IMPACTO CIENTÍFICO EDITORA

FINANCIAL LITERACY AMONG STUDENTS IN TECHNICAL HIGH SCHOOL COURSES IN THE PUBLIC SCHOOL SYSTEM OF THE STATE OF RIO DE JANEIRO

EDUCAÇÃO FINANCEIRA ENTRE ALUNOS DOS CURSOS TÉCNICOS DE NÍVEL MÉDIO DA REDE PÚBLICA DO ESTADO DO RIO DE JANEIRO

ALFABETIZACIÓN FINANCIERA ENTRE ESTUDIANTES DE CURSOS TÉCNICOS DE BACHILLERATO EN EL SISTEMA DE ESCUELAS PÚBLICAS DEL ESTADO DE RÍO DE JANEIRO

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ABSTRACT

This study investigates the contribution of teaching financial mathematics to the development of financial literacy practices among students in mid-level technical courses in administration and health management, offered at a public state school in Rio de Janeiro. The research is based on the Brazilian National Common Curriculum Base (BNCC), published in 2018, which established financial education as a cross-cutting theme in the Brazilian basic education curriculum and highlights the importance of developing essential skills such as financial planning, conscious consumption, and responsible resource management. The methodology adopted was quantitative-qualitative, with the application of semi-structured questionnaires to students in the 2nd and 3rd years of the integrated mid-level technical courses in administration and health management. The results reveal that students recognize the importance of financial mathematics for daily life, especially in concepts such as percentage, interest, discounts, and financial planning. Many reported applying this knowledge in real-life situations, such as calculating discounts, financing, income, and organizing personal and family budgets. However, the research also identified challenges, such as difficulty understanding technical terms, a lack of contextualization of content, and a scarcity of practical activities. Students suggest a more dynamic teaching approach, with everyday examples, simulations, and current topics, which reinforces the need for methodologies more

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connected to the students' reality. It is concluded that the teaching of financial mathematics, when aligned with the BNCC guidelines and the concrete needs of students, becomes an effective component for promoting financial education and forming more critical, autonomous citizens prepared to deal with the economic challenges of adult life.

Keywords: High School. Technical Education. Public Schools. BNCC (National Common Core Curriculum). Financial Mathematics. Financial Education.

RESUMO

Este trabalho investiga a contribuição do ensino de matemática financeira para o desenvolvimento de práticas de educação financeira entre alunos dos cursos técnicos de nível médio em administração e em gerência em saúde, disponíveis em uma escola pública estadual do Rio de Janeiro. A pesquisa tem como ponto de partida a Base Nacional Comum Curricular (BNCC), publicada em 2018, que estabeleceu a educação financeira como um tema transversal no currículo da educação básica brasileira e destaca a importância de desenvolver competências essenciais como planejamento financeiro, consumo consciente e a gestão responsável dos recursos. A metodologia adotada foi quanti-qualitativa, com aplicação de questionários semiestruturados a estudantes das 2ª e 3ª séries dos cursos técnicos de nível médio em administração e em gerência em saúde na modalidade integrado. Os resultados revelam que os alunos reconhecem a importância da matemática financeira para a vida cotidiana, especialmente em conceitos como porcentagem, juros, descontos e planejamento financeiro. Muitos relataram aplicar esses conhecimentos em situações reais, como cálculo de descontos, financiamentos, rendimentos e organização do orçamento pessoal e familiar. Entretanto, a pesquisa também identificou desafios, como a dificuldade de compreensão de termos técnicos, a falta de contextualização dos conteúdos e a escassez de atividades práticas. Os alunos sugerem um ensino mais dinâmico, com exemplos do cotidiano, simulações e temas atuais, o que reforça a necessidade de metodologias mais conectadas à realidade dos estudantes. Conclui-se que o ensino da matemática financeira, quando alinhado às diretrizes da BNCC e às necessidades concretas dos alunos, torna-se um componente eficaz para promover a educação financeira e formar cidadãos mais críticos, autônomos e preparados para lidar com os desafios econômicos da vida adulta.

Palavras-chave: Ensino Médio. Ensino Técnico. Escolas Públicas. BNCC. Matemática Financeira. Educação Financeira.

RESUMEN

Este estudio investiga la contribución de la enseñanza de matemáticas financieras al desarrollo de prácticas de alfabetización financiera entre estudiantes de cursos técnicos de nivel medio en administración y gestión sanitaria, impartidos en una escuela pública estatal de Río de Janeiro. La investigación se basa en la Base Curricular Común Nacional (BCCN) de Brasil, publicada en 2018, que estableció la educación financiera como un tema transversal en el currículo de educación básica brasileño y destaca la importancia de desarrollar habilidades esenciales como la planificación financiera, el consumo consciente y la gestión responsable de los recursos. La metodología adoptada fue cuantitativa-cualitativa, con la aplicación de cuestionarios semiestructurados a estudiantes de segundo y tercer año de los cursos técnicos integrados de nivel medio en administración y gestión sanitaria. Los resultados revelan que los estudiantes reconocen la importancia de las matemáticas financieras para la vida cotidiana, especialmente en conceptos como porcentaje, interés, descuentos y planificación financiera. Muchos reportaron aplicar este conocimiento en situaciones reales, como el cálculo de descuentos, financiamiento, ingresos y la organización de presupuestos personales y familiares. Sin embargo, la investigación también identificó desafíos, como la dificultad para comprender términos técnicos, la falta de contextualización del contenido y la escasez de actividades prácticas. Los estudiantes proponen un enfoque

pedagógico más dinámico, con ejemplos cotidianos, simulaciones y temas de actualidad, lo que refuerza la necesidad de metodologías más conectadas con su realidad. Se concluye que la enseñanza de matemáticas financieras, cuando se alinea con las directrices del BNCC y las necesidades concretas de los estudiantes, se convierte en un componente eficaz para promover la educación financiera y formar ciudadanos más críticos y autónomos, preparados para afrontar los retos económicos de la vida adulta.

Palabras clave: Bachillerato. Formación Técnica. Escuelas Públicas. Currículo Nacional Común (BNCC). Matemáticas Financieras. Educación Financiera.

1 INTRODUCTION

The Organization for Economic Co-operation and Development (OECD) has emphasized the importance of financial education as an essential tool for economic and social well-being. In its recommendations, the OECD highlights that financial education is crucial to empower individuals to make informed decisions about their personal finances, avoiding excessive debt and promoting conscious consumption. According to the OECD, financial education goes beyond simple knowledge about financial products. It involves the development of skills and attitudes that enable individuals to make informed decisions, plan and manage their personal finances, especially in a context of increasing complexity of markets and the digitalization of financial services. The organization also highlights that financial education is essential to promote inclusion, by enabling people from different socioeconomic profiles to have access to adequate services and know how to manage their resources efficiently (OECD, 2024).

