

Inflation: an analysis of PNLD 2021 mathematics integrator projects based on critical mathematics education

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Inflação: uma análise dos projetos integradores de matemática do PNLD 2021 a partir da educação matemática crítica

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Abstract

Understanding the concept of inflation is a relevant competence for the critical and citizen education of basic education students. In this context, this work aims to investigate whether and how Financial Education is approached in the didactic materials of the integrative projects in mathematics and its technologies for high school, with emphasis on the concept of inflation. For this, 54 integrative projects from nine books of Object 1 of PNLD 2021 were analyzed using the learning environments of Critical Mathematics Education. The analysis indicates that only six projects address the contemporary transversal theme "financial education". Among these, four contain the theme of inflation across eight activities, indicating reduced emphasis on it. In addition, it appears that only two have potential for constructing landscapes of investigation, and none explores the reference to pure mathematics. These data reveal significant

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limitations in the integrative projects on the theme of inflation, especially in the articulation between mathematical content and the socioeconomic aspects of daily life.

Key words: School financial education, Textbook, High school, Learning environments.

Resumen

La comprensión del concepto de inflación constituye una competencia relevante para la formación crítica y ciudadana de estudiantes de la educación básica. En este contexto, el presente trabajo tiene como objetivo investigar si y cómo la Educación Financiera se aborda como temática en las obras didácticas de los proyectos integradores del área de matemáticas y sus tecnologías destinadas a la enseñanza media, con énfasis en la idea de inflación. Para ello, se analizaron 54 proyectos integradores contenidos en nueve libros del Objeto 1 del PNLD 2021, por medio de los ambientes de aprendizaje de la Educación Matemática Crítica. Los resultados del análisis indican que solo seis proyectos contemplan el tema contemporáneo transversal "educación financiera". Entre estos, cuatro contienen la temática de la inflación en ocho actividades, lo que indica el reducido énfasis otorgado al tema. Además, se constata que solo dos presentan potencial para la construcción de escenarios de investigación y ninguna explora la referencia a la matemática pura. Tales datos revelan limitaciones significativas en los proyectos integradores en cuanto al tratamiento de la temática de la inflación, especialmente en lo que respecta a la articulación entre contenidos matemáticos y aspectos socioeconómicos del cotidiano.

Palabras-clave: Educación financiera escolar, Libro de Texto, Educación secundaria, Ambientes de aprendizaje.

Résumé

La compréhension du concept d'inflation constitue une compétence pertinente pour la formation critique et citoyenne des élèves de l'enseignement de base. Dans ce contexte, ce travail a pour objectif d'étudier si et comment L'Éducation Financière est abordée comme thématique dans les ouvrages didactiques des projets intégrateurs du domaine des mathématiques et de leurs technologies destinées à l'enseignement secondaire, avec un accent sur l'idée d'inflation. Pour ce faire, 54 projets intégrateurs contenus dans neuf livres de l'Objet 1 du PNLD 2021 ont été analysés, au moyen des environnements d'apprentissage de l'Éducation Mathématique Critique. Les résultats de l'analyse indiquent que seuls six projets abordent le thème contemporain transversal

de l'« éducation financière ». Parmi ceux-ci, quatre contiennent la thématique de l'inflation dans huit activités, ce qui indique l'accent réduit accordé au thème. De plus, on constate que seules deux présentent un potentiel pour la construction de scénarios d'investigation et aucune n'explore la référence aux mathématiques pures. Ces données révèlent des limitations significatives dans les projets intégrateurs quant au traitement de la thématique de l'inflation, notamment en ce qui concerne l'articulation entre les contenus mathématiques et les aspects socio-économiques du quotidien.

Mots-clés : Éducation Financière scolaire, Manuel scolaire, Enseignement secondaire, Environnements d'apprentissage.

Resumo

A compreensão do conceito de inflação constitui uma competência relevante para a formação crítica e cidadã de estudantes da educação básica. Nesse contexto, o presente trabalho objetiva investigar se e como a Educação Financeira é tomada como temática nas obras didáticas dos projetos integradores da área de matemática e suas tecnologias destinadas ao Ensino Médio, com ênfase na ideia de inflação. Para isso, foram analisados 54 projetos integradores contidos em nove livros do Objeto 1 do PNL 2021, por meio dos ambientes de aprendizagem da Educação Matemática Crítica. Os resultados da análise indicam que apenas seis projetos contemplam o tema contemporâneo transversal "educação financeira". Dentre esses, quatro contêm a temática da inflação em oito atividades, o que indica a reduzida ênfase conferida ao tema. Além disso, constata-se que apenas duas apresentam potencial para a construção de cenários de investigação e nenhuma explora a referência à matemática pura. Tais dados revelam limitações significativas nos projetos integradores quanto ao tratamento da temática da inflação, especialmente no que diz respeito à articulação entre conteúdos matemáticos e aspectos socioeconômicos do cotidiano.

Palavras-chave: Educação financeira escolar, Livro didático, Ensino médio, Ambientes de aprendizagem.

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Introduction

Financial Education (FE) is part of one of the transversal contemporary themes (TCT) of the National Common Core Curriculum [Base Nacional Comum Curricular – BNCC] (Brasil, 2018). The guiding document states that Financial Education aims to “[...] empower children and young people to establish judgments, make decisions, and act critically and reflexively in relation to the problems, and possible solutions, imposed by economic life in society” (Brasil, 2022, pp. 23–24).

Thus, for individuals to develop the ability to make conscious and responsible financial decisions, understanding the impact of their choices on personal, family, and collective life, FE must go through different areas of knowledge (Silva & Powell, 2013; Vaz & Nasser, 2021; Melo & Pessoa, 2024), which requires a practical understanding of the functioning of the economy, including topics such as minimum wage readjustments, financial market dynamics, investment strategies, purchasing power, and the scenario of the global economy.

In this context, one of the most impactful phenomena in real life is inflation, characterized by a generalized, continuous increase in the prices of goods and services in an economy (Vital, 2014). This process, consequently, results in a decrease in the purchasing power and value of the currency.

By connecting FE to the theme of inflation in basic education, the concept of School Financial Education (SFE) (Silva & Powell, 2013) is introduced, referring to FE in educational institutions. When considering this perspective, addressing inflation does not mean merely explaining economic indices, it is about discussing the reasons for the increase in prices of products in the supermarket, the correction of wages over time, the characteristics of different financial investments, and the relevance of seeking ways to protect and value money (Silva & Powell, 2013; Almansa & Mariani, 2019; Melo & Pessoa, 2024).

Therefore, from the reform of high school (Law no. 13.415/2017), the National Textbook Program [Programa Nacional do Livro Didático e do Material Didático – PNLD] for the year 2021 presented works aimed at integrative projects and life project (Object 1). The books made available have the purpose of promoting a significant formative trajectory for students, through proposals that establish an “[...] effective dialogue with their plans and achievements, while developing knowledge, skills, attitudes and values

with the potential to enable them to deal with the challenges of contemporary society” (Brasil, 2021, p. 13).

The implementation of an integrative project that considers the perspective of Critical Mathematics Education (CME) is fundamental in today’s schools. Through moments of investigation, it is possible to use mathematics to question reality, an essential practice for forming citizens who understand mathematics as a language for analyzing and interpreting the world around them.

Thus, analyzing textbooks is relevant, as it is essential to determine whether these materials address inflation meaningfully or only superficially. Therefore, this study aims to investigate whether and how Financial Education is addressed as a theme in the didactic materials of the integrative projects in mathematics and its technologies for high school, with emphasis on the idea of inflation.

Financial Education in Critical Mathematics Education

The integrative projects of PNLD 2021 are directed to the diversified part of the curriculum, composed of the formative itineraries (FI) (Brasil, 2021). They are structured in single volumes, organized by area of knowledge and related to an integrative theme (IT). Thus, each volume consists of six projects related to the nine general competencies of the BNCC, of which “Four projects address mandatory integrative themes (STEAM, Youth Protagonism, Mediaeducation, and Conflict Mediation) and the authors freely choose two” (Brasil, 2021, p. 14).

In addition, projects must emphasize at least one of the 15 TCTs (Brasil, 2021), organized into six thematic macroareas³. Among these, FE is characterized in the Economics Supplement [Caderno de Economia] from the definition proposed by the Organization for Economic Cooperation and Development (OECD), that is, as a:

[...] set of information through which students are introduced to the universe of money and encouraged to produce an understanding of finance and economics, through a teaching process, which makes them able to analyze, make reasoned judgments, make decisions, and have critical positions on financial issues involving their personal and family lives and the society in which they live (Silva & Powell, 2013, p. 12).

