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DEVELOPING STUDENTS' FINANCIAL LITERACY IN MATHEMATICS LESSONS BASED ON AN INTEGRATIVE APPROACH

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Abstract. The article addresses developing students' financial literacy through integrating mathematics and economic knowledge. The mathematical foundations of financial literacy – percentages, proportion, compound interest, linear and exponential functions – are identified. A system of topics with financial contexts aligned with the grade 5–11 mathematics curriculum and sample decision-oriented tasks are proposed.
Keywords: financial literacy, percentage, compound interest, exponential function, credit, integration, mathematics.

Introduction. Financial literacy is an important condition for an individual's economic well-being and sound decision-making in modern society. Summarizing international research, A.Lusardi and O.Mitchell showed that a low level of financial literacy is associated with poor decisions about saving, borrowing and investing[1]. In the OECD's PISA programme, the financial literacy of 15-year-old students is assessed as a separate domain[2].

The core of financial literacy consists of mathematical skills: calculating percentages, determining the total amount paid on a loan, and comparing returns on deposits. For this reason, the most effective way to develop it is not as a separate subject but by integrating it into mathematics lessons. The aim of the article is to develop a methodology for developing financial literacy in mathematics lessons based on an integrative approach.

Research methods. The study used analysis of international documents and literature on financial literacy, content analysis of the mathematics curriculum, and task design methods.

Literature review. Financial literacy has been widely studied in economic research: A.Lusardi and O.Mitchell demonstrated its impact on personal well-being[1], and the OECD developed a separate system for assessing it within PISA[2, 3]. From a pedagogical perspective, integrating financial literacy with mathematics draws on H.Freudenthal's idea of teaching through real contexts[4] and on modelling theory[5]. J.Boaler showed that open tasks in real-life contexts positively change students' attitudes towards mathematics[6]. In Uzbekistan, the task of linking mathematics education with practice is set out in state documents[7, 8]; however, a methodology for systematically integrating financial literacy into the mathematics curriculum has not yet been developed.

Results and discussion. Mathematical foundations of financial literacy. The PISA financial literacy framework distinguishes four content areas: money and transactions, planning and managing finances, risk and reward, and the financial landscape[2]. Each of these areas requires specific mathematical knowledge. For example, calculating a discounted price requires the concept of percentage; comparing a deposit and a loan requires compound interest and the exponential function; and planning a monthly budget requires equations and inequalities.

System of topics by curriculum. Analysis of the mathematics curriculum showed that a financial context can be linked to curriculum topics in almost every grade. No new topic is introduced; instead, existing topics are enriched with a financial context (Table 1).

Table 1.

Grade	Mathematics topic	Financial context	Sample task
5–6	Fractions, percentages	Discount, price	Comparing discounts in two shops
6–7	Proportion	Currency exchange, unit price	Which package is cheaper?
7–8	Linear function	Tariffs, monthly payment	Comparing two tariffs using graphs
8–9	Inequalities	Budget constraint	What can be bought with a given amount of money?
9–10	Geometric progression	Compound interest, deposit	How much will a deposit grow to in 5 years?
10–11	Exponential function, logarithm	Inflation, loan	When will the money double?

Table 1. System of topics with a financial context in the mathematics curriculum

Decision-oriented tasks. The essence of financial literacy lies not only in calculation but in making well-grounded decisions. Therefore, tasks are built on the structure "calculate – compare – decide – justify". For example, a task for grade 9: "A phone costs 3,600,000 soum. The shop offers two options: a) buy it immediately with a 10% discount; b) pay in instalments over 12 months, 330,000 soum per month. Calculate the total payment for both options and justify which one is more advantageous. What would you do if you did not have enough money right now?" In this task the student calculates the percentage (3,240,000 soum), finds the total instalment payment (3,960,000 soum), determines the difference and makes a decision based on his or her own situation. The last question has no single answer, which encourages the student to analyse the financial situation from all sides.

When studying compound interest, it is important to demonstrate visually the growth property of the exponential function. The "rule of 72" (to find how long it takes for money to double, divide 72 by the annual interest rate) is interesting and useful for students, and justifying it through logarithms in grades 10–11 allows mathematical and economic knowledge to be deeply integrated.

The discussion shows that a financial context increases students' motivation to learn mathematics because it is directly related to their lives. At the same time, the context must be authentic, using current prices, bank rates and the national currency. Cooperation with the economics teacher when designing tasks ensures that the context is accurate.

It is also important to take ethical and social aspects into account in tasks with a financial context. When solving problems about family budgets, debt and savings, students acquire not only mathematical calculation but also a culture of responsible consumption, thrift and planning. At the same time, tasks should not relate directly to the financial situation of students' families and should be presented in generalized, hypothetical situations. This is a requirement of pedagogical ethics and creates a comfortable environment for all students in the class.

Conclusion. The core of financial literacy consists of mathematical knowledge such as percentages, proportion, compound interest, and linear and exponential functions; therefore, integrating it into mathematics lessons is effective. A system of topics with a financial context aligned with the grade 5–11 curriculum and tasks structured as "calculate – compare – decide – justify" have been proposed. Such integration does not require introducing new topics and is carried out within the existing curriculum.

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