Brazil highlighted the theme of financial education by including it in the National Common Curriculum Base (BNCC) as one of the cross-cutting themes that should be included in the Brazilian school curriculum (BRASIL, 2018). The BNCC proposes that, in elementary school, financial education be introduced through the approach of content such as interest, inflation, investments and taxes. In high school, this theme is incorporated in a more structured way, through a specific set of skills, such as:

> "(EM13MAT104) Interpret rates and indices of a socioeconomic nature (human development index, inflation rates, among others), investigating the processes of calculating these numbers, to critically analyze reality and produce arguments.
> (EM13MAT203) Apply mathematical concepts in the planning, execution and analysis of actions involving the use of applications and the creation of spreadsheets (for family budget control, simulators of simple and compound interest calculations, among others), to make decisions.
> (EM13MAT304) Solve and elaborate problems with exponential functions in which it is necessary to understand and interpret the variation of the quantities involved, in contexts such as Financial Mathematics, among others.
> (EM13MAT305) Solve and elaborate problems with logarithmic functions in which it is necessary to understand and interpret the variation of the quantities involved, in contexts such as seismic shocks, pH, radioactivity, Financial Mathematics, among others.
> EM13MAT503) Investigate points of maximum or minimum of quadratic functions in contexts of Financial Mathematics or Kinematics, among others." (BRASIL, 2018, pp. 533, 534, 536 and 541).

The BNCC advises that schools and education networks integrate current and relevant topics into their curricula, such as financial education, in a transversal and contextualized way, respecting their specificities and pedagogical autonomy (BRASIL, 2018).

At the same time, several initiatives have been implemented with the objective of promoting financial awareness and training individuals to face the growing challenges of the contemporary economy, including those presented in Table 1:

Table 1

Examples of financial education initiatives in Brazil

Initiative	Description
National Strategy for Financial Education (ENEF)	Launched in 2010 and renewed in 2020 by the Federal Government, it aims to promote financial and social security education, expand the capacity of citizens to make informed decisions about their resources, and strengthen the stability of financial markets (BRASIL, 2020).
Learn Value	A program of the Central Bank of Brazil (BCB) in partnership with the Ministry of Education (MEC), offers free support to teachers and schools to promote financial education in a transversal way, integrated with the disciplines of the BNCC. It encourages the conscious use of resources, savings, and the responsible use of credit (BCB, 2020).
Financial Education at School	Developed by the MEC and the Securities and Exchange Commission (CVM), it trains elementary and high school teachers to disseminate financial education based on the BNCC, promoting a culture of planning, saving, investment, and conscious consumption (BRASIL, 2021).
Mapping Financial Education Initiatives	Led by the Brazilian Association of Financial and Capital Markets Entities (ANBIMA), it identifies and analyzes financial education projects in Brazil, expanding their visibility and contributing to the planning of national strategies (ANBIMA, 2023).
Financial Citizenship	Promoted by BCB through inclusion, education, consumer protection and social participation, encouraging the conscious management of personal financial resources (BCB, n.d.).

Source: Prepared by the authors, 2025.

However, the results of the assessment of students' financial literacy by Pisa (Program for International Student Assessment),[5] which also included exams on creative thinking skills and financial education, held in June 2022, were discouraging for Brazil, as it placed it among the countries with the lowest rates of financial education in the world. The report of this evaluation presented the results of 98 thousand students from 20 countries and revealed that the 416 points obtained by Brazilian students in the financial education assessment were 82

[5] PISA (Programme for International Student Assessment) is an OECD (Organization for Economic Cooperation and Development) program, created in 1997, whose first application took place in 2000. It is an international assessment applied every three years with 15-year-old students, with the aim of measuring the extent to which these students have acquired knowledge and skills essential for full participation in social and economic life (OECD, 2024, p.25).

points below the OECD average, which was 498, placing Brazil in 18th position in a list of 20 countries and economies (OECD, 2024).

According to Grussner (2007, apud Coladeli et al., 2013), the high levels of delinquency and indebtedness, added to exacerbated consumerism and the consequent reduction in national savings, may indicate a deficiency in the financial education of Brazilians. A relevant data that corroborates this statement is the Delinquency Indicator, carried out by the National Confederation of Shopkeepers (CNDL) and the Credit Protection Service (SPC Brasil), which shows four out of ten adult Brazilians (41.51%) in default in November 2024, which corresponds to 68.62 million consumers (CNDL, 2024).

In spite of the various initiatives aimed at promoting financial education, but especially in view of the insertion of this theme in school curricula, this article proposes to investigate the relevance of the knowledge and skills developed by the financial mathematical discipline in the conscious practice of students in relation to the use of financial resources, including balanced consumption, planning and control of the personal budget, the formation of reserves through savings, the strategic application of resources in investments and the making of reasoned and responsible decisions in the economic routine.

Thus, the general objective of the present research is to analyze the contribution of the teaching of the financial mathematics discipline to the development of daily practices of financial education among students of technical courses of administration and management in health in a public technical school of high school, located in the neighborhood of Marechal Hermes, metropolitan region of Rio de Janeiro.

The specific objectives are to describe the competencies and skills of the BNCC regarding financial education; relate the financial education skills promoted in the BNCC with the syllabus of the financial mathematics discipline offered to students of technical education courses at the high school level in the public network of the State of Rio de Janeiro; and to establish a statistical table on the attitude of students in relation to financial education.

It is important to highlight that the students of the technical courses of high school level in administration and health management, analyzed in this research, are inserted in the modality of integrated high school. In this modality, basic general education includes financial education in a transversal way throughout the training path. In addition, the technical courses in question include the discipline of financial mathematics as a specific curricular component. In both courses, this subject is offered in the 2nd grade of high school.

The method chosen is a quantitative-qualitative research based on the analysis of answers to a semi-structured questionnaire, carried out with a sample of students from the 2nd and 3rd grades, from the technical courses of high school level in administration and

health management, of the integrated teaching modality, enrolled in a public school located in the neighborhood of Marechal Hermes, metropolitan region of Rio de Janeiro, in order to investigate the contribution of the knowledge and skills acquired in the discipline of financial mathematics in situations involving decisions based on financial education.

