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Application of basic mathematical skills in the analysis of economic examples

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Abstract

This article examines the issue of the practical application of mathematical skills in teaching school curricula, namely on topics related to economics, and based on the topic "Statistics". It presents key facts about knowledge and applications of logic in a given situation, for the development of "economic" topics. During the study, a test was conducted based on the topics covered. The relevance of the study is due to the demand by the modern school to strengthen the applied economic orientation in teaching mathematics and considering the introduction of a separate subject "Fundamentals of Economics". The foregoing has served as the basis for choosing a research topic, the purpose of which is to study the application of practical skills of grades 8-10 in the applied economic orientation of teaching mathematics.

Keywords: mathematics, economic orientation, school program, system of education.

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Kazakhstan society needs modern educated, morally brought up, enterprising people who can independently make responsible decisions in a situation of a choice, forecasting their possible consequences, capable of cooperation, differing in mobility, dynamism, constructiveness, possessing the developed sense of responsibility for the destiny of the country. The issues of forming the basis of economic knowledge by schoolchildren acquire a special urgency in modern society, since children are confronted with economic information, various economic phenomena and events every day at home and at school, on the Internet, while reading fiction, watching movies, etc. Formation of the basics of economic knowledge makes it possible to form social and labor competence in a schoolboy and teach him how to make rational decisions based on his own preferences in a way that they do not conflict with moral norms, principles and values inherent in the society in which he lives.

The stages of economic literacy are directly related to the stages of development of society as a whole. At the initial stage of society's development (slave-holding and feudal system), economic literacy was the property of the ruling class, as well as of the some privileged social strata who were engaged in the management of trade and crafts. At the industrial stage of society's development there is the formation and rapid development of market economy, which in turn has a positive impact on the formation of economic literacy, since the preservation of private property in the means of production, competition and free pricing system, required the emergence of economically competent and literate workers in society. Mathematical applications should reflect basic ideas, contribute to the development of world views and enable students to apply their knowledge in future practice, i.e. be an integral part of education. These requirements are met by exercises with an economic focus.

In 2018, in our country the degree of economic literacy was measured by the methods of the said organization and for each region separately, but none of the results have been published so far. The main purpose of such measurements is to track the dynamics of the degree of economic literacy and assess the effectiveness of measures to improve it.

Relevance. The economic approach permeates deep spheres of practical activity of people, the solution of economic problems at the present stage is characterized by a quantitative approach, i.e. it is closely connected with mathematics.

Hypothesis. The analysis of educational literature on mathematics has shown that economic concepts are very rarely given in a compulsory mathematics course and are presented formally, as there is no goal that requires the identification of causal relationships of economic factors and their mathematical interpretation. Is it really so? And should basic economic studies be implemented as a subject of its own in the high school program? To confirm or refute the foregoing, conducted a certain study.

Method

Sample

Our sample consisted of 8^{th}, 9^{th} and 10^{th} grade students from 5 different cities of our country. All of them have studied “introduction to statistics” on mathematics lessons, that’s why they could take participation in this study. Total number of participants is 74. A majority of them were 9^{th} grade students (50%). Others with substantial representation included 8^{th} grade (32, 4%) and 10^{th} grade students (17, 6%).

Instruments

The relevant instruments used in this study were mathematics skills test with economic and statistics problems. It was 11-item multiple-choice test, which included 3 theoretical and 8 practical questions.

Procedure

The study was conducted during the spring term of 2020. The test was done remotely online. For each correctly answered question they were given one point. Therefore the maximum score they could get was 11.

Data Analysis and Results

Basic statistics

As we mentioned before, there were total 74 participants in the executed study, consisting of 8, 9 and 10 grade students. The outcome of the study varied depending on the grade of the students. Overall, as you can see in the Table 1 (or Figure 1), despite having less participants, 8 grade students showed much better results in comparison to other grade students. In general, there were no students who scored less than 5 points among the 8 graders, whereas 17% and 8% of 9 and 10 grade students respectively showed poor results. Furthermore, the highest scores – 10 and 11 points were achieved by more than half (54%) of the 8 grade students, while only 24% of 9 graders and 31% of 10 graders could show top results. Also, the average score acquired by participants, shows that 8 grade students, with an average score of 8.9, have better results compared to other grades with less than 8 points.

Conclusion

Components of financial literacy are: knowledge of information, rules, principles; mastering of general economic concepts and skills that constitute a cognitive basis for solving

standard tasks in various spheres of life; ability to adapt to the changing world; working with information. Economic training of schoolchildren makes it possible to bring civilized relations closer and to form an economic culture of relations in the state. Let not all graduates be able to engage in entrepreneurial activity on their own, but to understand the general directions of economic and financial policy, to explain their economic behavior and everyone should be responsible for it.

According to the data analysis of the study, we can see, that high school students have knowledge of basic economic concept through mathematics lessons and they are more than capable enough to apprehend, understand and solve statistical and economical problems. Despite the fact that the 8th grades showed a good result, it may come to the conclusion that they have mastered the basic topics and can apply the skills in further, deeper studies. Unfortunately, there is not enough time to pay attention to solving problems of applied nature in mathematics class, so it is possible to continue in-depth study, if there was possibility to introduce “Fundamental of Economics” as a subject of its own into the Education Program, it could be better to implement it in the 9^{th} grade.

References

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Tables

Table 1

Data of the Study

Points Scored	Grade 8	Grade 9	Grade 10	Total
1	0	1	0	1
2	0	0	0	0
3	0	1	0	1
4	0	4	1	5
5	1	4	0	5
6	3	3	5	11
7	1	5	1	7
8	2	5	1	8
9	4	5	1	10
10	11	7	4	22
11	2	2	0	4
Total number of students	24	37	13	74
Average	8.9	7.3	7.5	7.9

Figure 1: Graph of the results