10.46551/emd.v8n15a20 ISSN 2526-6136

OBInvest: Brazilian Investment Olympiad — links between investments, finance and Mathematics for High School students

Abstract: The design and implementation results of OBInvest are presented, aiming to contribute to a Financial Education that stimulates a responsible culture regarding investments and financial protection. Its methodology is centered on research, critical reading and technology-mediated learning. It is based on the environments of School Financial Education, invitation to reflection, duality and a multidisciplinary lens. In preparation, there is access to texts, video classes and simulators. In the first phase, there is an objective test, and in the second, objective and discursive questions, based on texts, videos and simulators. The results show that OBInvest stimulated learning and the production of knowledge, evidenced by the participants' responses/reports, showing it to be promising for the economic and financial education of young people.

Keywords: Financial Education. Financial Literacy. Investments. Olympics. Digital Media.

Ivail Muniz Junior
Colégio Pedro II
Rio de Janeiro, RJ — Brasil
0000-0001-7509-410X
ivailmuniz@cp2.g12.br

Gilberto Gil Fidelis Gomes Passos
Centro Federal de Educação Tecnológica Celso Suckwof da Fonseca
Rio de Janeiro, RJ — Brasil
0009-0007-5848-8298
gilberto.passos@cefet-rj.br

Wagner Dias Santos
Centro Federal de Educação Tecnológica Celso Suckow da Fonseca
Rio de Janeiro, RJ — Brasil
0009-0005-7143-6877
wwdiass@gmail.com

Received • 01/04/2024
Accepted • 15/05/2024
Published • 20/08/2024

Article

OBInvest: Olimpiada Brasileña de Inversiones — vínculos entre inversiones, finanzas y Matemáticas para estudiantes de Secundaria

Resumen: Se presenta el diseño y los resultados de la implementación de OBInvest. Su metodología se centra en la investigación, la lectura crítica y el aprendizaje mediado por la tecnología. Se basa en entornos de Educación Financiera Escolar, una invitación a la reflexión, a la dualidad y a la multidisciplinariedad. Como preparación se dispone de acceso a textos, videoclases y simuladores. En la primera fase se realiza una prueba objetiva, y en la segunda, preguntas objetivas y discursivas, basadas en textos, vídeos y simuladores. Los resultados muestran que OBInvest estimuló el aprendizaje, como lo evidencian las respuestas/informes de los participantes, demostrando que es prometedor para la formación económica y financiera de los jóvenes.

Palabras clave: Educación Financiera. Alfabetización Financiera. Inversiones. Olimpíada. Medios Digitales.

OBInvest: Olimpíada Brasileira de Investimentos — articulações entre investimentos, finanças e Matemática para estudantes do Ensino Médio

Resumo: São apresentados o *design* e alguns resultados da implementação da OBInvest, a fim de contribuir para uma Educação Financeira que estimule uma cultura responsável sobre investimentos e proteção financeira. A metodologia da OBInvest é centrada na investigação, leitura crítica e aprendizagem mediada pela tecnologia. Fundamenta-se na perspectiva dos ambientes de Educação Financeira Escolar, convite à reflexão, dualidade e lente multidisciplinar. Na preparação, tem-se acesso a textos, videoaulas e simuladores em plataforma específica. Na primeira fase, há uma prova objetiva, e na segunda, questões objetivas e discursivas, baseadas em textos, vídeos e simuladores. Os resultados mostram que a OBInvest estimulou a aprendizagem e a produção de conhecimentos, evidenciados pelas respostas/relatos dos participantes, mostrando-a promissora para a formação econômica e financeira dos jovens.

Palavras-chave: Educação Financeira. Literacia Financeira. Investimentos. Olimpíadas. Mídias Digitais.

1 Introduction

The Financial Education initiatives, including those aimed at young people in both school and non-formal education environments, have been advocated and implemented since the 1990s in the United States, and in several countries at the beginning of this century, following the actions of the Organization for Economic Cooperation and Development (OECD) since 2003, as shown by Aprea *et al.* (2016).

The remarkable growth in initiatives aimed at educating people financially, with different intentions, conceptions and foundations, has various motivations and justifications. Some of them refer to economic, demographic and social challenges, such as the concentration of wealth, unemployment, an ageing population, forms of work, inequality and income disturbances, as well as technological changes and the reduction in the supply of quality public services such as health, education and security. In addition, the wide range of financial products offered in recent years, related to investments, credit, protection and pensions, has been presented as a strong justification for an education that helps people think about generating, spending, managing and saving money (Muniz, 2016a; Cordeiro, Costa and Silva, 2018).

