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MATHEMATICAL EDUCATION AND SCIENCE IN THE CHECHEN REPUBLIC: STATE AND PERSPECTIVE

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Abstract

Mathematics education and mathematical science in the USSR were the level which other countries aimed to achieve.

The development of mathematical education and mathematical science in the Chechen Republic has a history of almost a century, but still does not have an analysis of the education system, functioning, results achieved, evaluation of successes, consideration of shortcomings, there is no elaborated line for further development of mathematical education and mathematical science in the republic. The main research works analysis of scientists-mathematicians in the republic, the analysis of the state and conduct of research works, as in the field of general secondary education in the direction of mathematics, vocational education and mathematical science development, has not been carried out. It follows that all work should be studied, systematized and further ways of improvement should be determined. The article attempts to carry out such work on the basis of the available factual material obtained from various sources. The task of the study is to consider issues related to the history of the system formation of mathematical education and mathematical science in the Chechen Republic in the twentieth and early twenty-first century, basic statistical data, problems that need to be solved and prospects; to determine the reasons for the unsatisfactory state of affairs in mathematics teaching in the schools of the republic, as well as in the institutions of general and vocational education in the republic; and some ways to problem solution have been suggested.

1. Introduction

Mathematics is the universal language of all sciences, which determines its special position. The attitude toward mathematics, understanding its role and significance show the future development of society in the modern world. Other sciences are also important, but they all converge on mathematics. Mathematics is the central nerve, aorta and artery of human civilization and the basis of any science.

Mathematical education has always been a problem. Today it seems to be a serious task on a national scale. First we will give a few quotes.

"The quality of schoolchildren's knowledge is terrifying, and there is not even hope for improvement. This fact has recently been recognized by top managers, for example, the Deputy Minister V. Bolotov" (Sadovnichy, 2010, p. 4).

The report of the rector of Moscow State University named after M.V. Lomonosov at the All-Russian Congress of Mathematics Teachers at Moscow State University is said "Mathematical education is going through hard times" (Sadovnichy, 2010).

The level of regional mathematics education in a multinational country, which is Russia, is an integral and essential component of the single country preservation; the factor affecting national security. Practice shows that high-quality mathematical education is usually the privilege of large cities - Moscow, St. Petersburg, Novosibirsk, etc. Besides other factors, modern technologies give the opportunity to achieve the same level in the regions.

Naturally, the development of regional mathematics education requires special attention and separate analysis. As a rule, the regions where mathematical science and education are put on the proper level are powerful industrial centers. These two factors do supplement each other.

In this regard, the development of mathematics and the formulation of mathematical education in the national subjects of the Russian Federation are of great interest.

The USSR education system, and, in the Chechen Republic as its constituent, can be the subject of analysis, beginning in 1930, when compulsory primary education was introduced by law.

Studying of the Chechen Republic history of mathematical science formation and development, as well as the system of mathematical education as a whole, being insufficiently studied, can permit to build models for its improvement, to organize research work on improving indicators.

2. Problem Statement

The problem of the history of the formation and development of mathematical education and mathematical science in the Chechen Republic has not been studied, and has not even been systematized. The article provides some factual material that allows assessing the state of general secondary, vocational education and mathematical science.

3. Research Questions

The subject of the research is the state and history description of the formation and development of mathematical science and mathematical education in the Chechen Republic.

4. Purpose of the Study

The purpose of the work is to update the problems of mathematical science and mathematical education development in the Chechen Republic based on the consideration of some issues related to the history of the emergence and development of mathematical science and mathematical education in the region, systematization of available data, analysis of the reasons for the low quality of general secondary and professional mathematical education.

5. Research Methods

The analysis of pedagogical, educational, methodical literature, statistical data and other factual material available on the topic was carried out by general logical methods (analysis, synthesis, deduction, etc.).

6. Findings

For the state review of the mathematical education and mathematical science level in the Chechen Republic, we take the following parameters as a basis:

А) USE results in mathematics; Б) study in SESC named after A.N. Kolmogorov or the similar, including in the area; В) participation results in mathematical competitions and other competitive events; Г) study on this specialty in the leading universities of the country; Д) the amount of candidates and doctors of physical and mathematical sciences, the republic representatives.