³ The six thematic macroareas of the TCT are: Environment (Environmental Education and Consumer Education), Economy (Work, Financial Education, and Tax Education), Health (Health and Food and Nutrition Education), Science and Technology (Science and Technology), Multiculturalism (Cultural Diversity and Education for the Valorization of Multiculturalism in the Brazilian Historical and Cultural Matrices) and Citizenship and Civism (Family and Social Life, Traffic Education, Human Rights Education, Rights of Children and Adolescents, Aging Process, Respect and Valorization of Older People) (Brasil, 2019).

Thus, it is necessary to emphasize the multidisciplinary character of FE, especially from the perspective of TCT, as reflected in the complexity of the situations it addresses. Corroborating this perspective, Pessoa and Muniz (2021) argue that this characteristic is pertinent, as the economic experiences explored encompass dimensions that transcend mathematical calculation and include components of different natures.

Thus, by understanding FE from a perspective that accounts for the social, cultural, environmental, and political dimensions of society, it is possible to view it through the lens of Critical Mathematics Education (CME). Thus, based on Paulo Freire’s ideas of literacy, Skovsmose (2000) presents the understanding of mathemacy, which “[...] can be conceived as a way of reading the world through numbers and charts, and of writing it by being open to change” (Skovsmose, 2014, p. 106). By transposing this perspective to the field of FE, it comes to be understood more broadly. Its approach goes beyond the mere application of financial mathematics calculations, turning to the critical analysis of simulations and real-life data, such as those from economic and demographic research institutes, as well as reports and news from reliable sources.

Thus, from the perspective of mathemacy, FE is effective in developing the competence to interpret and intervene critically in social and cultural contexts structured by mathematics, thereby overcoming a domain restricted to operational skills. In this context, Skovsmose (2000; 2014) introduces the concept of landscapes of investigation as a resource that opposes the traditional paradigm of exercise, promoting situations that stimulate reflection and criticality.

Thus, Table 1 presents the understanding of the six learning environments articulated by Skovsmose (2000), which is systematized in two scopes. The first covers the exercise paradigm and the landscapes of investigation. The second combines three types of reference: pure mathematics, semi-reality, and real life.

Table 1

Learning Environments (Skovsmose, 2000)

	Exercise List	Landscapes of Investigation
References to pure mathematics	(1)	(2)
References to a semi-reality	(3)	(4)
References to real-life	(5)	(6)

The learning environments (1) and (2) are related to pure mathematics, but are fundamentally distinguished by the approach adopted (Alrø & Skovsmose, 2010). The

first environment (1) represents the exercise paradigm, in which the activity aims only at executing algorithmic tasks, exemplified by commands such as “calculate” or “solve”. On the other hand, (2) is configured through investigative practices, in which dialogue is stimulated, and criticism and reflection are instigated through inquiries. In the context of inflation, applying the accumulated rate model can be seen as a way to systematize the phenomenon.

The learning environments (3) and (4) consider semi-reality, a context built with untrue data to make problem solving easier. Their difference lies in the level of cognitive complexity required. (3) represents the direct application of the exercise paradigm, in which the task is essentially procedural and can consider the real inflationary indices with absurd values. In turn, environment (4) transcends mere resolution because, although it also uses exercises, the objective shifts to investigation and exploration, as well as the formulation of explanations about the proposed situation.

Finally, learning environments (5) and (6) deal with authentic real-life situations, which require the use of truthful information (Alrø & Skovsmose, 2010). (5) aligns with the paradigm of the exercise, converting a real-world situation into a closed problem that converges to a single solution, in which dialogic and critical processes are secondary. Environment (6) adopts the paradigm of the landscape of investigation, in which the approach to reality is open and divergent, valuing dialogue, criticism, and action over a single correct answer.

From this, Table 2 presents an example of an activity that could be used to contemplate each of the learning environments addressing the theme of inflation, the focus of this study.

Table 2

Examples of activities that contemplate learning environments on the subject of inflation

Examples of activities that contemplate learning environments on the subject of inflation	
(1)	In January, inflation was 1%; in February, 2%; and in March, 3%. What is the accumulated inflation in these three months?
(2)	After a period of trading, the company offered to cover the accumulated losses over two years and proposed a real gain of 1% over the same period. Talk to your colleagues and answer the questions: a) What should be the apparent rate that corrects employees’ salaries? b) Explain how you determined this result. c) To what extent does the strategy used approach the method of calculating accumulated inflation?
(3)	The General Market Price Index (Índice Geral de Preços do Mercado — IGP-M) is used to calculate the adjustment to real estate rent. The rent of Pedro’s

house will be adjusted by the IGP-M, which, in the period considered, was 20%. Knowing that Pedro pays BRL 950.00 in rent, what should the new amount be?

On Easter 2024, Pedro bought a box of candy for BRL 12.50. A year later, he bought the same product for BRL 15.75. When analyzing the packaging, Pedro identified the description in "small" letters that the weight had decreased due to a reduction from 12 to 10 chocolate units per box. Based on this information, answer: a) What was the inflation of this product in this period? b) Considering the reduction in the amount of chocolates per package, what was the unit value of each chocolate in 2024 and 2025? c) Do you think it is fair that the price of a product increases even if the quantity supplied decreases? Can this be considered inflation? Why? d) Have you noticed that some products keep the price, but come with less quantity? Is this a form of inflation? How does this impact the consumer? Discuss with your peer.

(4)

On September 1, 2015, the maximum price of cooking gas in Santa Maria/RS (13 kg bottle) was approximately BRL 60.004:

(5)

a) Use IBGE's Broad National Consumer Price Index (Índice Nacional de Preços ao Consumidor Amplo—IPCA) Calculator⁵ to find out what this inflation-adjusted value would be in April 2025.

b) Considering that the current average price is BRL 125.00. Is the current price above or below the inflation-adjusted value?

Fruit and vegetable prices vary throughout the year. In some months, certain products go on sale, but in others they seem much more expensive. You want to understand why these changes are and how to make more economical and conscious choices in your shopping. Thus, conduct a survey on the average prices throughout the year of tomatoes (kg), avocados (kg) and bergamot (kg) and answer the questions: a) Which product became more expensive in winter (July)? b) Which month seems to be the best to save when buying tomatoes? c) What may have caused the increase in the price of lettuce between January and July? d) Write a report explaining how you would make your purchasing decisions throughout the year. e) Make a list of three tips to help others save by buying fruits and vegetables, considering seasonality. f) Compare prices in other states and discuss what influences price variation. Discuss in a group.

(6)

For such issues to be incorporated into projects, from the CME perspective, it is pertinent to identify five fundamental aspects: the theme, research, planning, product, and group work (Biotto Filho, 2008). The theme is the starting point, emerging from relevant situations involving students' interests, context, and utopias, connecting their backgrounds and foregrounds to social and political issues.

The investigation is characterized by the autonomous search for information and the problematization of reality, stimulating the student to build knowledge and reflect

⁴ The news article entitled "Botijão de gás de cozinha custa até R\$60 em Santa Maria" [Cylinder of cooking gas costs up to R\$60 in Santa Maria] was published in Gaúcha Zero Hora (GZH), a portal belonging to the RBS Group. Available at: <https://gauchazh.clicrbs.com.br/geral/noticia/2015/09/botijao-de-gas-de-cozinha-custa-ate-r-60-em-santa-maria-4844270.html>.

⁵ The Calculator allows you to update a value by the variation of the IPCA between two dates. Available at: <https://www.ibge.gov.br/explica/inflacao.php>.

critically on the role of mathematics in society. Planning guides actions, predicts paths, and allows constant reformulations, as the project is an open and dynamic process. The product represents the materialization of learning and reflections and should be socially shared with the group and the community. Finally, group work favors cooperation, dialogue, and negotiation of ideas, enabling participants to become active subjects in the collective construction of knowledge and in the critical understanding of mathematical practices in their surroundings.

Therefore, through the articulation between the CME perspective and the curriculum requirement to integrate TCT in the integrative projects in the area of mathematics and its technologies, the relevance of an analysis on how FE, specifically inflation, is materialized and explored in the textbooks of the PNLD 2021 is evidenced.

