics education;
5. Individual approach in mathematics education;
6. The principle of systematicity and consistency in mathematics education;

7. The strength of knowledge in mathematics education.

The second paragraph of chapter II of the dissertation is called **"Ways and means of forming mathematical skills"**. It is indicated that the primary school curriculum forms part of the secondary school curriculum. Therefore, studying mathematics in grades I-IV should be considered as the first step in the complete mastery of school mathematics. Most of the issues related to the secondary school curriculum are laid in the elementary grades. Therefore, the good establishment of education in primary classes generally takes an important place in the successful study of school mathematics.

The curriculum of the subject of mathematics is a result-oriented educational program that has been implemented in general education schools since 2014 and combines issues related to the subject's content (content standards), organization (teaching strategies) and evaluation (evaluation standards).

The content of elementary school mathematics is grouped into five areas, and these areas are called content lines. Each content line is an area taught by mathematics.

1. Numbers and actions
2. Algebra and functions
3. Geometry
4. Measurement
5. Statistics and Probability

The content of the subject is expressed in the form of standards. A content standard is essentially outcome-based and contains specific knowledge and skills to be mastered. The knowledge component specifies what will be taught, and the skill component specifies how to demonstrate what has been learned.

"Pedagogical experiment and its results" is the last paragraph of chapter II.

In order to verify the accuracy of the hypotheses put forward in the dissertation and to determine the effectiveness of the proposed methodology in order to increase the cognitive activity of students with competence-oriented mathematical education in elementary grades, an editorial experiment was conducted in stages covering the years 2016-2021.

In the first stage, called the determinant experiment (2015-2017 academic year), the purpose of the study was to study the situation in the process of competency-oriented mathematical training in the direction of increasing the cognitive activity of students, to determine the theoretical and methodological foundations for solving the problem posed, to formulate and express the working hypothesis of the study, select experimental and control classes, ensure that the level of students and teachers in those classes is approximately equal, and study the level of classes in terms of the subject of the study by written or oral means conducting questionnaires and interviews to identify the difficulties faced by teachers in solving the problem of increasing the cognitive activity of students by solving mathematical problems.

In the second stage, which is called the teaching of the editorial experiment, in order to fulfill the tasks set in the research, a teaching-research work was conducted on learning and mastering the methodical system on the possibilities and ways of increasing the cognitive activity of students through solving mathematical problems in primary classes.

During the experiment, the content of the methodical system proposed by us and the opinions on the teaching methodology were conveyed to the teachers working in those classes, they were provided with the necessary teaching materials. The teachers working in the control classrooms were informed about the purpose of the experiment, but were not given any additional information about the study.

The experiment was conducted both in city schools and in rural schools - Baku city, Narimanov district No. 57 and 82, Yasamal district No. 20 and Khatai district No. 265 full secondary schools, Guba district Khaltan village school I-IV grades. 1 experimental and 1 control class were selected in each school where an experiment was sought. The third stage (inspection) of our pedagogical experiment covered the years 2019-2021. At the last stage of the experiment, the main goal was to test the effectiveness of the proposed methodology for forming and developing problem-solving skills (standard and non-standard) in elementary school students, and increasing their

cognitive activity through mathematical problems. For this, after learning the program material in the experimental classes, additional test material was given, and based on that material, tests were conducted in both the experimental and control classes.

The results obtained at each stage of the editorial experiment were analyzed by the statistical method given in the methodical literature. At this time, as a research method, at a certain stage of training, both experimental and control classes were used to search for an examination based on the same material, and to study the level of knowledge, skills and habits of students in a comparative manner.

In connection with the experiment we conducted, studies were designed to determine the initial level of the formation of mathematical skills in students in mathematics education of grades I-IV.

It is clear from the experiment that the numerical average marks obtained by the students of the experimental classes are higher than the numerical average marks obtained by the students of the control classes, the percentage of success increased by 11.9-13.2%, and the percentage of quality increased by 26.3-32%.