With obligatory participation in the exam, since 2009, the percentage of students who did not pass mathematics exam ranges within 10-15. This result remains the lowest in the country.

Relatively objective USE results in the republic can only be called from 2015. Without doing a more detailed analysis, we present only the following data on the USE results. An average score of those who passed the profile mathematics did not reach 29, who passed – 38:

The majority of those who received positive results are the result of tutors work. The school does not provide an adequate level and therefore a need to attract tutors appears.

There is information about only 2 students studying in SESC named after A.N. Kolmogorov for all the time of its existence. In the entire history in 1976, one student from the ChIASSR became the winner of the All-Russian Olympiad. Here is one remark: "The results at the international level mathematical Olympiad speak about the general level of education development in the country and the readiness of these countries to create and reproduce new technologies" (Agakhanov & Podlipsky, 2008). Graduates from the republic in the entire history of education studied in leading universities: 14 at Moscow State University, 4 - at Leningrad State University, 1 - MIPT. Studying on mechanical and mathematical, mathematical and mechanical faculties is meant.

According to the available data, in the country and abroad, the owners of candidate and the doctor of physical and mathematical sciences scientific degrees among the representatives of the indigenous nationality on mathematics and mechanics are about 30 people. Moreover, this number includes those who have passed away. Two barbaric military campaign have had a huge negative impact on the situation in the education and science sphere of the Chechen Republic, past on its territory in the last decade of the twentieth century and at the beginning of new twenty-first century.

All data speak about serious problems in mathematics education both in general and in vocational education. Among the positive facts, for the first time in the history of the republic it seems to be essential to note the mathematical school opening in 2015, which should set the grade both in the mathematical education level of schoolchildren and in the organization of mathematics teaching.

Education in Chechnya, as a direction in the social sphere, began to take shape as a system in the early twenties of the twentieth century.

The mathematics teaching at the national school was conducted in the Chechen language at that time. In 1927, by the decision of the Bolshevik authorities, the writing in the schools of Chechnya, as well as in other national republics, was changed, that is to say the graphic base from the Arabic script was completely translated into Latin. This translation was only used in the national republics. Talking about the serious results of the Vainakhs mathematical education (Vainakhs - the name of the Chechens and Ingushes) is hardly appropriate in those years.

This was the period of the education system formation with its shifts, with the change of alphabets, the content of school programs in mathematics, the introduction of ideological components, etc.

Additional difficulties were associated with the acute shortage of mathematics teachers. The Republic has not passed examples similar to the well-known anecdotal cases about the sum of fractions ½ and 1/3 "equal" to 2/5.

At the beginning of the 30 s no data is found on the presence of both scientists, mathematicians, representatives of indigenous nationality, and people with higher education in this specialty.

Shamsadov M.M. (1913-1960) is the first student who entered the Faculty of Mechanics and Mathematics of the country leading Moscow State University named after Pokrovsky (now M.V. Lomonosov) on the specialty of Mathematics. He studied at MSU in 1933-1938 and graduated with a second degree diploma (MSU Archive).

In the 1920s, in the republic, as in many regions of the country, so-called working faculties appeared which were aimed at eradicating illiteracy, training primary-level teachers, which graduate was M.M. Shamsadov mentioned above.

The teacher institute was opened in Grozny in 1938. Prior to the eviction of the Chechens and Ingushes in 1944, according to available data, the following Chechens representatives graduated from the Physics and Mathematics Faculty of this institute, who later worked at schools of the republic as mathematics teachers, heads of schools, and education departments for all their lives: Magomadov Sh.M. (1919- 1983), Denilkhanov S.M. (1919-1997), Khoguyev M.U., Ibragimov N.Kh. (1916-2001). Ibragimov N.Kh. was awarded the title of School Honored Teacher of the RSFSR by Decree of the Supreme Soviet Presidium of the RSFSR on May 25, 1960. Perhaps he was the first representative among the Chechens, who had such a high rank. But in any case he was the first representative among Chechen mathematicians in this rank.