Methodological aspects

This research adopts a qualitative approach (Lüdke & André, 1986) and applies the principles of content analysis (Bardin, 1997) to analyze the textbooks of Object 1⁶ of PNLD 2021 in mathematics and its technologies. To this end, the pre-analysis, dedicated to the initial organization of the investigation, involved the constitution of a *corpus* composed of nine didactic works, available in digital format (PDF). Thus, Table 3 presents the code used to identify each book (LPx), the editors, title, and publishing house.

Table 3

Corpus of analysis

LP	Responsible Editors	Title	Publishing house
LP1	Julio Cesar A. de P. Santos	Da escola para o Mundo [From school to the world]	Ática
LP2	Joamir Roberto de Souza	Ver o mundo [See the world]	FTD
LP3	Cibeli de Oliveira C. Bueno	+Ação — na escola e na comunidade [+Action — at school and in the community]	FTD
LP4	Ana Paula Souza Nani	Identidade em ação [Identity in action]	Moderna
LP5	Fabio Martins de Leonardo	Moderna em projetos [Moderna in projects]	Moderna
LP6	Mara Regina Garcia Gay	Práticas na escola [Practices at school]	Moderna
LP7	Rogéria G. do Rêgo Rita de Cássia de F. Pereira Myllena P. F. da Silva	Você no mundo [You in the world]	MVC

⁶ PNLD 2021 is composed of five objects: Object 1 – Integrative Projects and Life Project; Object 2 - Didactic Works by Areas of Knowledge and Specific Didactic Works; Object 3 - Continuing Education Works; Object 4 – Digital Resources; Object 5 - Literary Works.

	Djamere de S. B. Leite Marcella S. M. Machado		
LP8	Patrícia Furtado Juliana Facanali Eliane P. Gonçalves	Vamos juntos, Profe! [Let's go together, Teacher!]	Saraiva
LP9	Felipe Fugita	#Novo Ensino Médio [#New high school]	Scipione

Among the works of the integrative projects in mathematics and its technologies, LP3 accounts for approximately 39% of the works distributed to high schools nationwide, in accordance with PNLD 2021. The other books have similar quantitative participations, such as LP6 (7.81%), LP9 (7.54%), and LP2 (5.92%) (Brasil, 2022).

After we constituted the *corpus*, we proceeded to a floating reading of the material to become familiar with the documents. In the following stage, we identified the integrative themes (IT) and the transversal contemporary themes (TCT) of the 54 projects contained in the nine books to sort the projects that dealt with FE. To this end, we read all projects and selected six that addressed the theme.

Thus, from this first refinement, LP1, LP4, LP5, and LP9 did not include FE. Therefore, the *corpus* of analysis consists of six projects, each comprising five books. Table 4 details, for each project, the corresponding IT, its title, and its organizational structure in stages or actions.

Table 4

Systematization of integrative projects that deal with TCT in Financial Education

TCT	IT	LP	Project	Steps/Actions
Financial Education	Youth Protagonism	LP2	2 Consumption	Step 1: Young people and the environmental impacts of their consumption; Step 2: Society and conscious consumption; Step 3: Conscious consumption and financial organization of young people Step 4: Youth, artistic expression, and conscious consumption Final Stage: Presentation of a cultural gathering
			6 Our school	Step 1: Looking at our school Step 2: Volunteering, fundraising, and donations to the school Step 3: Cultural expressions of young people in school Step 4: Organizing a community event Final Stage: Holding a community event
		LP3	2 Budget: How to take care of our money?	Step 1: Let's get started ("Kickoff conversation: What is budgeting?", "In focus: The financial situation of Brazilian families" and "Organizing the work: Project 2") Step 2: Know how to do it ("The components of the family budget", "Fixed expenses and variable expenses", "How to make a family budget", "Consumerism X conscious consumption", "Forms of credit", "Possible investments with the help of the family budget" and "Inflation: how does it affect the budget?" Step 3: To finalize ("Final product: Information panel" and "Evaluation")
			LP6	5

	Financial planning	Step 2: Understanding interest Step 3: Consumer, consumerist? Step 4: Planning Step 5: With you, the blog! Step 6: Project evaluation
LP7	2 How to do business with mathematics	Step 1: Talking about entrepreneurship Step 2: Entrepreneurial practices to transform small businesses into sustainable ones Step 3: Lecture cycle: sharing experiences
LP8	5 Money comes, money goes	In action 1: Sustainable consumption In action 2: Money in our daily lives In action 3: Organization of financial life In action 4: Planning Almost there! Sharing

Table 4 shows that the six projects addressing FE are linked to the “Youth Protagonism” IT. This fact may be related to the construction of the theme around the student’s life project, one of the pillars of the high school reform. This project involves personal, professional, and social aspirations. Thus, FE can be understood as the bridge that connects the dreams of the life project to reality.

The second refinement was based on the identification of the inflation theme in the *corpus* under analysis. To this end, the 54 projects were revisited from two perspectives: occurrences observed in the works themselves and reference inflation rates published by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística—IBGE). To ensure the capture of all lexical derivations, the search was defined as follows: “infla”, “IPC”, “INPC”, “IGP,” and “POF”. This set currently covers essential concepts related to price variation and consumption budgets⁷ in Brazil.

Thus, the survey of the activities⁸ was carried out by searching for the terms defined in each work, using the PDF file identification tool. The first refinement yielded nine activities distributed across four projects.

In other words, LP1, LP4, LP5, LP7, LP8, and LP9 did not show any inflation-related activity. Such omission is notorious in both LP7 and LP8. Although LP7 is dedicated to entrepreneurship (Table 4), one of the structuring axes of the formative

⁷ The terms refer, respectively, to the concepts of: inflation; Consumer Price Index (CPI) and Broad National Consumer Price Index (BNCPI); National Consumer Price Index (NCPI); General Market Price Index (GMI); and Household Budget Survey (HBS) [Respectively: Índice de Preços ao Consumidor (IPC) and Índice Nacional de Preços ao Consumidor Amplo (IPCA); Índice Nacional de Preços ao Consumidor (IPCN); Índice Geral de Preços do Mercado (IGP-M); and Pesquisa de Orçamentos Familiares (POF)].

⁸ We adopted the term “activity”. However, it should be noted that examples used for the introduction of content/concepts, activities with resolution presented, and those intended for resolution by students were included under this designation.

itineraries (Brasil, 2019), and LP8 aims to reflect on consumption habits and their consequences, both completely disregard inflation. This gap constitutes an inconsistency, since inflationary dynamics directly impact both topics.

Thus, the nine activities were submitted to an analysis that included solving their questions. At this moment, one of them was discarded, since the idea of inflation focused only on the context of the question, disregarding elements that instigated critical reflection both in the student's and in the teacher's material, despite requiring the graphic interpretation that could contribute to a reading of the world, i.e., mathemacy.

Table 5 presents the unit/chapter in which these activities are inserted, the steps, along with the respective identified project activities (PA) and their respective quantity. It should be noted that PAx refers to the categorization number x, and its respective alternatives, when multiple, will be designated as PAx.Y.

Table 5

Activities selected from the integrative project books

LP	Textbook Unit/Chapter –Title	Steps	PA	Total by step
LP2	Project 2: Consumption	Step 3: Conscious consumption and financial organization of young people	PA1	1
	Project 6: Our school	Step 2: Volunteering, fundraising, and donations to the school	PA2 & PA3	2
LP3	Project 2: How to take care of our money?	Step 2: Know how to do	PA4	1
LP6	Project 5: Financial planning	Step 1: My financial life	PA5 & PA6	2
		Step 2: Understanding interest	PA7	1
		Step 4: Planning	PA8	1

The exploration of the material, the second phase of content analysis, focused on the systematic categorization of the *corpus*. This step was performed in accordance with the principle of exhaustion, ensuring that all data collected in the searches were rigorously examined (Bardin, 1997).

Thus, the identified activities were classified according to their potential to encompass diverse learning environments. It should be noted that both the materials intended for students and teachers' guidelines were scrutinized, and that this classification is based on the descriptions found in the examined works.

Thus, Table 6 presents the classification structure of the activities into three *a priori* categories: *References to pure mathematics*, *References to a semi-reality*, and *References to real life*. As detailed in the second column, each category is subdivided

into two learning environments: the exercise paradigm and the landscapes of investigation.