According to the analysis of the performance of the verification tasks conducted during the experiment, we identified the following 3 groups according to the level of formation of mathematical skills of I-IV students:

1. Poor students. Students belonging to this group do not take the initiative and are not active in solving research-related works, cannot think logically in problem situations, cannot conduct experiments and draw conclusions, cannot propose and justify hypotheses, do not have research skills and habits, do not have an interest in searching, cannot choose research methods, cannot give scientific comments, they read with "2" and "3" grades.

2. Intermediate students. Students belonging to this group are able to learn new material independently, feel like researchers in mathematics classes, are active in collective problem solving, are able to collect, analyze and summarize material, have the ability to ask questions, make reasoning, have the ability to observe, seek they are interested, they read with "3" and "4" marks.

3. High-level students. Students included in this group can independently explain new facts, events and regularities, look at the same fact, event and regularities from a new point of view, apply scientific methods of research (analysis, synthesis, mathematical modeling). find several solutions to the problem, choose the most effective one, conduct an experiment, propose and justify a hypothesis, evaluate their research work and the research works of their friends, read with "4" and "5" grades.

From the analysis of the conducted test experiment, we received the following results:

1. If the student gets what he wants when solving a non-standard or fun work, then he is creative and interested in other work, mastering the work he solves for a long time and more firmly, and thus students develop mathematical skills.

2. Being able to successfully apply personality-oriented tasks in mathematics lessons requires every primary school teacher to have high pedagogical skills, to take into account the level of intellectual development of students, and to use their creative abilities effectively.

3. Solving personalized tasks is based on cooperation. During the lesson, each student in the class demonstrates his or her own special individual knowledge and skills, and at this time, knowledge and ideas are exchanged between the students in the class. This, in turn, leads to an increase in the cognitive activity of students.

4. It is effective to use solving of type, heuristic, non-standard and entertaining problems to form research activity in elementary school students.

5. The research activity of elementary school students contributes to the creation of the following knowledge and skills:

- independently explain and prove new facts and regularities;
- to classify, compare, analyze, generalize previously studied phenomena, regularities;
- conducting an experiment, hypothesizing and justifying;
- to look at the same facts and events from different points of view;
- apply scientific methods;

- finding several options for solving the problem and justifying the most efficient one.

- improving the quality of mathematics education;
- development of students' logical, critical, creative thinking, as well as formation of problem-solving and decision-making habits;
- increase in students' cognitive activity;
- formation of problem-solving abilities;
- formation of students' independent research skills;
- inculcation of mutual respect and cooperative habits;
- increasing interest in the subject

This proves the truth of the hypothesis put forward in the study.

Result:

1. In the modern era, practical knowledge and skills are preferred in the formation of the competence-oriented content of mathematical education. Mathematical competence is the ability to effectively apply acquired knowledge and skills. Competence-oriented education serves the development of society more efficiently.

2. Competency-oriented approach implies that students acquire knowledge and skills not separately, but in a complex way. In this regard, the system of teaching methods is defined differently. Competency-oriented approach helps students to develop life skills. Mathematical competences are the important ability to structure data (situations), to distinguish mathematical relationships, to create a mathematical model of the situation, to analyze and change it, to interpret the obtained results.

3. The main issue in the formation of competency-oriented content is the modeling of practical educational information. The formation of basic competencies in students creates conditions for stimulating the teaching process at school, helps to deepen and expand the sphere of cognitive activity of students.

4. The formation of basic competencies allows a modern person to understand the situation and achieve results in a professional life in a time when the dynamism of modern consciousness is increasing. The organization of competency-oriented classes for the development of creative thinking, not mechanical memory, increases initiative in

students, creates interest in learning, improves the quality of training, and increases efficiency.

5. In the process of competence-oriented education, students develop the following skills: work on textbooks, focus on observation, use natural phenomena, information tools, technical tools, cooperate with people, take action from events, make independent judgments, be able to apply knowledge, acquire independent knowledge, commenting on what they have learned and heard;

6. To acquire mathematical competence, students must be able to follow procedures and algorithms quickly and accurately, use multiple strategies to solve problems, communicate their thoughts, understand the importance of mathematics, and believe that they can learn it.