Thus, the available information shows the presence of several specialists, mathematics teachers among the indigenous population of Chechnya. Accordingly, nonresident teachers, or people who have attended the course of working faculties work mainly at schools. This continues until the 1944 eviction. The Chechens, abandoned for extinction in Kazakhstan and Kyrgyzstan steppes, were cut off from

education and science for almost 13 years. Although individuals, despite numerous obstacles, were able to get a higher education there.

According to available information, with a higher mathematical education the following people returned from Kazakhstan: Elimbayev P.Kh. (1931-1998), Mutsaev A.M. (1931-2004), Janar-Aliev A. Ya. (1932-2000), Ilyasov A.A. (1929-1997), Yandarov V.O. (1937-2014) and Israilov S.V. (born in 1936). Yandarov V.O. and Israilov S.V. devoted themselves to mathematical science. Moreover, Israilov S.V. became the first Chechen who got a degree in Physics and Mathematics.

The return of the evicted peoples in the late 50s of the twentieth century to their historic homeland set the task of restoring the education system and its mathematical component.

After the Chechen-Ingush autonomy restoration at the end of the 50s, the learning process was organized in Russian. The knowledge of mathematics is foremost the ability to solve issues. Children, first of all, should understand the content of the text tasks, what is given and what is required from them. One of the goals of school education in mathematics is to contribute to the development of students' logical thinking. Nevertheless, logical thinking is impossible without an elementary understanding of the task content.

Stress arising in children, particularly of primary school age, in the perception of educational material presented in a non-native language, leads to many negative consequences, primarily, reducing interest in the subject and learning in general. If the child catches even shades of sounds, syllables, aside from words in the native language, then learning non-native language, this does not occur even in relation to the whole sentence. A lot of examples can be cited where wording of the sentence in Russian does not cause any reaction; a literal translation may even cause a smile, but the semantic translation involuntarily puts the student in need of a conscious perception of the sentence.

A number of studies show that studying a non-native language reduces the intellectual and mental development of children by 15-30 percent. In other studies, this figure reaches 60%.

Studies show that children for whom and in the language of whom mathematics textbooks were written used today in most schools of the republic, in particular, written by M.I. Moro (Moro, 2008), and others, go to school, having the vocabulary from 3,000 to 7,000 units. Children, for instance, the Chechens, had the vocabulary of 20-30 units corresponding to the language of the used mathematics textbook at the beginning of the zero years, and the first lesson material of mathematics contains more than 120 words. When we bring them, these words, to one root, we will get about 90. What should a teacher do in this situation? Should he explain the semantics of words in the mathematical tasks formulation or mathematical knowledge formation, thinking? The second cannot be done without the first one, the first will be done or will have to be done, but at the expense of the second, moreover, being confident in the ineffectiveness of their actions, because the words with which vocabulary work is conducted at the lesson do not become an active stock of schoolchildren due to the lack of support in the form of communication environment. The teacher has the opportunity to use an understandable native language in the visual-illustrative setting of tasks.

ICT terminology use in the mathematical tasks formulation at primary school, as the most common, would allow the teacher to reduce the time for vocabulary work.

The studies conducted in 2008-2018 in preschool institutions of Grozny and Urus-Martan showed that even younger children understood the meaning of many ICT words without problems. The children accurately knew the semantics of more than 20% of words out of 500 terms presented. These words are almost absent in the math textbook for the 1st grade of 2007 (Moro, 2008). For the first time, a few words of this terminology appeared in the task formulation in the mathematics textbook for the 1st grade of 2016 (Moro, 2016).

There has been a tendency to increase the text in the task formulation in mathematics textbooks, which creates additional difficulties for the teacher in the national school, who needs to explain the semantics of these words at the expense of lesson time, and the student who needs to understand these words.

The math textbook author L.G. Peterson explains "All textual wording increases are exclusively connected with the requirements of the RAS experts about "mathematical accuracy and uniqueness" of the texts. These are their corrections" (from correspondence with the author). For comparison: lexical material available to the author do not exceed 20-30 words at the initial period in mathematics textbooks for 1 grade in the UK, Norway schools (Heineman Mathematics, 1981; Pederson, Anderson & Johansson, 2006; Broadbent, 2004; Haanæs & Dahle, 2000).