2 THEORETICAL FRAMEWORK

2.1 BNCC COMPETENCIES AND SKILLS REGARDING FINANCIAL EDUCATION

The National Common Curriculum Base (BNCC), approved in 2017 for Early Childhood Education and Elementary Education, and in 2018 for High School, was prepared in accordance with the provisions established by the Federal Constitution of 1988, the Law of Guidelines and Bases of National Education (LDB) of 1996 and the National Education Plan (PNE) of 2014. It represents a regulatory framework of great importance for the structuring of Brazilian basic education. It is a normative document that establishes the rights and objectives of learning and development of students throughout the stages and modalities of basic education, guiding curricula, pedagogical proposals, teaching materials and teaching practices (BRASIL, 2018). In this context, financial education emerges as one of the essential general competencies for the formation of autonomous, critical and conscious subjects, integrating in a transversal and contextualized way to the various areas of knowledge.

The BNCC conceives financial education as a current and relevant topic, which must be worked on in a transversal and integrative way throughout the different areas of knowledge. This approach proposes reflections on students' daily situations, such as interest, inflation, investments, including aspects such as profitability and liquidity, and taxes. In addition, it seeks to promote a broad and interdisciplinary understanding, involving not only the economic dimension, but also cultural, social, political, and psychological aspects related to consumption, work, and the use of money. (BNCC, 2018, pp. 19 and 269).

This conception converges with the definition of financial education established by the Organization for Economic Cooperation and Development (OECD), which, within the scope of PISA 2022, understands financial education as something that goes beyond the simple transmission of knowledge about money. It is about the development of knowledge, skills, and attitudes that enable students to make conscious and effective decisions in different financial contexts. By integrating this concept into the school curriculum, an education is promoted that not only prepares young people to deal with everyday economic issues, but also enables them to actively participate in economic and social life. By opportune, the OECD defines financial education as follows:

> "is the knowledge and understanding of financial concepts and risks, as well as the skills and attitudes to apply that knowledge and understanding in order to make

effective decisions in a variety of financial contexts, improve individual and collective financial well-being, and enable participation in economic life." (OECD, 2024, pp. 40-41).

Thus, the implementation of financial education in schools must be carried out collaboratively, involving the constitution of didactic modules and the production of pedagogical materials, such as lesson plans and integrated projects. The BNCC recommends that these actions be developed in an interdisciplinary manner, involving different areas of knowledge to provide a complete and contextualized training (BRASIL, 2018).

Table 2 presents the general competencies of the BNCC that are related to financial education:

Table 2

Thematic axes of financial education

Thematic Axis	Description
Financial awareness	Development of the ability to understand, interpret and use financial information, promoting a critical view of the consumption and management of resources.
Informed decision-making	To train students capable of making conscious decisions, based on theoretical and practical knowledge, considering the economic, social and environmental impacts of their choices.
Financial planning and control	Encouragement to the preparation of financial plans, with a view to organizing the personal and family budget, savings and investments.
Interdisciplinarity	Integration of financial education to the various curricular subjects, such as Mathematics, Human Sciences, Languages and Natural Sciences.

Source: Adapted from BRASIL, 2018.

From these competencies and contents, an alignment between the objectives of the BNCC and technical high school is perceived, contributing to students understanding fundamental concepts of financial calculation and being able to apply such knowledge in their personal, family and professional reality. Studies such as those by Figueiredo and Begosso (2020) reinforce that the presence of financial education in school curricula is essential to foster the financial autonomy of young people, while research such as that of Souza et al. (2019) denounce that the implementation of this proposal still encounters obstacles in several public institutions, and is sometimes neglected.

In line with Bennemann and Allevato (2012, apud Skovsmose, 2008), who highlight the importance of mathematics as an instrument for a critical reading of reality, financial education should also promote in students the ability to intervene in their socioeconomic context, allowing them to understand the power structures involved in the relations of production, consumption and income distribution.

Therefore, financial education, when articulated with the BNCC guidelines and the syllabus of the financial mathematics discipline in technical courses, not only expands the cognitive repertoire of students, but also strengthens their civic performance, preparing them for adult life and the challenges of the world of work, as pointed out by Lopes et al. (2024).

2.2 RELATIONSHIP OF THE FINANCIAL EDUCATION SKILLS PROMOTED IN THE BNCC WITH THE SYLLABUS OF THE FINANCIAL MATHEMATICS DISCIPLINE

In view of the growing complexity of economic dynamics in the contemporary world, combined with the intensification of consumer relations and the multiplicity of financial products and services, the importance of financial education as a tool for the exercise of citizenship and for the development of conscious economic practices becomes evident. This scenario requires more than technical mastery from young people, as it requires discernment, planning and the ability to make responsible decisions, qualities that should be promoted by the school through the articulation between curriculum and social reality (Bennemann and Allevato, 2012, apud Skovsmose, 2001).

The National Common Curriculum Base (BNCC) recognizes this urgency by instituting financial education as a contemporary and transversal theme, to be worked on in an interdisciplinary way in various areas of knowledge. In this sense, she proposes that content related to personal finance management, budget organization, responsible consumption and investments be addressed in curricular components such as Mathematics, Human Sciences and Natural Sciences. In the context of High School, the BNCC proposes the development of skills such as: "evaluating the financial impacts of personal and collective decisions", "interpreting information expressed in tables, graphs and economic indexes" and "solving problems involving basic financial operations" (BRASIL, 2018).

These competencies are resonated in the syllabus of technical courses at the secondary level of the state public network of Rio de Janeiro, especially in the courses of administration and health management, in which the discipline of financial mathematics is structured with the aim of providing students with training both from a conceptual and practical point of view.

This understanding stems from what is contained in the syllabus of these courses, which, when analyzed, demonstrate that the technical courses of administration and management in health share some content in common, such as simple interest, compound interest, discounts and amortization systems. In addition to these, each course also features exclusive content. In the management course, students have basic mathematical operations (ratio, proportion, power, and percentage), applied financial mathematics, and business operations, such as profit and loss calculation. The health management course, on the other hand, differs by including the study of payment series.

Then, the skills to be developed involve understanding the fundamentals of financial calculation, including the value of money over time and the principles that govern business operations and the concept of interest and the ability to solve problems involving percentages, proportionality, profit and loss in financial operations, identify and analyze situations involving simple and compound interest regimes, distinguish between nominal and effective rates, apply commercial and rational discount methods (simple and compound) in financial securities, and understand the main amortization systems, recognizing their characteristics and advantages.

Therefore, the competencies, skills and syllabus form the necessary pillars for students to be able to deal with practical situations of the organizational routine, stimulating logical-mathematical reasoning, informed decision-making and critical analysis of the economic dynamics to which they are inserted, which are also in line with the National Curriculum Parameters (PCN) for High School.