In this context, the ability to critically analyze and decide on financial matters, ranging from saving and investing to fraud protection, has become a highly valuable skill. This competence, commonly referred to as Financial Literacy, according to Aprea *et al.* (2016), reflects the ability to interpret and understand financial issues. In other words, the ability to deal with, interpret and analyze financial issues has been called *Financial Literacy* — ability to *read* financial issues. The process of helping people to develop this capacity has been understood and defined by most economic agents as *Financial Education*.

To accompany these transformations, the approach to financial and economic contexts and notions in the Mathematics curriculum of Basic Education has been advocated by national guiding documents, especially with the recent inclusion of Financial Education as a cross-cutting and integrating theme in the Base Nacional Comum Curricular [National Common Curriculum Base — BNCC]. An example of this policy is mathematics textbooks, which have sought to present Financial Education topics, although still in a limited way and strongly linked to Financial Mathematics (Marin and Silva, 2020; Pessoa, Muniz and Kistemann Jr., 2018).

In the context of Financial Education in schools, it is important to note that practice and research on Financial Education in Basic Education had already been taking place on at least three fronts for about a decade before its inclusion in the BNCC. There are records of specific initiatives by math teachers in the classroom, such as those recorded by Muniz (2007) and Stephani (2005).

In 2010, with the creation of the National Strategy for Financial Education (ENEF), in addition to actions aimed at adult financial education, a specific set of measures for financial education in schools was defined. The main one was the program called *Educação Financeira nas Escolas* [Financial Education in Schools — ENEF, 2010], created with the aim of promoting discussions and training for primary school students on various topics involving financial situations.

In addition, research points to a movement to think about, research and discuss Financial Education in Basic Education, within the scope of Mathematics Education, such as the study groups of the Fundão Project, at the Federal University of Rio de Janeiro (UFRJ); in the

Postgraduate Program in Mathematics Education (PPGEM), at the Federal University of Juiz de Fora (UFJF); within the scope of Colégio Pedro II, the Study Group on Mathematics Development and Learning (GREDAM), at the Federal University of Pernambuco; among others (Silva and Powell, 2013; Muniz, 2016). At UFJF, a series of five symposia on the subject took place between 2014 and 2019.

With this Financial Education movement, driven by different agents such as banks, finance companies, insurance companies, consultants, digital influencers, among others, with different intentions and conceptions, together with the growth in access to and use of digital media and social networks in the contemporary world, the Brazilian Investment Olympics (OBInvest) emerged on the national scene in August 2020, with the aim of democratizing and disseminating knowledge of Financial Education and Finance to high school students from all over Brazil.

The Olympiad was conceived by Professor Gilberto Gil Passos and developed at the Celso Suckow da Fonseca Federal Center for Technological Education (CEFET-RJ), by a team led by Professors Gil, Carlos Pantoja and Wagner Dias, with the active participation of students, including Thiago Rodrigues. This team was responsible for implementing the project, both in creating content for the media and social networks, and in designing and developing the Stocks platform, which was responsible for hosting the test. OBInvest debuted in 2021, with the participation of more than 4,300 students and 400 schools from all over the country.

Based on the production of content through digital media and guided by the National Common Curriculum Base (BNCC), its creators and organizers seek to promote "an interdisciplinary study involving cultural, social, political and psychological dimensions, in addition to the economic one, on the issues of consumption, work and money" (Brasil, 2017, p. 269).

From a multidisciplinary lens and considering didactic, cultural and behavioral aspects, as pointed out by Muniz (2016), Pessoa, Muniz and Kistemann Jr. (2018), Pessoa and Muniz (2021), Kahneman (2010), OBInvest seeks to invite students to reflect on situations and make decisions that contribute to the development of skills and competencies necessary for the critical, emancipatory and inclusive formation of the 21st century individual. In this way, it aims to promote the full exercise of citizenship and the possibility of young people entering a new job market.

OBInvest differs from other competitions in at least two respects: the formative pre-test and the multidisciplinary nature. In terms of training, OBInvest offers a series of digital materials in the form of videos, simulators and texts, so that students can learn by doing, i.e. by following the Olympiad's channels, they become capable of building their own knowledge about finance and investments during the training process.