Initially, our children have unequal conditions for getting education. If we consider the first class, then they have a higher workload by the number of hours in the curricula, they need to additionally study the Chechen alphabet, containing one and a half times more letters than in the Russian language, 49 instead of 33, etc. The Chechen alphabet learning ends only in May of the school year, while the Russian - in February. The foundation for success is basically laid in the first class.

The well-known statement of P.K. Uslar, the first enlightener and organizer of Chechnya schools about the need to educate children at the initial stage in their native language is being ignored in the educational process organization in the republic, aside from the classic statement "Native word - D.K. Ushinsky said - is the basis of all mental development and the treasury of all knowledge". (Ulsar, 1887, p. 23).

When mathematics teaching in the early 60s, after the restoration of Chechen-Ingush ASSR autonomy, began to give negative results and problems with the language as the main reason became obvious, there was a need to solve it.

"An empirical study of the most effective forms and methods of teaching non-Russian (Chechen and Ingush) children and the structure of primary education in schools of the republic was conducted in 1969...

The expediency of arithmetic (mathematics) textbook translating in the primary school into the native (Chechen and Ingush) language of students and others.

"The question of whether it is advisable to translate arithmetic (mathematics) primary school textbooks into their native language (Chechen and Ingush), got a negative answer by all teachers:

"Such a translation would be a brake on the development of Russian spoken language" (Grozny region). (The Russian-speaking population prevailed here - A.Ya.). (Umarov, 1982, p. 68)

"There is no need to translate arithmetic (mathematics) textbooks into their native language. Arithmetic (mathematics) itself contributes to the development of Russian spoken language, the development of thinking in Russian" (Achkhoy-Martanovsky region). (Umarov, 1982, p. 69)

"It is inexpedient to translate arithmetic (mathematics) textbooks into the Chechen language, since almost every school has children of non-Chechen nationality in the region" (Nadterechny region). (Umarov, 1982, p. 71).

The latter opinion requires a special analysis: "there are children of non-Chechen nationality at school" - the presence of children of non-Chechen nationality, not even in the classroom, but at the school, is an argument for all children of the school to study in a language that is not native for them. That is the fact that some children cannot (and are not likely to want) study in a foreign language, so all the other children have to be taught in their native language. The argument is deadly "convincing". But it was the "iron" logic of state policy in the field of education of that period. The "experiment" to translate the mathematics teaching into the Chechen language was again launched in 2008, after numerous appeals and discussions, in 47 schools of the republic, involving almost a thousand and a half children. By this time, the translation of M.I. Moro textbook had been privately done. Then this translation was approved by the educational and methodological council of the Ministry, despite official warnings about poor-quality translation, about serious shortcomings. We will give an example of translation. Task No.9, p.22, part 2. (Moro , 2008).

"Make up one task according to the drawing, in the condition of which there is a word *more,* and another in the question of which there is a word *less*. Solve these tasks".

This task translation into the Chechen language is given in the following form.

"Сизкепаца хӀоттаде цхьа хьесап шен хаамехь дуккхах дош а долуш, шолгӀа хьесап — хаттарехь кӀезгах дош а долуш. И хьесапаш кхочушде".

We gave this translation in this view to 4 doctors of sciences, including philological ones, to more than 10 candidates of sciences who graduated from MSU, RSU and GOI, and parents. They read the task up to 4-5 times. Nevertheless, we could not achieve an understanding of the two components: what is given, and what is required.

In addition, this task is for students just starting their studies.

The translation included a huge amount of archaisms and neologisms. Learning tasks for mathematical knowledge formation were replaced by the form. Mathematics, as an academic discipline, had far more problems and obstacles than the language, that is to say, there was a language, but there was no mathematics. No doubt, that at the expense of mathematics, the language problems could not be solved.

А поскольку язык был, то за его счет проблемы математики еще можно было решать. При всех недостатках перевода, довольно существенных, результативность использования этих учебников, как показала практика посещенных уроков и справка по итогам преподавания по переводному учебнику, составленная Министерством образования и науки ЧР, была гораздо выше. Перевод был сделан людьми, ни одного дня не проработавшими в школе.

A multilingual educational model, completely copied from North Ossetia, was launched in 2010 by the leadership of the Ministry of Education and Science, consisting of people who did not have pedagogical experience even for one year. The model was "valid" for 5 years, and then also collapsed. Pupils from 96 schools took part.