Under the terms of the National Curriculum Parameters (PCN) for High School, the mathematics curriculum should be conceived as a dynamic and contextualized instrument, aimed at the development of essential skills for citizenship formation. Far from being restricted to the transmission of technical content, the curriculum should articulate knowledge that dialogues with the students' reality, promoting logical reasoning, critical argumentation and reflective reading of quantitative information. In a society in constant transformation, this curricular approach enables students to understand complex phenomena, make informed decisions and actively participate in social life (BRASIL, 2000).

The articulation between BNCC competencies and the contents of financial mathematics is also reflected in the methodology to be adopted by teachers, who are encouraged to work with contextualized problems and explore situations in the students' daily lives, promoting greater engagement and critical understanding of the content.

When investigating the perception of students and teachers at a technical school in Quixadá (CE), Araújo et al. (2020) observed that, even when students do not show initial

interest in the area of finance, they recognize the practical usefulness of the content learned, especially in relation to their future professional performance. These data highlight the relevance of maintaining financial mathematics as a central strategy for the insertion of financial education in technical schools and corroborate the BNCC proposal by highlighting the value of the transversal approach, which favors integration between different areas of knowledge and establishes connections between school knowledge and the concrete demands of students.

ccording to Lopes et al. (2024), the teaching of financial mathematics in the school environment should go beyond the technical domain and promote a critical understanding of personal finance, especially in relation to indebtedness, consumption, and long-term planning. For the authors, the qualified insertion of financial education in the school curriculum can contribute significantly to the development of skills essential to adult life and the labor market, especially among young people in public schools.

Thus, the teaching of financial mathematics in technical courses at the secondary level, especially when articulated with the guidelines of the BNCC, represents a strategic curricular component for the integral formation of the subject, enabling him not only for the world of work, but for life in society, based on critical analysis and conscious decision-making in the financial context

3 METHODOLOGY

According to Gil (2012, p.70), the quantitative method, of a statistical nature, plays a fundamental role in supporting research in the social sciences, as it allows the confrontation of the theoretical perspective of the problem with the empirical data of reality. In this sense, Santos (2001, p. 27) complements by stating that the collection procedures correspond to the "practical methods used to gather information necessary for the construction of reasoning around a fact/phenomenon/problem". Among the advantages of this method are direct contact with reality, saving resources, agility in obtaining data, and the possibility of quantification. However, it has limitations, such as the emphasis on perceptive and subjective aspects of individuals, the superficiality in the analysis of social structures and processes, and the difficulty in capturing the dynamics of social transformations.

The present research makes a quantitative-qualitative study, with data collection carried out through a semi-structured questionnaire, applied on June 2 and 9, 2025. The instrument has 20 questions, 13 of which are closed, 2 closed with space for detailing and 5 open, organized into six thematic sections. The first section deals with non-sensitive personal data; the second, of school data; the third addresses the training and application of financial

mathematics; the fourth explores financial practices and habits; the fifth investigates perceptions about financial education; and the sixth seeks to identify difficulties in learning the subject, in addition to gathering suggestions to improve the teaching and learning process of the subject.

The research population is composed of 681 students enrolled in the various courses offered by a technical high school of the state public network, located in the neighborhood of Marechal Hermes, in the metropolitan region of Rio de Janeiro. The target audience is students in the 2nd and 3rd grades of technical courses in health administration and management in the integrated high school modality, which represents 263 students, from which a sample of 158 students was extracted, 109 from the administration course and 49 from the health management course, as shown in Table 3.

Table 3

Population and sample of students by course and grade.

Course	Series	Population	Sample
Administration	First	72	0
	Second	**94**	**61**
	Third	**82**	**48**
	Subtotal	***248***	***109***
Clinical Analysis	First	62	0
	Second	65	0
	Third	49	0
	Subtotal	*176*	*0*
Health Management	First	44	0
	Second	**49**	**29**
	Third	**38**	**20**
	Subtotal	***131***	***49***
Internet Computing	First	35	0
	Second	56	0
	Third	35	0
	Subtotal	126	0
	Total	***681***	***158***

Source: Prepared by the authors, 2025.

Considering that the research was carried out in June, corresponding to the middle of the school year, it is relevant to highlight that the students of the 2nd grade are still in the process of learning the syllabus related to the discipline financial mathematics, while the students of the 3rd grade have already completed this curricular component. This difference in the stage of training can significantly impact the level of conceptual understanding and practical application of said contents.

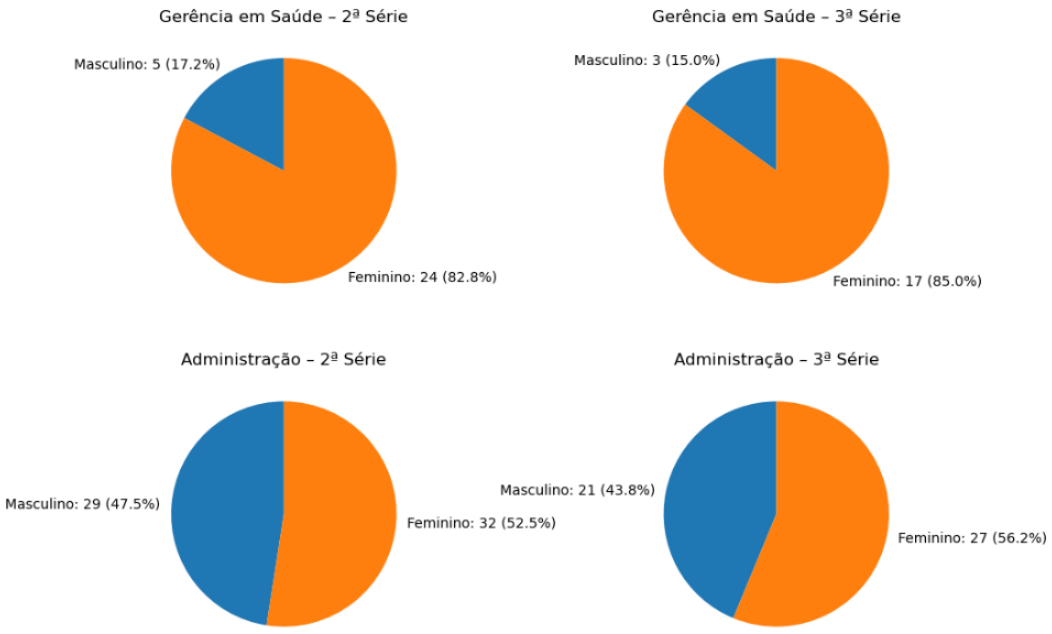
4 PRESENTATION OF RESULTS

4.1 PERSONAL AND SCHOOL DATA

Personal data on age and gender were collected, followed by school information related to the course, modality and grade. The definition of the modality would allow the identification of students from the teaching modality with external concomitance, but this case did not occur and all participating students belong to the integrated modality. Figure 1 presents part of these data, highlighting the distribution of sex by course and grade. The mean age observed was as follows: in the administration course, students in the 2nd grade have an average of 16.4 years, while those in the 3rd grade have an average of 17.3 years; and in the health management course, the average age is 16.2 years in the 2nd grade and 17.2 years in the 3rd grade.