Table 6

Distribution of activities according to categories

Categories		Learning Environment	Classification
References to pure mathematics	It emphasizes mathematical procedures such as calculating rates and indices.	(1) (2)	- -
		(3) (4)	PA1, PA6, & PA7 PA8
References to a semi-reality	It offers a contextualization that simulates reality.	(5) (6)	PA2, PA3, & PA5 PA4
	It encompasses real data or indices, which are presented with their respective sources.		

When analyzing the data in Table 6, we note that there are no activities related to *references to pure mathematics*, as proposed in Object 1. We also note that four activities make *references to real life* and four others to *a semi-reality*, of which six are linked to the exercise paradigm.

In this context, the next section, Results and Discussions, details the third phase of content analysis, which consists of the treatment and interpretation of the results, systematized through a careful reflective analysis of the data (Bardin, 1997). In this section, we present each of the four projects, highlighting their organizational structures, approaches, data sources, concepts, and emphasis on inflation; we also present the identified activities.

Results and Discussion

This section is dedicated to presenting and discussing the results of the study. It is structured into four subsections, each of which addresses a project that takes inflation as one of the topics. In addition, in each subsection, we will justify the categorization of the activities.

Project 2 - LP2: Consumption

Project 2 aims to: "Understand the relationship between conscious consumption and Financial Education, as well as the importance of the organization, planning, and administration of financial resources by young people [...]" (Souza, 2020, p. 45). To this end, it is organized into five stages, each containing an introductory part followed by a series of activities designed to deepen the four steps listed in Table 4.

It is noteworthy that some activities include, in their statements, thematic aspects such as the marketing of counterfeit or smuggled products, investments, and technological resources that assist in financial organization. In addition, other activities propose to systematize knowledge from research actions.

The project promotes reflection on responsibility in topics such as the product life cycle, sustainable mobility, and resource savings, including an analysis of the Brazilian consumers' profile, the development of statistical research, and training in financial management using digital tools. As a final product, it instigates the production of various artistic manifestations on the theme of conscious consumption, presented through a cultural gathering (soirée).

The topics above are discussed in several sources, among which we highlight articles from the Constitution of the Federative Republic of Brazil of 1988 and research data from federal institutes, organizations, magazines, confederations, reports, and agencies. In addition, they contain information about the consumer profile. This framework is complemented by a set of visual materials that illustrate awareness of environmental preservation and artistic expression.

Regarding the conceptual skills in mathematics, the project proposes to sketch and interpret charts and functions, perform percentage calculations, and calculate simple and compound interest. To this end, some activities encourage the use of an electronic spreadsheet (construction of charts, execution of calculations, and preparation of financial plans), a calculator (monetary operations), dynamic geometry software (graphical representation of a function), and billing of essential services, such as water, sewage, and energy.

Finally, it is noteworthy that the treatment of inflation was limited to its application for monetary restatement purposes in PA1 (Figure 1). It uses natural and numerical languages and includes an image of an invoice for water and sewage services that does not contain real elements, such as the identification of the responsible company, address information, or consumption details. As it is based on a simulated

invoice with no data or sources related to the IPCA, the inflation index mentioned, the activity is categorized as a *reference to semi-reality*.

Figure 1

PA1 Activity (Souza, 2020, p. 62)

Original	<p>b) Larissa tem 16 anos e trabalha em uma empresa como jovem aprendiz, modalidade de emprego para jovens regulamentada por lei. Parte do seu salário é utilizada para ajudar nas despesas da sua residência. No mês de novembro, Larissa ficou responsável por pagar a conta de água e esgoto cujo valor era de R\$ 85,50, com vencimento no dia 15. No entanto, Larissa atrasou o pagamento em 8 dias. Observe a parte da fatura em que está descrito o valor do acréscimo para pagamento após o vencimento.</p>	
Translation	<p>b] Larissa is 16 years old and works in a company as a young apprentice, a form of employment for young people regulated by law. She uses part of her salary to cover household expenses. In November, Larissa was responsible for paying the water and sewage bill of BRL 85.50, due on the 15th. However, Larissa delayed payment by 8 days. Note the section of the invoice that shows the accrual amount for payment after the due date.</p> <p>Featured text (Orange Frame/Invoice): In the case of late payment, a fine of 2% will be added, along with a monetary restatement based on the IPCA/IBGE variation for the previous month, and default interest of 0.033% per day.</p>	

When analyzing Figure 1, we not that it requires the calculation of the additional amount resulting from an eight-day delay in payment, considering the incidence of a fixed fine of 2%, simple interest of 0.033% per day and monetary restatement based on the variation of the IPCA, restricted to the paradigm of the exercise, which justifies its classification in the learning environment (3).

The resolution of PA1, as presented in the teacher’s handbook, shows a significant conceptual inconsistency. The failure lies in the IPCA’s omission of the update, which creates a conceptual inconsistency in the activity statement. Also, we realize that the treatment given to inflation is superficial, not constituting, therefore, a focus of deepening.

Project 6 - LP2: Our school

This project aims to develop collective initiatives that strengthen a sense of belonging and improve the school environment. Its structural organization resembles that of the previous project: each step starts with a brief introduction, followed by the proposal being developed through various research activities or dynamics that address the themes presented in the statements.

Throughout the five steps, a study is proposed on the possibilities and legal guidelines related to the school. Based on the environmental needs diagnosis, students should select a priority action to implement. The culmination will occur in the realization of an event whose purpose is to raise funds for the execution of the defined improvement action. In addition, throughout this process, dialogue is encouraged with all segments of the school community (students, parents/guardians, teachers, employees, and management team).

The approach to the themes draws on a diverse range of sources, among which we highlight guiding documents such as the 1996 Law of Guidelines and Bases of National Education (Lei de Diretrizes e Bases da Educação Nacional—LDB, sanctioned in 1996), publications of government agencies at the state and federal levels, productions of research centers, as well as press reports and articles.

As for mathematical skills, the project includes analyzing charts, performing basic operations in monetary contexts, studying proportionality and percentages, constructing frequency tables, and calculating areas and measures of central tendency. Additionally, specific actions encourage the use of spreadsheets and flowcharts as tools for organizing and planning actions.

Inflation was addressed in two sequential activities (PA2 and PA3), both classified in the learning environment (5). PA2 aims to understand the official inflation index in Brazil (IPCA), while PA3 proposes a comparative analysis of this index with the transfers of the Fund for the Maintenance and Development of Basic Education and the Appreciation of Education Professionals [Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação—FUNDEB]. Figure 2 details the structure of PA2, which initially consists of the interpretation of an audiovisual resource on the IPCA, made available by IBGE (PA2.a), as well as alternatives on the IPCA (PA2.b and PA2.c).

Figure 2

PA2 Activity (Souza, 2020, p. 184)