In the multidisciplinary aspect, students were offered opportunities to produce knowledge and meanings about macroeconomic situations and notions, such as inflation and purchasing power, the financial market, the monetary system, investments — including fixed income and variable income, Financial Mathematics, the value of money over time, interest in a way that is connected to Mathematics in Basic Education, with the aim of contributing to the development of some of the skills described in the BNCC.

It's worth noting that knowledge olympiads, in general, have, among other objectives, to contribute to the development of critical-scientific thinking and stimulate interest in scientific research among students. By tackling challenging problems, students are encouraged to seek innovative solutions, broadening their cognitive skills in order to prepare them for the

challenges of the contemporary world.

In particular, OBInvest presents problems that portray real situations linked to the teaching of School Financial Education (SFE) and thus provides a unique opportunity for inclusion and diversity in the teaching of mathematics. Unlike traditional assessments that often focus on memorizing concepts, OBInvest, from its conception, values reasoning and problem-solving skills, allowing students from different backgrounds and locations in the country to develop throughout their participation in the competition.

In this paper, we will present the notions that theoretically and methodologically underpin the design and implementation of OBInvest, followed by an initial synthetic analysis of the data and results from the first edition.

2 Theoretical framework

Financial Education (FE) is a prominent contemporary issue (Pessoa and Muniz, 2021). While some see it as an indispensable strategy for people's financial health — or the lack of it as the main motivation for financial problems such as debt and compulsive consumption — others see the Financial Education movement as a process of domination and judgment. There are also those who see PE, especially the kind that is intended to be taught in schools, as simply a *different* approach to Financial Mathematics.

OBInvest was conceived from the outset as a space for learning about finance and investments. It is a means of contributing to the Financial Education of young people, especially high school students. It is an area for developing Financial Literacy as a set of skills, competencies and abilities to deal critically and in an informed manner with a range of financial situations.

The Olympiad was also designed as a space where students could learn before and during the exam. It was designed collaboratively between teachers and students, taking into account dialogues with the BNCC, the professional experience of math teachers and finance professionals, as well as studies on economic notions, including investments and the financial market.

Research on School Financial Education, generated in the field of Mathematics Education, has also contributed, above all, to a conception of Financial Education that contemplates the initial purposes of OBInvest.

In this work, because the authors are mathematics teachers by training, we start from the central idea of the BNCC indication, in the thematic unit of Numbers:

> Another aspect to be considered in this thematic unit is the study of **basic economic and financial concepts, with a view to educating students about finance.** Thus, subjects such as interest rates, inflation, financial investments (profitability and liquidity of an investment) and taxes can be discussed. This thematic unit favors an interdisciplinary study involving the cultural, social, political and psychological dimensions, in addition to the economic one, on the issues of consumption, work and money (Brasil, 2017, p. 269, emphasis added).

Bearing in mind the guidelines of the BNCC and the desire of its creators to create their own teaching and learning methodology for Financial Education, OBInvest was conceived and structured based on four pillars of knowledge necessary for students to understand and enter the world of Finance and Investments. The pillars are shown in the image below and are

explored in all the content and in the test.

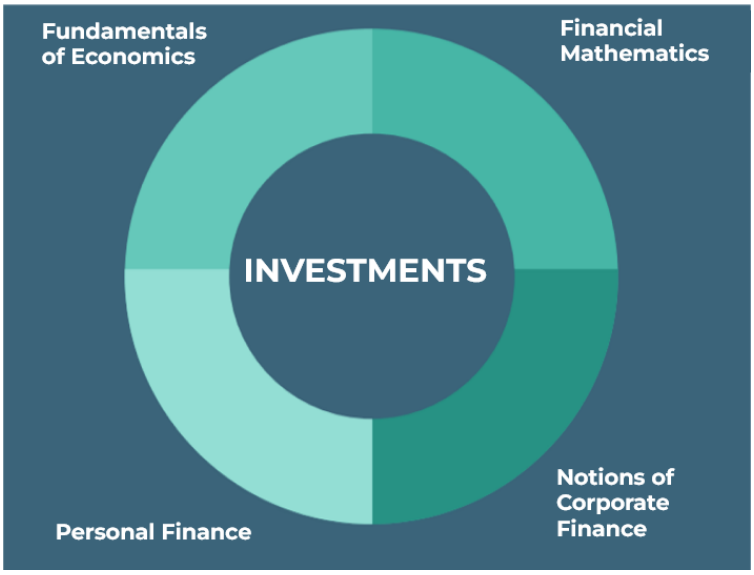


Figure 1: Pillars of Knowledge addressed at OBInvest (Own elaboration)