Figure 1

Gender distribution by course and grade



Source: Prepared by the authors, 2025.

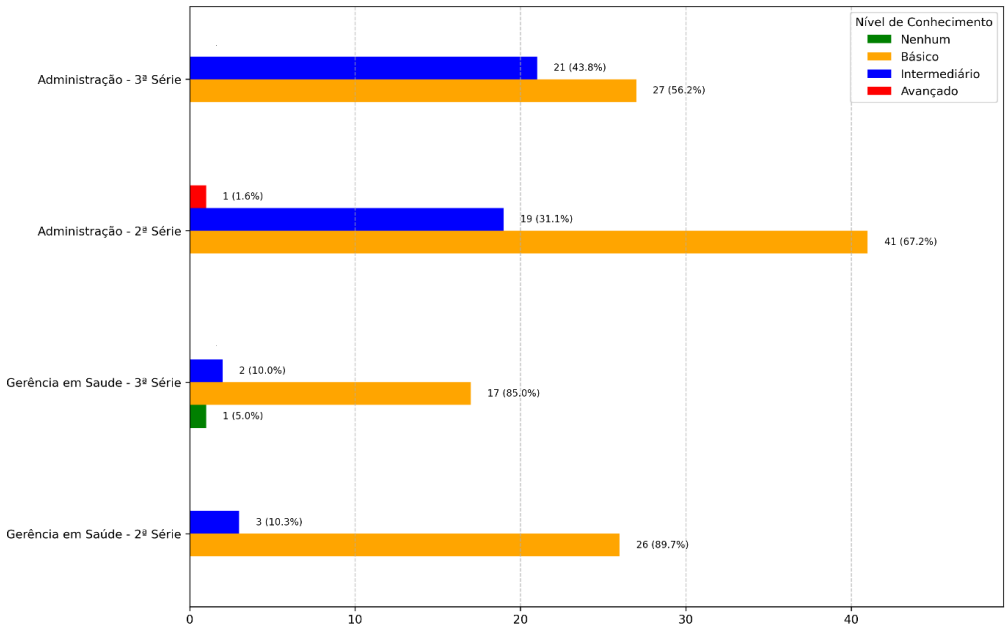
4.2 TRAINING AND APPLICATION OF FINANCIAL MATHEMATICS

In this section, four questions were asked, the first being to assess the respondent's current knowledge of financial mathematics. According to the data presented in Figure 2, 56.2% of the students in the 3rd grade of the administration course declare to have basic knowledge in financial mathematics, while 43.8% consider themselves to have an intermediate level. In the 2nd year of the same course, 67.2% reported having basic knowledge, 31.1% intermediate and only 1.6% reported having an advanced level. Therefore,

there is an increase in the proportion of students with intermediate knowledge in the 3rd year of the administration course. In the health management course, 85% of the students in the 3rd grade indicate having basic knowledge, 10% intermediate and 5% none. In the 2nd grade, the percentages are similar: 89.7% with basic knowledge and 10.3% intermediate. Contrary to what was observed in the administration course, there is relative stability in the development of competencies throughout the health management course.

Figure 2

Distribution of levels of knowledge about financial mathematics by course and grade

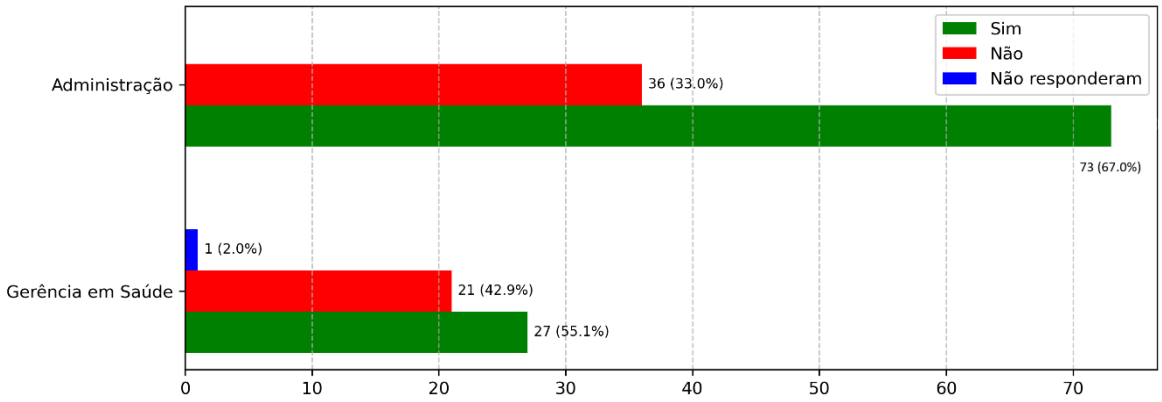


Source: Prepared by the authors, 2025.

The second question investigates whether the students had already applied knowledge of financial mathematics in everyday situations. As illustrated in Figure 3, the data reveal that 67.0% of the business students say they have made this application, while 33% report that they have not. In the health management course, 55.1% said they had already used this knowledge, while 42.9% had not. It is observed, therefore, that many students are able to recognize and apply financial mathematics concepts in various everyday situations, especially in consumption decisions, financial organization and expense planning. On the other hand, considering that more than a third of the students in both courses are unable to apply this knowledge in practical contexts of daily life, there is a lapse in the development of financial mathematics skills.