Original	<p>9. Leia o texto a seguir, analise a tabela e resolva as questões.</p> <p>Inflação é o nome dado ao aumento dos preços de produtos e serviços. Ela é calculada pelos índices de preços, comumente chamados de índices de inflação.</p> <p>O IBGE produz dois dos mais importantes índices de preços: o IPCA, considerado o oficial pelo governo federal, e o INPC.</p> <p>[...]</p> <p>O propósito de ambos é o mesmo: medir a variação de preços de uma cesta de produtos e serviços consumida pela população. O resultado mostra se os preços aumentaram ou diminuíram de um mês para o outro.</p> <p>A cesta é definida pela Pesquisa de Orçamentos Familiares – POF, do IBGE, que, entre outras questões, verifica o que a população consome e quanto do rendimento familiar é gasto em cada produto: arroz, feijão, passagem de ônibus, material escolar, médico, cinema, entre outros.</p> <p>Os índices, portanto, levam em conta não apenas a variação de preço de cada item, mas também o peso que ele tem no orçamento das famílias.</p> <p style="font-size: small;">IBGE. Inflação. Disponível em: https://www.ibge.gov.br/explica/inflacao.php. Acesso em: 8 fev. 2020.</p>																										
Translation	<p>9. Read the text, analyze the table, and solve the questions below.</p> <p>Inflation is the increase in the prices of products and services. It is calculated by price indices, commonly called inflation indices.</p> <p>IBGE produces two of the most important price indices: the IPCA, considered official by the federal government, and the INPC.</p> <p>[...]</p> <p>The purpose of both is the same: to measure the variation of prices of a basket of products and services consumed by the population. The result shows whether prices increased or decreased from one month to the next.</p> <p>The basket is defined by the Family Budget Survey (Pesquisa de Orçamentos Familiares – POF) of IBGE, which, among other issues, verifies what the population consumes and how much of the family income is spent on each product: rice, beans, bus tickets, school supplies, doctors, movies, among others.</p> <p>The indices, therefore, take into account not only the price variation of each item, but also its impact on the household budget.</p> <p>IBGE. Inflation. Available at: https://www.ibge.gov.br/explica/inflacao.php. Access on: 8 Feb. 2020.</p> <p>IPCA values accumulated in the year, from 2008 to 2019</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Year</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> </tr> </thead> <tbody> <tr> <td>IPCA (%)</td> <td>5.90</td> <td>4.31</td> <td>5.91</td> <td>6.50</td> <td>5.84</td> <td>5.91</td> <td>6.41</td> <td>10.67</td> <td>6.29</td> <td>2.95</td> <td>3.75</td> <td>4.31</td> </tr> </tbody> </table> <p>Source: IBGE. Índice Nacional de Preços ao Consumidor Amplo – IPCA [National Broad Consumer Price Index]. Available at: https://www.ibge.gov.br/estatisticas/economicas/precos-e-custos/9256-indice-nacional-de-precos-ao-consumidor-amplo.html?t=series-historicas&utm_source=landing&utm_medium=explica&utm_campaign=inflacao#plano-real-ano¹². Accessed on: 8 Feb. 2020.</p> <p>a) Watch the video available on the IBGE website, in “Curiosidades do IPCA” [IPCA Curiosities] section, at https://www.ibge.gov.br/explica/inflacao.php, and talk to a colleague about what you understood from the video.³</p> <p>b) Do you know how the accumulated IPCA is calculated? Research it.⁴</p> <p>c) Draw a line chart with the data in the table.</p>	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	IPCA (%)	5.90	4.31	5.91	6.50	5.84	5.91	6.41	10.67	6.29	2.95	3.75	4.31
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019															
IPCA (%)	5.90	4.31	5.91	6.50	5.84	5.91	6.41	10.67	6.29	2.95	3.75	4.31															

Valores de IPCA acumulados no ano, de 2008 a 2019

Ano	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
IPCA (%)	5,90	4,31	5,91	6,50	5,84	5,91	6,41	10,67	6,29	2,95	3,75	4,31

Fonte: IBGE. **Índice Nacional de Preços ao Consumidor Amplo – IPCA**. Disponível em: https://www.ibge.gov.br/estatisticas/economicas/precos-e-custos/9256-indice-nacional-de-precos-ao-consumidor-amplo.html?t=series-historicas&utm_source=landing&utm_medium=explica&utm_campaign=inflacao#plano-real-ano. Acesso em: 8 fev. 2020.

a) Assista ao vídeo disponível no site do IBGE, na seção “Curiosidades do IPCA”, em <https://www.ibge.gov.br/explica/inflacao.php>, e converse com um colega sobre o que vocês compreenderam do vídeo.

b) Você sabe como é calculado o IPCA acumulado? Pesquise a respeito.

c) Elabore um gráfico de linhas com os dados da tabela.

When considering the allocation of financial resources in the school, focusing on FUNDEB transfers (2019 and 2020), PA3 (Figure 3) investigates whether the nominal evolution of these values was consistent with accumulated inflation during 2015–2019. Therefore, the inflationary index is used as a comparative benchmark to assess whether there has been real growth in educational resources over the years.

Figure 3

PA3 Activity (Souza, 2020, p. 185)

Original	<p>10. Leia o texto a seguir sobre o Fundeb, observe o gráfico e responda as questões.</p> <p>O Fundeb (Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação) é a principal fonte de financiamento do setor no Brasil e de redução da desigualdade entre estados e municípios – ao promover uma redistribuição dos recursos entre mais ricos e mais pobres.</p> <p>[...]</p> <p>O fundo é constituído de 27 “poupanças” estaduais – 26 nos estados e uma no Distrito Federal – as quais recebem dinheiro de aproximadamente 20 tributos vinculados à educação. O principal deles é o Imposto sobre Circulação de Bens e Mercadorias (ICMS). Em 2019, estima-se uma receita de R\$ 156 bilhões ao Fundeb. O montante é utilizado em creches e unidades de pré-escola, educação infantil, ensino fundamental, ensino médio e educação de jovens e adultos (EJA). Pelo menos 60% devem ser empregados nos salários de professores da rede pública na ativa.</p> <p>Fonte dos dados: FUNDEB: o que pode mudar no fundo de financiamento da educação básica. <i>Desafios da Educação</i>, 19 jun. 2019. Disponível em: https://desafiosdaeducacao.grupoa.com.br/fundeb-financiamento-educacao-basica/. Acesso em: 8 fev. 2020.</p> <p>a) Sobre o que trata o gráfico da reportagem? b) O que se pode concluir observando os números no decorrer dos anos indicados? c) Consulte no site do FNDE os dados estatísticos referentes a matrículas, coeficientes de distribuição de recursos e receita anual prevista por estado e município (disponível em: http://www.fnde.gov.br/index.php/financiamento/fundeb/area-para-gestores/dados-estatisticos, acesso em: 8 fev. 2020). Procure e identifique, nos dados apresentados, quantos alunos foram atendidos na sua cidade e o total de recursos estimados para o ano atual. Ao final, responda: qual é o valor anual por aluno? d) A previsão de receita total do Fundeb para o exercício de 2020 foi de 173,7 bilhões de reais (disponível em: https://www.cnm.org.br/comunicacao/noticias/publicada-estimativa-do-fundeb-para-2020-confira-valores-e-estados-beneficiados, acesso em: 8 fev. 2020). Verifique se a receita estimada do Fundeb, em 2019 e 2020, acompanhou a inflação do período de 2015 a 2019.</p>
Translation	<p>10. Read the text below about FUNDEB, observe the chart, and answer the questions.</p> <p>FUNDEB (Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação) [Fund for the Maintenance and Development of Basic Education and the Appreciation of Education Professionals] is the main source of financing for the sector in Brazil and of reducing inequality between states and municipalities — by promoting a redistribution of resources between the richest and the poorest. [...] The fund consists of 27 state “savings,” 26 in the states and one in the Federal District, which receive money from approximately 20 taxes linked to education. The main one is the Tax on Circulation of Goods and Merchandise [Imposto sobre Circulação de Bens e Mercadorias — ICMS]. In 2019, FUNDEB had revenues of around BRL 156 billion. The amount is used in kindergartens and pre-school units, early childhood education, elementary school, high school, and youth and adult education (EJA, in the Brazilian acronym). At least 60% must be employed in the salaries of active public school teachers.</p> <p>(Texto lateral fonte do gráfico): Data source: FUNDEB: FUNDEB: o que pode mudar no fundo de financiamento da educação básica [What can change in the funding for basic education]. <i>Desafios da Educação</i>, 19 Jun. 2019. Available at: https://desafiosdaeducacao.grupoa.com.br/fundeb-financiamento-educacao-basica/. Access on: 8 Feb. 2020. (Texto lateral vertical): EDITORIA DE ARTE</p> <p>a) What is the chart of the report about? b) What can you conclude by observing the numbers over the indicated years? c) See on the FNDE website the statistical data regarding enrollments, resource distribution coefficients, and expected annual revenue by state and municipality (available at: http://www.fnde.gov.br/index.php/financiamento/fundeb/area-for-managers/dados-estatisticos, accessed on: 8 Feb. 2020). Look for and identify in the data presented how many students were served in your city and the total estimated resources for the current year. At the end, answer: what is the annual amount per student? d) FUNDEB’s total revenue forecast for 2020 was BRL 173.7 billion (available at: https://www.cnm.org.br/comunicacao/noticias/publicada-estimativa-do-fundeb-para-2020-confira-valores-e-estados-beneficiados. Accessed on: 8 Feb. 2020). Check if FUNDEB’s estimated revenue in 2019–2020 followed the inflation of 2015–2019.</p>

Both activities are classified in *References to real life*, using authentic data from the IPCA (PA2) and FUNDEB (PA3). However, their questions are limited to the exercise paradigm, as they do not encourage social and political reflection on the phenomenon, focusing solely on data search and comparison.

Finally, the two activities, despite addressing relevant themes, do not develop a critical perspective on the impact of inflation. The exploration of the topics remains at a superficial level and is not intended to stimulate in-depth reflection on the causes and consequences of the phenomenon, thereby limiting its potential.

Project 2 - LP3: Budget: How to take care of our money?