7. The creation of new competence-oriented content at the primary education level plays an important role in solving the contradictions between the demands of society and the school and the educational needs of the individual. Improving the quality of education depends on the development of new competency-oriented content, along with knowledge, skills and habits, as well as the formation of relevant competencies in young schoolchildren.

8. The formation of basic competences in students at the primary education level depends on certain parameters of the content (completeness, openness, healthy psychological environment) and principles (humanism, cultural compatibility, freedom of choice, subjectivity) in a specially organized educational environment.

As a result of the research, we consider it appropriate to implement the following **proposals** in order to improve elementary mathematical education in the conditions of competitive education:

1. Countries with good experiences in teaching mathematics in primary classes (Finland, Turkey, etc.) should study their successes in this field in a comprehensive way, and implement assessment systems such as RISA, STEM, TIMS, PIRLS in educational institutions of Azerbaijan.

2. It is important to develop new curricula in mathematics for the primary education level, taking into account the age and

comprehension ability of students.

3. To determine the methods of formation of logical and algorithmic thinking style in students;

4. To ensure inculcation of mathematical language and mathematical modeling methods in students;

5. To determine directions for improving mathematical memory in students.

The implementation of the above-mentioned suggestions, especially the application of evaluation methods such as ПИСА, ТИМС, РИРЛС in the assessment of mathematical knowledge, will create conditions for the faster development of competence-oriented mathematical education. At the same time, the application of such programs requires students to have a special mathematical memory, and here the main issue depends on the form in which the teacher teaches that mathematical knowledge, from simple to complex and in a simpler, understandable way. We think that the successful implementation of the mentioned proposals is the best way to encourage the development of competence-oriented mathematical education.

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

1. Issues of organizing competence-oriented training in primary classes // Preschool and Primary Education, Scientific-methodical journal, 2016, №1 p. 46-49
2. A new competency-based math program and textbook challenge in elementary grades // Materials of the All-Republic scientific-practical conference on “Pedagogical approaches in education: experience of the past and vision of the future” dedicated to the 93rd anniversary of the birth of our national leader Heydar Aliyev; May 4-5, 2016, 2016, p. 167-169
3. Current status of mathematics education content and textbooks in elementary grades // Materials of the XXI Republican scientific conference of doctoral students and young researchers October 24-25, 2018, p. 196-199
4. The concept of the content of competence-oriented education // Materials of the republican scientific conference of master's,

- doctoral students and young researchers on “Heydar Aliyev and the youth of Azerbaijan”. BSU, 2017, p. 65-66
5. Basic competences to be acquired during the training process // The great czech educator Jan Amos Komensky: A classic and modern approach to education international conference, BSU, April 4-5, 2019, p. 210-213
 6. The role of non-standard tasks in the formation of mathematical skills // Dedicated to the 96th Anniversary of the National leader of Azerbaijan, Heydar Aliyev III International scientific conference of young researchers BEU, April 29-30, 2019. p. 10-13
 7. The importance of creating new mathematical content that will build competencies // Materials of the Scientific-Practical Conference of Young Researchers of Western Caspian University, 2019, p. 281-283
 8. Competency-oriented organization of elementary mathematics content and application of situational problems // The X International scientific symposium dedicated to the 880TH anniversary of Nizami Ganjavi “ Science and Education yesterday, today, tomorrow”, 2021, p. 253-258
 9. The main aspects of competent mathematical education in primary school // Web of Science, 2021
 10. Types of competences and ways of their formation // Azerbaijan Girls University, Scientific works, Volume 12 №3, 2021, p. 162-170
 11. The role of problem solving in the formation of mathematical skills // Curriculum, Scientific-methodical journal, Volume 14, №4, 2021, p. 59-63
 12. Content based on Singaporean mathematics and competence // Tavri National University, material of the international scientific and practical conference, “Innovative scientific research in the field of pedagogical and psycho-educational sciences”, 2021, p. 13-16
 13. The place of the new competence-oriented content in the personality formation of students // Scientific works of the Institute of Education of the Republic of Azerbaijan, №2, 2022, p.27-32.

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