Figure 3

Application of financial mathematics knowledge in real situations by course



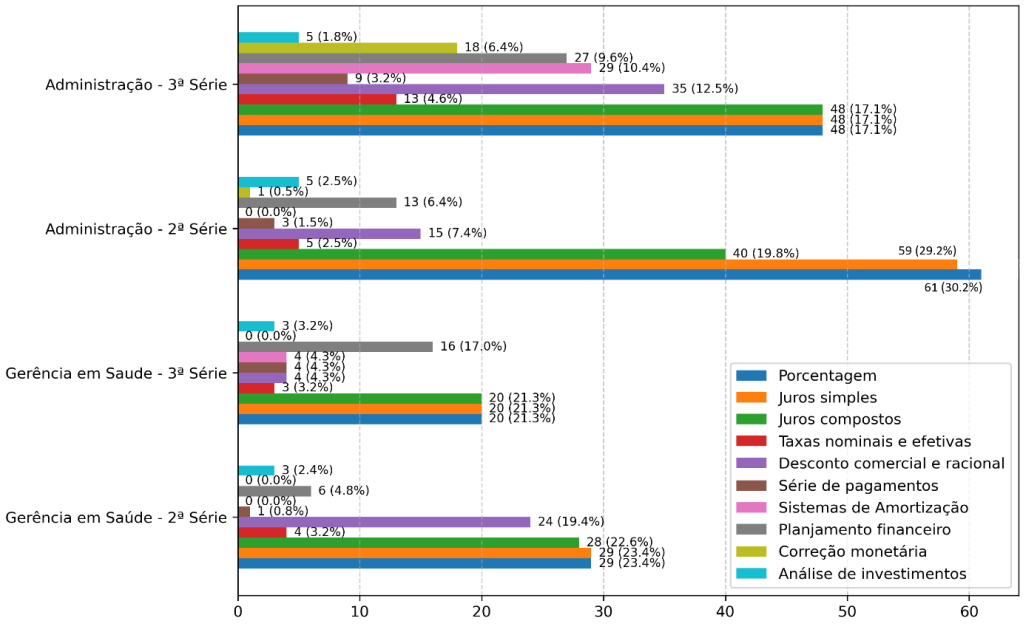
Source: Prepared by the authors, 2025.

The respondent who stated that he had already applied knowledge of financial mathematics in real situations was asked to describe these experiences. In this case, 100 complements were obtained, whose answers revealed a variety of practical contexts in which this knowledge was used, allowing the identification of different forms of application in daily life. Condensing the answers of the participating students, the most recurrent situation was the use of financial mathematics in purchases and discounts, mentioned by 40 students, who highlighted the calculation of discounts, price comparison and purchase decisions in different types of commerce; then, 16 students mentioned the use of concepts such as interest and installments to evaluate payment terms, understand financing and invoices; percentages and various calculations were mentioned by 11 students, who reported applying them in various contexts of daily life; financial planning and control appeared in 18 responses, with emphasis on the organization of expenses, use of spreadsheets and savings strategies; investments were mentioned by four students who reported experiences with financial investments and profitability analysis; four students mentioned the use of financial mathematics to help family members or perform school tasks; One of the participants reported not remembering the situation in which he applied the knowledge acquired through the course, while six others did not fill in the field intended for description, although they indicated that they had experienced some practical application.

The third question serves to identify if certain concepts of financial mathematics had already been addressed in class. To this end, the following topics were presented: percentage, simple interest, compound interest, nominal and effective rates, commercial and rational discounts, payment series, amortization systems, financial planning, monetary adjustment and investment analysis. The results are expressed in Figure 4, which separates the data by course and grade:

Figure 4

Concepts of financial mathematics



Source: Prepared by the authors, 2025.

It was observed that the concepts most frequently addressed in financial mathematics classes were percentage, simple interest and compound interest, which reflects their practical relevance and direct applicability in everyday situations, such as calculations of discounts, financing and income. This is followed by discounts and financial planning, which also have a significant presence, suggesting a concern with understanding business operations and financial organization. On the other hand, concepts such as amortization systems, fees, monetary adjustment, series of payments and investment analysis were less mentioned, which may indicate that these are contents covered in less depth or in more advanced phases of the course. This distribution suggests that teaching is focused on the most accessible and useful fundamentals for students' daily lives, but also points out opportunities to broaden the approach to financial mathematics topics.

The last question of the block, in an open format, sought to identify which of the concepts presented in the third question the students consider most useful for their personal lives. According to the survey, the financial mathematics concepts considered most relevant to personal life were percentage (83 mentions), interest (77 mentions, including simple and compound) and financial planning (73 mentions). These themes appear prominently because they are directly linked to the daily lives of students, such as controlling expenses, calculating discounts, understanding financing and organizing the personal budget. On the other hand, the least mentioned concept was series of payments, with only three mentions. The low frequency of this term may be related to its inclusion only in health management courses. In

any case, this verification suggests that the most valued content for students is those with clear and direct practical application in everyday life.

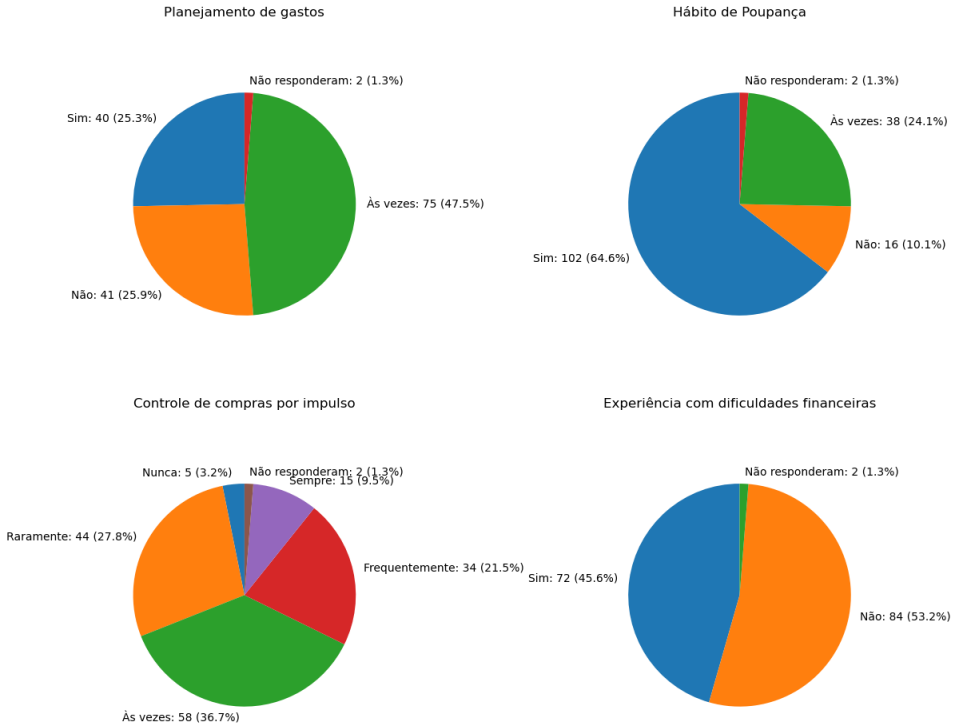
4.3 FINANCIAL PRACTICES AND HABITS

Figure 5 presents the results obtained from four questions designed to investigate to what extent the contents of the financial mathematics discipline are being incorporated by technical high school students in their daily practices. By addressing topics such as spending planning, savings habits, impulse purchase control, and experiences with financial difficulties, the questionnaire seeks to verify whether the knowledge acquired in the classroom is translating into behaviors aligned with conscious financial education. The intention is to assess the adherence between formal education and practical application, identifying whether students are developing skills that help them make more responsible and sustainable financial decisions on a daily basis.