This project aims to analyze multiple aspects of budget management, with a focus on its application to personal and family finances. Methodologically, it is structured into three steps, unfolding into twelve subsections (as detailed in Table 4). Each subsection consists of a conceptual introduction to the theme, followed by an average of three activities.

The project emphasizes the analysis and control of expenses, the planning of expenses and investments, the decision-making process in acquisitions, and the structuring of an individual financial plan. As a culminating product, it proposes preparing a panel of recommendations and best practices for effective financial management and disseminating the acquired knowledge to the school community.

The thematic approach is based on documentary sources, including publications and research from federal government agencies, as well as journalistic materials. The themes cover FE, financial planning, indebtedness, default and credit modalities.

Although the project proposal emphasizes concepts of financial mathematics, we identified only activities focused on graph analysis and compound interest calculations. Additionally, the spreadsheet was used as a tool for organization and financial control.

Inflation is discussed in the last subsection of Step 2, entitled "Inflation: How does it affect the budget?" This step addresses the value of money over time and some inflationary measurement indices. Subsequently, the discussion moves on to investment interest, introducing compound interest.

This path serves as a foundation for PA4 (Figure 4), which uses *references to real life* to present a set of steps that demonstrate investigative potential by proposing the problematization of inflation and the SELIC rate [Sistema Especial de Liquidação e de Custódia—SELIC]. Thus, PA4 is classified in the learning environment (6), standing out as the only one among the eight analyzed in this manuscript.

Figure 4

PA4 Activity (Bueno, 2020, p. 69)

Original	<p>> ATIVIDADES NÃO ESCREVA NO LIVRO Sugestões de respostas e comentários das atividades estão nas Orientações para o professor ao final do livro.</p> <ol style="list-style-type: none"> 1. Reúna-se com um colega e respondam: na opinião de vocês, como a inflação pode interferir no orçamento familiar? 2. Reúnam-se em grupos e pesquem qual foi o valor da inflação de acordo com o IGP-M e com o IPCA no último período disponível. Esse índice é maior ou menor em relação ao mesmo período do ano anterior? E em relação ao mês anterior? Escrevam um relatório com as percepções obtidas a partir das comparações feitas. 3. Ainda em grupos, pesquem quais são as principais categorias de itens que são avaliados na cesta de produtos e serviços para o cálculo do IPCA. 4. Você sabe o que é a taxa Selic? De que modo ela influencia os investimentos? Reúna-se com um colega e pesquem a respeito do assunto. Algumas perguntas que podem nortear a pesquisa: <ul style="list-style-type: none"> • O que é a taxa Selic? • Qual é o órgão responsável pela taxa Selic? • Qual é o valor da taxa Selic atualmente? • Qual é a tendência da taxa Selic para os próximos meses? <p>Em seguida, produzam um texto com as informações obtidas e guardem para compor o painel do produto final.</p>
Translation	<p>> ACTIVITIES (Label: <i>DO NOT WRITE IN THE BOOK</i>) Suggestions for answers and comments on the activities are in the Teacher's instructions at the end of the book.</p> <ol style="list-style-type: none"> 1. Meet with a colleague and answer: In your opinion, how can inflation interfere with the family budget? 2. Gather in groups and research the value of inflation according to the IGP-M and the IPCA in the last available period. Is this index higher or lower compared to the same period of the previous year? What about the previous month? Write a report with the perceptions obtained from the comparisons made. 3. Still in groups, research the main categories of items that are evaluated in the basket of products and services for the calculation of the IPCA. 4. Do you know what the SELIC rate is? How does it influence investments? Meet with a colleague and research the subject. Some questions that can guide the research: <ul style="list-style-type: none"> • What is the SELIC rate? • Which body is responsible for the SELIC rate? • What is the current SELIC rate? • What is the tendency of the SELIC rate for the coming months? <p>Then, produce a text with the information obtained and save it to compose the final product panel.</p>

Through open questions and guidelines for collaborative research, in PA4, students are encouraged to seek updated information on inflationary indices, such as the IPCA and the IGP-M, and to propose a critical reflection on their impacts on the family budget and investments. This approach favors the development of research skills, comparative analysis, and written production, and promotes youth protagonism by bringing mathematical and economic content closer to students' social reality. From this perspective, Skovsmose (2014, p.111) presents mathemacy, "[...] as the ability to critically evaluate the "goods" and "evils" that are available for consumption. This brings us to the understanding of mathemacy as a response-ability, considered crucial with respect to consumption practices".

Thus, mathematics can be an instrument of empowerment for subjects, enabling them to take a critical stance in various situations, especially when evaluating options in consumption contexts. In this sense, PA4 can foster the development of mathemacy, as it proposes situations that go beyond mere mathematical skills, mobilizing skills for critical reflection on social contexts.

Project 5 – LP6: Financial planning

The project aims to "[...] show the importance of learning financial mathematics, so that the student can make conscious choices about the management of their own

and family's financial resources" (Gay, 2020, p. 110). To achieve this purpose, its structure articulates succinct theoretical or contextual introductions with practical research and exploration activities. Moreover, the socialization of knowledge is emphasized, fostering discussion and the exchange of experiences among participants.

The teacher's guidance material presents a quote from the National Strategy for Financial Education [Estratégia Nacional de Educação Financeira—ENEF] to refer to the understanding of FE from the OECD, as follows:

[...] the process by which individuals and societies improve their understanding of financial concepts and products, so that, with information, education, and guidance, they can develop the values and competencies necessary to become more aware of the opportunities and risks involved in them and then be able to make well-informed choices, know where to seek help, and take other actions to improve their well-being. Thus, they can contribute more consistently to the formation of responsible individuals and societies, committed to the future (Brasil, 2011, p. 20).

Thus, the project is structured into six sequential steps that culminate in a personal financial diagnosis and the dissemination of the acquired knowledge. It begins with organizing the family budget and studying fundamental concepts, such as interest. Next, it promotes a critical reflection on consumerism and moves on to strategic financial planning, including investment analysis. The final product includes creating and launching a blog to synthesize knowledge and share it with the school and local community.

The rationale is based on journalistic sources and interviews, exploring topics such as financial planning and the importance of accepting constructive criticism. The approach includes mathematical concepts, such as percentage and simple and compound interest. The development involves using spreadsheets to organize the family budget and calculators to calculate percentages.

Inflation is integrated into the discussion on financial planning. The approach involves discussing the inflationary impacts on wages and income (PA5), grounded in *references to real-life*, as it considers students' perceptions of reality. On the other hand, it considers *references to a semi-reality* when proposing discussions on the readjustment of product and service prices (PA6 and PA7), culminating in the simulation and development of future planning (PA8).

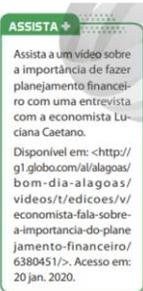
PA6, PA7, and PA8 are characterized by presenting semi-reality situations, based on hypotheses. While PA6 and PA7 focus predominantly on the application of

mathematical calculation procedures, AP8 distinguishes itself by proposing a simulation-based activity.

In addition, three activities (PA5, PA6, and PA7) were developed in line with the exercise paradigm. PA5 (Figure 5) addresses financial planning as a central theme, investigating the repercussions of inflation on wages and income. Thus, when considering the personal dimension of the student in relation to the theme, their concrete experiences are evident, reflecting a relationship with their reality and considering epistemic, identity, and social relationships.