To provide students with opportunities to produce knowledge based on these four pillars, three types of learning spaces have been offered:

1. Video lessons on mathematical and financial topics;
2. Texts on Financial Education in schools, Financial Markets, Investment Analysis and Personal Financial Planning;
3. *Lives*, talks and weekly posts, seeking interactivity and continuous engagement with Internet users.

The creation of content for the digital media and the preparation of the OBInvest test sought to address these issues, always with the aim of contributing to the students' education, so that they can develop skills and competencies that help them plan their financial lives, as well as their decision-making processes, taking into account the knowledge acquired about the importance and value of money over time.

The concept of Financial Education that essentially contemplates and underpins the objectives of OBInvest is presented in Muniz (2016a). In this conception, Financial Education in School Contexts (EFCE) is

> a process of education based on a set of strategies and actions developed for the school context, considering mathematical and non-mathematical, didactic and multidisciplinary aspects, which invites students to reflect on economic and financial situations related to the acquisition, planning, use and redistribution of money, in a critical and reasoned way. We will cover topics such as income and work, planning, budgeting and financial management, consumption, culture and sustainability; the value of money over time and its causes: inflation, exchange, interest and investments; equivalence of capital and rates; taxes and contributions; social security and protection, seeking to produce didactic connections with Basic Education through the teaching of mathematics, inviting students to reflect on the possible consequences of their decisions and attitudes towards their demands, needs, projects and achievements in their personal lives, families and the society in which they live. (Muniz, 2016a, p. 46).

This perspective of EF, which aims to encourage students to think critically (evaluating options, considering their risks and reflecting on possible alternatives) is based on four principles: invitation to reflection; didactic connection; duality and multidisciplinary lens, as presented in Muniz (2016b).

Our position is that School Financial Education should not be considered just a process of educating people to deal with money - the most usual view presented by the market. We are looking for a broader vision, because the central issue is not money, but human choices (Figure 2).

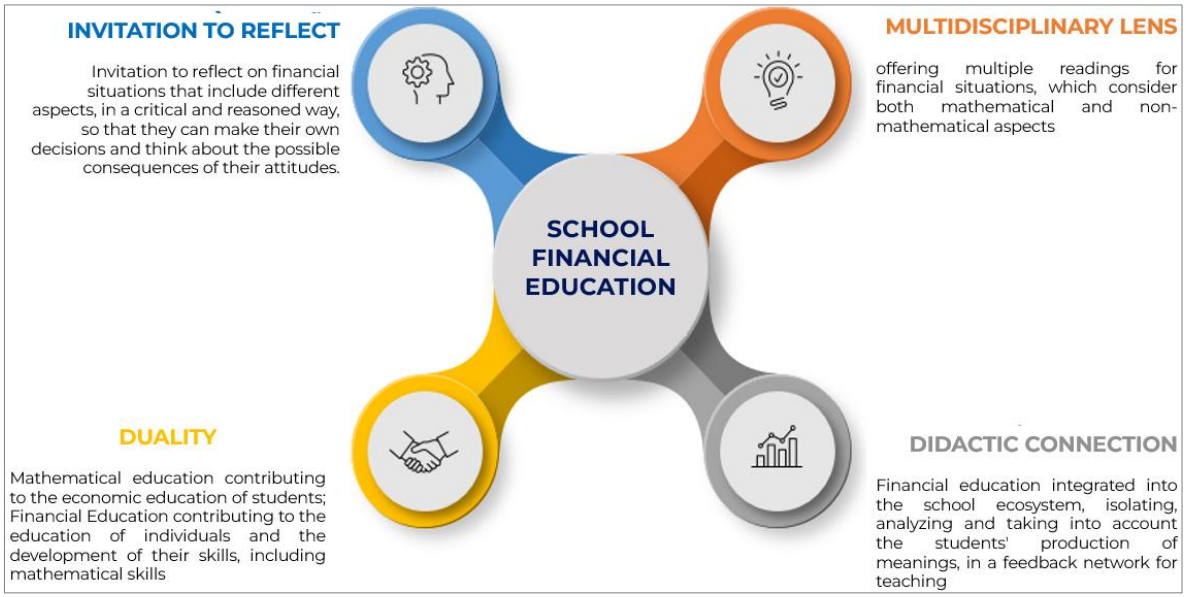


Figure 2: The 4 principles of School Financial Education as conceived by Muniz (Muniz, 2016b, p. 4)

The *invitation to reflect* makes it clear that FE should not be prescriptive or imposing, but rather an invitation to students to reflect on financial situations that take into account different aspects, so that they can make their own decisions.