In practice, it turned out that an experiment was being conducted ... on electronic textbooks or textbooks, published subsequently, after the end of the school year. Two math textbooks were published

for the first grade, but in 2011, when the school year was over. The first (edition of 1560 copies) was almost in Russian, with the exception of some words. The second (460 copies) was vice versa (Adamova, Bushueva, & Sultanova, 2010). How to use and how to distribute these textbooks among students, teachers, methodologists, etc. is unclear. Although the model is more favorable for the educational process of children in schools with a national composition of children. It allows us to use some capabilities of the native language.

To judge the level of these textbooks, we will give examples from the mathematics electronic textbook for grade 4. (Sultanova, 2014)

Dada and Askhab decided to lay the floor with square ceramic tiles in the kitchen. The length of the kitchen is 6 m and the width is 9 m. How many ceramic tiles are required if the side of a tile is 3 dm?

Remember, $1m^2 = 100$ dm^2

Length is less than width.

Aslan and Dima went simultaneously in opposite directions from Red Square to Georgy Konstantinovich Zhukov monument. After 5 min the distance between them was 715 m. Alan's speed is 65m/min. Define Dima's speed.

Multiculturalism is "respected", Aslan is Chechen, Dima is Russian. Everything can be allowed, but Aslan is unlikely (we may assume that the author means him) would go to the same monument in the opposite direction. He will have to go around the globe.

Such pearls were characteristic for the entire textbook used in the "experiment".

The study language is paid the main attention in the article as the most important factor in improving the quality of the educational process. Especially at the initial level, where the study foundations are laid both at the school and after it. If there are no qualitative results in the initial level, then the followers are engaged in "working on errors", trying to fill gaps in knowledge. The middle ranking works for primary, the senior for middle...

Another serious problem of modern mathematics education in the republic is personnel. New schools being built in the republic require new mathematics teachers. Teachers of mathematics are people with different basic qualifications.

The teaching of mathematics has the following picture in one of the regions of the Chechen Republic. More than 130 people are teachers of mathematics. 15 people have a basic economic education among them, engineers - 3, a lawyer, a chemist, a specialist in tourism – 3, without education or students - 11 people, that is to say, more than a quarter of teachers do not have the appropriate qualification. In the same area in one of the schools, three teachers of mathematics do not have the appropriate qualifications. A 2nd year student, without an experience, has mathematics workload of 30 hours in the school of the region; here the workload of another teacher is 40 hours. There is a school where mathematics teaching the 11th grade is conducted by a teacher without job seniority. This is only one subject. And if we analyze the teaching staff, we can get a completely different picture.

Lawyers, economists, and engineers work at school as directors in the area, making up almost 20% of managers. The practice of appointing heads of schools - directors and head teachers, which took place in the Soviet school, doesn't apply to the humanities and natural scientists. Thus if the humanist was appointed as the director, then the head teacher, as a rule, was a natural scientist and vice versa. Naturally,

these leaders are not "teachers of teachers," as they used to be called in the Soviet period. The level of leadership on the basis of the principle "a teacher lives on our street, I communicate with her, I know the problems of the school and the ways to solve them", which took place in the republic, cannot solve educational problems. A teacher "who lives on the official's street", for example, will never tell him that she made mistakes in preparing for the lesson, in explaining the material, in polling, in consolidating, etc.

Thus, the improvement of the state of affairs in mathematical education and science direction in the republic requires a set of measures.

7. Conclusion

1. The tasks of preparing and raising the professional level of teaching and managing educational institutions, organizing the educational process taking into account the language situation are significant for the Chechen Republic.

2. It is shown that one of the main problems of mathematical education poor quality in the Chechen Republic is unequal conditions for obtaining general education. They are associated with the instruction language, especially in primary schools, with an increased academic load during the entire period of study. The solution of the language problem should be based on the principle: at the present stage of the national school development, the instruction language should assist to improve the quality of studying mathematics, but not to language issues at the expense of mathematics.

3. The lexical units of a mathematics textbook, especially in primary schools, should contain a large number of ICT terminology as the most understandable for children, regardless of their nationality. To sum up, mathematics textbooks for primary classes need to be improved.

Measures may be different.

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