The data show that most respondents (64.6%) say they save frequently, although many still do not have the consistent habit of planning their expenses (25.9%), since most declare to do so only sometimes (47.5%). The control of impulse purchases is also a point of attention, with most oscillating between partial control and impulsiveness (67.7%). Although 53.2% of the students have not faced financial difficulties due to lack of planning, 45.6% have already experienced this type of problem, indicating that, despite the contact with financial mathematics, almost half of the interviewees still do not transform the knowledge acquired into practices related to the formation of reserves for unforeseen events and planned acquisitions. Respondents demonstrate a reasonable level of financial awareness, with good savings practices, but still face challenges in planning and emotional control in consumption decisions.

Figure 5

Financial practices and habits of all interviewees



Source: Prepared by the authors, 2025.

4.4 PERCEPTIONS ABOUT FINANCIAL EDUCATION

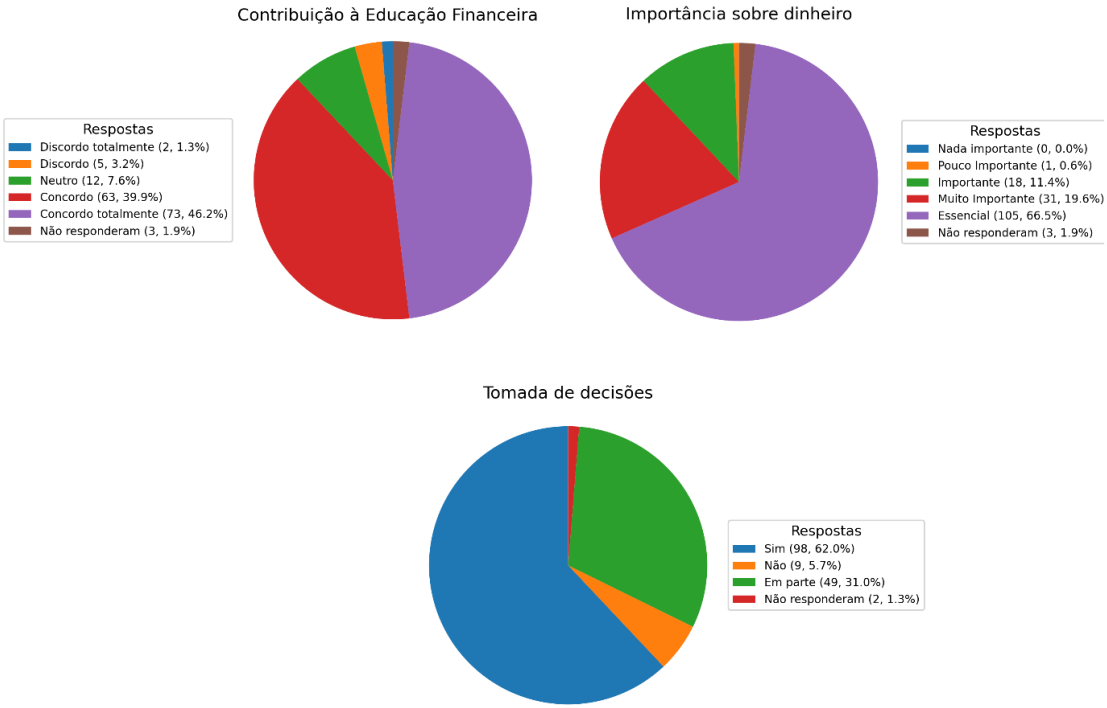
The purpose of this section is to draw an overview of how respondents perceive financial education. The three questions assess whether they recognize financial mathematics as useful for their learning, whether they value teaching about money in school, and whether they apply this knowledge in their daily lives. Each student is also asked what he means by "financial education", allowing him to capture personal and practical visions. Together, these questions help to measure the level of awareness and effectiveness of teaching, in addition to guiding possible pedagogical improvements in the sense of aligning financial mathematics with financial education. The results are expressed in Figure 6.

The majority of students agree or strongly agree (86.1%) that the financial mathematics discipline contributes to their financial education, indicating a positive perception of its relevance. Only 4.4% disagree and 7.6% remained neutral. The vast majority consider it essential or very important (86.1%) to learn how to deal with money at school. Only one answer (0.6%) indicated little importance, and there was no student who considered the topic irrelevant. The majority of students believe that financial mathematics content helps in making conscious decisions (62%), while 31% say that this occurs in part. Only 5.7% said no, which reinforces the perception of practical applicability of the contents. The data reveal that students recognize the importance of financial education and value the teaching of

financial mathematics as a useful tool for everyday life. The general perception is positive, with emphasis on the relevance of the theme in school education.

Figure 6

Perceptions of financial education of all interviewees



Source: Prepared by the authors, 2025.