Figure 5

PA5 Activity (Gay, 2020, p. 122)

Original	 <p>Assista a um vídeo sobre a importância de fazer planejamento financeiro com uma entrevista com a economista Luciana Caetano.</p> <p>Disponível em: <http://g1.globo.com/al/alagoas/bom-dia-alagoas/videos/t/edicoes/v/economista-fala-sobre-a-importancia-do-planejamento-financeiro/6380451/>. Acesso em: 20 jan. 2020.</p>	<p>3 Após assistirem ao vídeo indicado ao lado, em uma roda de conversa, discutam com a turma algumas questões, como as sugeridas a seguir, e registrem o que acharem importante para usarem posteriormente como tema de conteúdo para o blogue.</p> <ul style="list-style-type: none"> • Qual é a orientação da economista para que se possa "organizar" o orçamento, passando a planejar melhor as despesas? • Qual é o impacto que a inflação causa nos salários e rendimentos? • Quais são as despesas eventuais que ocorrem ao longo do ano e devem ser consideradas no orçamento anual?
Translation	<p>WATCH + Watch a video about the importance of doing financial planning with an interview with economist Luciana Caetano. Available at: http://g1.globo.com/al/alagoas/bom-dia-alagoas/videos/t/edicoes/v/economista-fala-sobre-a-importancia-do-planejamento-financeiro/6380451/. Accessed on: 20 Jan. 2020.</p> <p>3 After watching the video indicated on the side, in a conversation circle, discuss with the class some issues, such as those suggested below, and record what you think is important to use later as a content theme for the blog.</p> <ul style="list-style-type: none"> • What are the economist's guidelines so that one can "organize" the budget and start planning expenses better? • What is the impact that inflation has on wages and incomes? <p>What are the occasional expenses that occur throughout the year and should be considered in the annual budget?</p>	

PA6 and PA7 are also characterized by the exercise paradigm, based on semi-reality, learning environment (3). PA6 (Figure 6) shows a situation in which the value of an equipment part, initially stipulated at BRL 1,500.00, is adjusted based on an inflation rate of 4.5%, which requires the student to calculate the new value.

Figure 6

PA6 Activity (Gay, 2020, p. 124)

Original	<p>2 Renata quer juntar dinheiro e comprar um equipamento para embalar os doces que vende na comunidade. Todo mês ela ganha R\$ 300,00 com as vendas. Ela tem despesas de R\$ 120,00 mensais com os impostos de seu negócio, além dos ingredientes e suprimentos necessários para produzir os doces. Do valor líquido, ela usa 40% com as despesas mensais da casa e consegue guardar 60% desse valor na poupança para a compra do equipamento.</p> <p>a) O que é valor bruto e valor líquido? Nesse caso, qual é o valor líquido que Renata obtém mensalmente?</p> <p>b) Qual é o valor que ela consegue guardar mensalmente?</p> <p>c) Você considera que Renata está agindo certo ao guardar o que ganha na poupança para pagar o equipamento? O que aconteceria se ela parcelasse o valor?</p> <p>d) Sabendo que o preço do equipamento é de R\$ 1500,00 e no 12º mês haverá reajuste de 4,5% devido à inflação, quantos meses Renata precisará juntar o mesmo valor para conseguir pagar o equipamento de uma só vez? Considere que ela não vai aumentar o valor dos doces nesse período.</p>
Translation	<p>2 Renata wants to raise money and buy equipment to pack the sweets she sells in the community. Every month, she earns BRL 300.00 from sales. She spends BRL 120.00 per month on her business taxes, added to the costs of the ingredients and supplies needed to produce the sweets. Of the net amount, she allocates 40% to household expenses and saves 60% to purchase the equipment.</p> <p>a) What are gross value and net value? In this case, what is the net amount Renata gets monthly?</p> <p>b) What is the amount she can save monthly?</p> <p>c) Do you consider that Renata is doing the right thing by saving what she earns in savings to pay for the equipment? What would happen if she bought it in instalments?</p> <p>d) Knowing that the price of the equipment is BRL 1,500.00 and in the 12th month, there will be a 4.5% adjustment due to inflation, how many months will Renata need to add the same amount to be able to pay cash for the equipment? Suppose she will not increase the value of sweets in this period.</p>

In turn, AP7 (Figure 7) presents three situations to analyze different contexts. Although inflation is not the primary focus of the activity, the concept is introduced tangentially. Specifically, when exploring Landscape 3, the activity proposes adjusting the original trip cost. This approach aims to highlight the dynamics of product and service price variation over time.

Still, it is noteworthy that PA6 and PA7 cover other topics, not maintaining a direct relationship with the central object of investigation; however, both mobilize the calculation of percentages and the understanding of the impact of inflation on prices and financial planning.

Figure 7

PA7 Activity (Gay, 2020, p. 129)

Original	<p>Agora é a sua vez! Imagine três cenários em diferentes momentos no tempo:</p> <p>Cenário 1 (Hoje) Você tem R\$ 200,00 reais e quer fazer uma viagem que custará R\$ 300,00. Você quer muito fazer essa viagem e acaba pagando os R\$ 100,00 restantes com cartão de crédito. Você não sabe quando receberá mais dinheiro. Considere que, nesse mês, a taxa de juros do rotativo do cartão de crédito nesse banco é de 11,7% ao mês. Observação: considere que, no pagamento com cartão de crédito, os R\$ 100,00 só serão debitados quando completar um mês, e os juros serão cobrados a partir de então.</p> <p>Cenário 2 (Em três meses) Você precisou esperar três meses para fazer a viagem, mas agora, depois de alguns serviços prestados, tem os R\$ 300,00 e consegue pagar a viagem à vista.</p> <p>Cenário 3 (Em 12 meses) No terceiro mês você juntou os R\$ 300,00. Em vez de usá-lo, decidiu investir esse valor por oito meses, num fundo de investimento que apresentava rendimento de 0,31% ao mês.</p> <p>Em seguida, ao fazer os cálculos, representem os três cenários em um gráfico. Vocês poderão utilizar a planilha eletrônica para o cálculo de dados e a construção dos gráficos. E, então, respondam:</p> <ul style="list-style-type: none"> • No cenário 1, qual seria o valor da dívida após os 12 meses? • No cenário 3, qual seria o valor total acumulado no 12º mês? • Ainda no cenário 3, supondo que no ano seguinte o valor da viagem sofreu reajustes de acordo com o índice da inflação, que foi de 3,25%, quanto pagou pela viagem? Valeu a pena investir por 12 meses? Por quê?
Translation	<p>Now it's your turn! Imagine three landscapes at different points in time:</p> <p>Landscape 1 (Today) You have BRL 200.00 and want to take a trip that will cost you BRL 300.00. You really want to take this trip and end up paying the remaining BRL 100.00 by credit card. You do not know when you will receive more money. Assume that the interest rate on the revolving credit card at this bank is 11.7% per month. Note: Please assume that when paying by credit card, the BRL 100.00 will only be charged when you complete one month, and interest will be charged thereafter.</p> <p>Landscape 2 (In three months) You had to wait three months to make the trip, but now, after some work, you have BRL 300.00 and can pay cash for the trip.</p> <p>Scenario 3 (In 12 months) In the third month, you could save the BRL 300.00. Instead of using it, you decided to invest the amount for 8 months in an investment fund with a yield of 0.31% per month. Then, when calculating, represent the three landscapes in a graph. You can use the spreadsheet to calculate data and build the charts. And then, answer:</p> <ul style="list-style-type: none"> • In Landscape 1, after 12 months, what would the debt be? • In Landscape 3, what would be the total accumulated value in the 12th month? • Still in Landscape 3, assuming that in the following year the value of the trip was adjusted according to the inflation index, which was 3.25%, how much did you pay for the trip? Was it worth investing for 12 months? Why?

Finally, PA8 (Figure 8), the only activity classified in the learning environment (4), considers semi-reality when proposing the elaboration of a forecast for the first two years after high school. The proposal includes two moments that consider inflation. The first is related to future planning, requiring students to critically and practically analyze the inflation rate in a given period, understanding its impacts on individual financial planning and socioeconomic dynamics. The second moment concerns knowledge of different types of investment. Therefore, when proposing the activity, the guiding material highlights that:

Students are expected to respond that one should consider the inflation rate from one year to the next. There are several indices, but the IPCA (Broad National Consumer Price Index) is the official one. To estimate future expenditure, one must calculate it using compound interest, treating the inflation index as the interest rate and time (for example, 3 if the first year of graduation is 3 years from now) (Gay, 2020, p. 135).

Thus, the activity aims to develop critical awareness of the influence of economic phenomena on everyday life. Thus, it evidences an invitation to reflection, urging the student to ponder and engage with the proposed theme (Skovsmose, 2014).