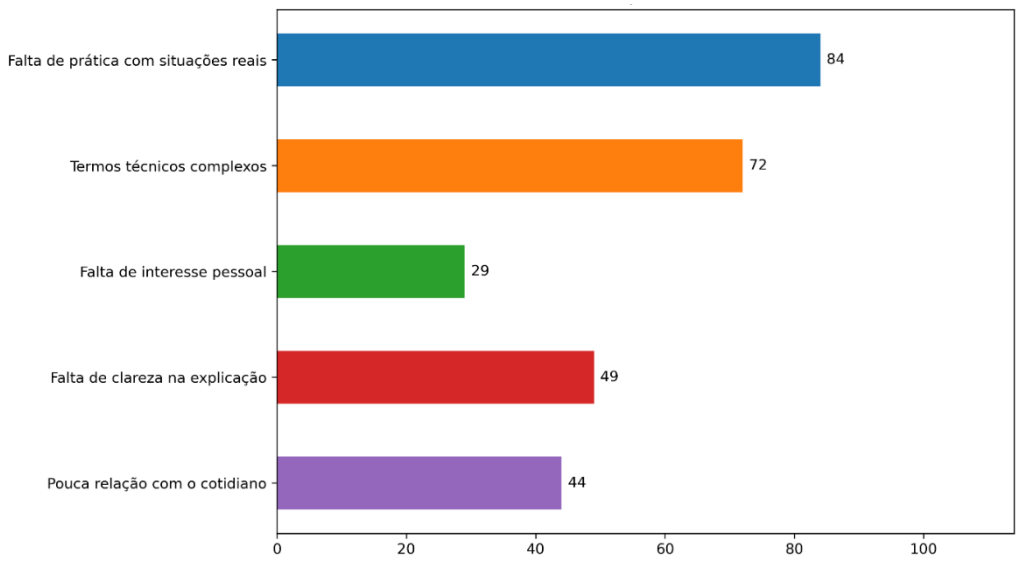
Finally, 64 students expressed what they understand by "financial education". Thus, it was possible to identify that respondents associate financial education mainly with impulse control, expense planning, and prevention of lack of money in important situations. This understanding is close to the definitions of the BNCC and the OECD by valuing planning and conscious decision-making. However, concepts such as investments, credit and interdisciplinary approach, present in the institutional guidelines, still do not appear prominently in the students' view.

4.5 DIFFICULTIES AND SUGGESTIONS

The first question proposes to identify the main difficulties faced by students in learning financial mathematics, the results of which are presented in Figure 7:

Figure 7

Difficulties reported when learning financial mathematics



Source: Prepared by the authors, 2025.

The main difficulty pointed out by the students was the lack of practice with real situations, mentioned by 84 students, which suggests the absence of a concrete application of the concepts learned, which can compromise understanding and motivation. Secondly, complex technical terms were cited by 72 students, indicating that the extensive use of the specialized language of the discipline can represent a significant barrier in the teaching and learning process. The lack of clarity in the explanation, mentioned by 49 students, and the little relationship with everyday life, pointed out by 44 students, reinforce the perception that financial mathematics is often taught in an abstract way and disconnected from the students' reality, whose factors can hinder the internalization of content and reduce engagement. The lack of personal interest, reported by 29 students, although less frequent, still represents a relevant challenge, as it may be related to the way the discipline is presented or to the absence of pedagogical strategies that arouse curiosity and show the practical usefulness of the content.

To conclude this section and the questionnaire, two open questions were asked to the students with the objective of collecting suggestions for activities or themes to be addressed in financial mathematics classes, as well as proposals to improve the teaching of this discipline.

For the proposition of activities or themes, 29 responses were obtained, and it was possible to group the suggestions into categories, revealing that 13 students showed interest in practical activities related to everyday life, such as simulations, real examples and everyday situations; nine students suggested topics related to financial planning and expense

control, including budget organization, savings and money management; three students mentioned topics related to financial education and taxes, such as payment slips, carnets, financing and tax returns; two students indicated interest in investments and applications; one student mentioned more technical content in financial mathematics, such as progressions and interest rates; One student indicated that he was satisfied with the current content.

In turn, 31 suggestions were presented to improve the teaching of financial education, which were grouped into the following categories: seven students highlighted the importance of relating the contents to everyday life and real life, including situations in the labor market and adult life; six students suggested the adoption of practical and contextualized classes, focusing on exercises, simulations and applied activities; four students proposed to address topics such as financial planning, investments and expense control; four others suggested improvements in teacher training and in the curricular structure, such as the specialization of teachers, the implementation of the discipline over the three years and the inclusion of technical subjects; two students asked for more dynamic and interesting classes; three showed satisfaction with the current teaching; two indicated the need for a specific discipline of financial education; three presented responses that were out of place from the proposal.

It is opportune that the role of the teacher and pedagogical practices are fundamental to make the teaching of financial education more effective and meaningful, being valued by students when the content is contextualized in real situations of daily life and adult life. The suggestions also indicate that the teacher should act as a mediator of practical experiences, using applicable examples and engaging activities, in addition to having specialized training that allows addressing the topics in a clear, up-to-date and relevant way. For the respondents, the ideal teacher is the one who combines technical mastery with accessible, practical didactics and connected with reality.

5 FINAL CONSIDERATIONS

This study aimed to analyze the contribution of the teaching of financial mathematics to the development of financial education practices among students of technical courses in high school administration and health management in a state public school in Rio de Janeiro. From the articulation between the guidelines of the National Common Curricular Base (BNCC) and the syllabus of the discipline, it was possible to verify that financial mathematics, when approached in a contextualized and practical way, can be an effective tool in the formation of citizens who are more aware and prepared to deal with the economic challenges of everyday life.

The data obtained through the field research reveal that students recognize the importance of financial mathematics for their daily reality, even though they face challenges related to technical language, the lack of practical examples, and the difficulty of connecting theory and practice. Most students demonstrated familiarity with concepts such as percentage, interest, and financial planning, and many reported having already applied this knowledge in real situations, such as purchases, expense control, and personal budget organization. However, more complex contents, such as payment series, amortization systems and investment analysis, are still little explored or understood, which indicates the need for deepening and diversification of pedagogical strategies.

The suggestions presented by the students reinforce the importance of a more dynamic, practical and connected teaching with everyday life, which values the students' experience and promotes meaningful learning. The presence of contextualized activities, simulations, and discussions on current topics can make the teaching of financial mathematics more attractive and effective, contributing to the formation of citizens who are more aware and prepared to deal with the economic challenges of adult life.

Thus, it is concluded that the teaching of financial mathematics, especially when aligned with the competencies of the BNCC and the concrete needs of students in the public network, represents a powerful tool for the promotion of financial education. More than transmitting technical content, it is about forming critical, autonomous subjects capable of making responsible decisions in an increasingly complex economic scenario. To this end, it is essential to invest in the continuing education of teachers, in the updating of curricula and in the construction of pedagogical practices that value the reality of students and encourage their active participation in the learning process.

Among the limitations of the research, it is noted that the study was conducted in only one school unit of the state network, which may limit the generalization of the results. In addition, the analysis was based on the students' perception, without directly including the view of teachers or school managers.

For future research, it is recommended to expand the scope of the investigation to other institutions and regions, as well as to explore the perspective of teachers on the challenges and potentialities of teaching financial education. It would also be relevant to investigate the impacts of specific pedagogical interventions, such as integrative projects or the use of educational technologies, on learning and on the change in students' financial behavior.

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