Figure 8

PA8 Activity (Gay, 2020, p. 273 - 274)

Original	<p>Planejando o futuro</p> <p>1 Faça uma previsão de suas despesas para os dois primeiros anos após o término do Ensino Médio. Comece fazendo uma estimativa dos tipos de despesas, dos valores e dos possíveis rendimentos. Para isso, reflita sobre o seguinte:</p> <ul style="list-style-type: none"> O que você pretende fazer após o término do Ensino Médio? Você acha que estará estudando? Trabalhando? Montando um empreendimento? Com base no que pretende fazer, experimente listar as categorias e os valores para despesas. Na dúvida, prefira prever despesas um pouco a mais: <ul style="list-style-type: none"> Se continuar os estudos, fazendo um curso técnico ou universitário, por exemplo, é possível que seja pago? Quais seriam as despesas? Para esse objetivo, quais seriam as despesas relacionadas (materiais escolares, transporte, refeições etc.)? Você pensa em montar um empreendimento? Você já pesquisou quais são os passos? Já orçou o valor de taxas para abrir uma empresa? E o valor do investimento de seu negócio (espaço, se for preciso, materiais, divulgação etc.), já chegou a orçar? No caso de abertura de uma empresa, são necessários um bom plano de negócios, muito estudo e trocas com quem já passou pela experiência, para tomar tal decisão. Você pensa em mudar da casa de seus pais e ir morar em outro local? Aproveite as categorias listadas na tabela com as despesas familiares e orce todas elas para essa nova realidade. Você teria alguma atividade para gerar renda? Por exemplo: trabalho, estágio ou prestação de serviços? Qual seria o valor mensal? Seja realista, para não estimar valores que você gostaria, mas nem sempre são reais. Pense nas suas habilidades e no que sabe fazer, veja qual atividade econômica se encaixa mais no seu perfil. Pesquise qual é a média dos salários para a função escolhida e veja uma projeção de ganho para daqui a dois anos. Ou você também pode perguntar a algum conhecido, que tenha acabado de terminar o Ensino Médio e começado a trabalhar em algo que interessa a você, qual é a média de ganho. <p>Conhecendo os diferentes tipos de investimento</p> <p>1 Para saber mais, faça, em dupla, uma pesquisa on-line com o intuito de entender melhor o que são esses riscos e quais tipos de investimentos entram em cada uma dessas categorias. Assim, vocês poderão fazer uma escolha consciente do melhor investimento para vocês.</p> <ul style="list-style-type: none"> Selecione as informações e registrem as que acharem mais interessantes em uma folha à parte ou no Caderno de ideias. Esse material também poderá ser usado no blogue. Durante a pesquisa, provavelmente vocês encontrarão diversos sites oferecendo simuladores de juros e cálculos de rendimento para alguns investimentos. Vocês podem utilizar um deles para calcular os rendimentos do montante que investirão dentro do prazo predeterminado, assim terão mais um elemento a ponderar na escolha do melhor investimento para o seu perfil.
Translation	<p>Planning for the future</p> <p>1 Forecast your expenses for the first two years after you finish high school. Start by estimating the types of expenses, amounts, and possible earnings. To do this, reflect on the following:</p> <ul style="list-style-type: none"> What do you plan to do after you finish high school? Do you think you'll be studying? Working? Setting up a venture? Based on what you want to do, list the categories and their related costs. When in doubt, prefer to forecast expenses a little more: <ul style="list-style-type: none"> If you continue your studies, for example, by taking a technical or university course, will you have to pay for it? What would be your costs? For this purpose, what would be the related expenses (school supplies, transportation, meals, etc.)? Are you considering setting up a venture? Have you researched the steps? Have you ever budgeted the fees for starting a business? And has the investment value of your business (space, if necessary, materials, advertising, etc.) already been budgeted? In the case of opening a company, it takes a solid business plan, extensive research, and exchanges with those who have already gone through the experience to make such a decision. Do you think about moving out of your parents' house and living elsewhere? Take advantage of the categories listed in the table with family expenses and budget them all for this new reality. Would you have any activity to generate income? For example: work, internship, or service provision? What would be the monthly amount? Be realistic, so as not to estimate unrealistic, wishful values. Think about your skills and what you know how to do, and see which economic activity fits your profile best. Research what the average salary is for your chosen role and see a projection of earnings two years from now. Or you can also ask an acquaintance who has just finished high school and started working on something that interests you, what the average wages are. <p>Knowing the different types of investment</p> <p>1 To learn more, do an online survey together to better understand what these risks are and what types of investments fall into each of these categories. This way, you will be able to make a conscious choice of the best investment for you.</p> <ul style="list-style-type: none"> Select the information and record the ones you find most interesting on a separate sheet or in the Idea Booklet. This material can also be used in the blog. <p>During the research, you will probably find several websites offering interest simulators and yield calculations for some investments. You can use one of them to calculate the yields from the amount you will invest over the predetermined period, giving you one more element to consider when choosing the best investment for your profile.</p>

Thus, by integrating inflation into the simulation of future contexts, it is possible to build reasoned arguments, exercise decision-making, and problematize economic phenomena that directly affect the student's reality; it is, therefore, a proposal that considers the landscapes of investigation. Finally, it should be noted that this type of activity explicitly addresses the identity and social dimensions, as it encourages individuals to reflect on their unique life projects (Charlot, 2000; 2021).

This perspective converges with the principles of CME and SFE, conceived as an articulated set of knowledge through which students are encouraged to build an understanding of financial and economic topics (Silva & Powell, 2013). The semi-reality approach adopted by PA8 seeks to promote critical analysis to plan the future, encouraging students to reflect on their personal and family lives and on their social contexts.

Final considerations

From the analysis of 54 integrative projects in the area of mathematics and its technologies, contained in nine volumes of PNLD 2021, we identified only six that address the contemporary transversal theme “financial education”, all of which are linked to the integrative theme (IT) “Youth Protagonism”. This quantitative data shows the reduced emphasis given to the theme.

When assessing these six projects, we realize that only one presented an explicit understanding of Financial Education (FE), which, in turn, is based on OECD guidelines. Such a landscape is problematic on two fronts. On the one hand, the scarcity of understanding of the materials and, on the other hand, the fact that the OECD definition is the subject of recurrent criticism in the scientific literature in the area of mathematics education, especially for its limited attention to the identity and social dimensions that permeate the topic. Therefore, projects must make their understanding of FE explicit. For this purpose, the School Financial Education (SFE) perspective, which considers both mathematical and non-mathematical aspects, is a viable option.

When considering the five fundamental aspects of a project from the perspective of Critical Mathematics Education (CME) (theme, research, planning, product, and group work) (Biotto Filho, 2008), we noted that the six projects address these five areas, although emphasizing different perspectives. All present a theme developed logically and coherently, promoting research in a comprehensive or more targeted way. Above all, it is noteworthy that group work is conceived in various ways, as reflected in the culmination of each project, while proposing a cultural gathering requires greater dialogue and debate among participants, and preparing a panel of recommendations and good practices requires a more objective and targeted approach.

When establishing the analysis of the six projects in order to seek evidence on the theme of inflation, we realized that Project 2 of LP7 and Project 5 of LP8 did not mention the topic, which highlights a significant gap, as inflation must be considered a

fundamental element when discussing entrepreneurship (Project 2 of LP7) and family budget (Project 5 of LP8).

Thus, we note the absence of activities that make *references to pure mathematics*, which is in accordance with the delimitation of Object 1. In addition, the analysis shows that the monetary correction was limited to the exercise paradigm. On the other hand, the inflation rates (IPCA and IGP-M, in the Portuguese acronyms) that showed a higher incidence in the analyzed materials were predominantly linked to the perspective of reality.

Still, it is observed that the activities with potential for the landscapes of investigation, learning environments (4) and (6), stand out for fostering critical and reflective thinking, considering identity and social dimensions, when valuing the unique perspectives of the subjects. This approach corroborates the thesis that social relations are intrinsic to the way individuals appropriate knowledge (Charlot, 2000; 2021).

We also emphasize that the landscapes of investigation aim to instigate students to formulate questions and actively seek explanations. The success of this approach depends on student engagement, and students must appropriate the proposal and assume the protagonism of the investigative process, taking responsibility for conducting exploration and building meaning (Skovsmose, 2000; 2014).

As for the technological resources explored, although the activities use videos and propose research, they do not explore interactive digital tools, such as the Citizen Calculator⁹, from the Central Bank of Brazil, or the IPCA Calculator¹⁰, made available by IBGE. Failure to use these resources represents a missed opportunity to connect the contents to authentic data and applications of the Brazilian economic scenario.

Finally, we highlight the absence of projects in the analyzed *corpus* focused mainly on inflation. This finding indicates a gap to be explored both in future didactic publications and in academic investigations.

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⁹<https://www3.bcb.gov.br/CALCIDADAO/publico/exibirFormCorrecaoValores.do?method=exibirFormCorrecaoValores>.

¹⁰ <https://www.ibge.gov.br/explica/inflacao.php>.
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