The *didactic connection* establishes the importance of the school context in the practice of Financial Education. In this EFE, we want to understand how students think mathematically when analyzing financial situations, and what non-mathematical aspects emerge, so that this understanding generates new materials, new ways of teaching, as well as new assessment processes.

The *duality* marks a position: EFE can and should be a two-way street, and therefore dual, so that both the students' mathematical knowledge helps them to understand, analyze and make decisions in economic and financial situations (SEF), and the Financial Education approach contributes to the development of the students' mathematical skills, in other words, so that the teaching of Mathematics and Financial Education are two sides of the same coin.

And finally, the principle of the *multidisciplinary lens* argues that it is essential to offer multiple readings of the financial situation, so that financial, economic, mathematical, behavioral, cultural, social, political and ecological aspects can be used in an articulated way when reading situations of consumption, income, indebtedness, investment, financial planning, sustainability, etc. Studies involving marketing, neuroscience, economics, anthropology and the sociology of consumption constitute different lenses. And, like lenses, they focus on some aspects and blur others.

These four principles are directly connected to the design of the test, as economics and finance intertwine to provide themes for the questions that present situations about supply and demand, inflation and purchasing power, risk and volatility, income and variable instruments, economic inequality and income distribution, risk protection and savings, among others. Figure 2 summarizes these four principles (Muniz, 2016b).

3 Methodology

OBInvest was designed to contribute to the economic and financial education of high school students, with the aim of encouraging a responsible culture of investment and financial protection. OBInvest's methodology is centered on research, critical reading and technology-mediated learning.

The preparation part offers students a set of materials in texts, videos, economic and financial reports, official portals, calculators and simulators, as can be seen in Figure 3.

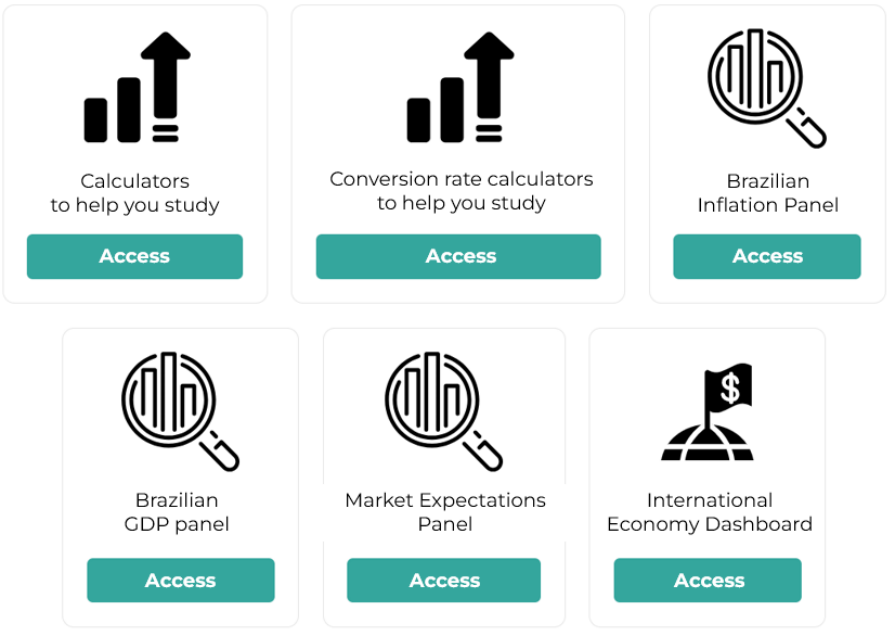


Figure 3: Panel of tools available on the OBInvest website (Available at https://obinvest.org/ferramentas; accessed on Jan. 2024)

In addition to these materials, a blog offers users economic information that is updated periodically. An example of the structure of this information is shown in Figure 4.

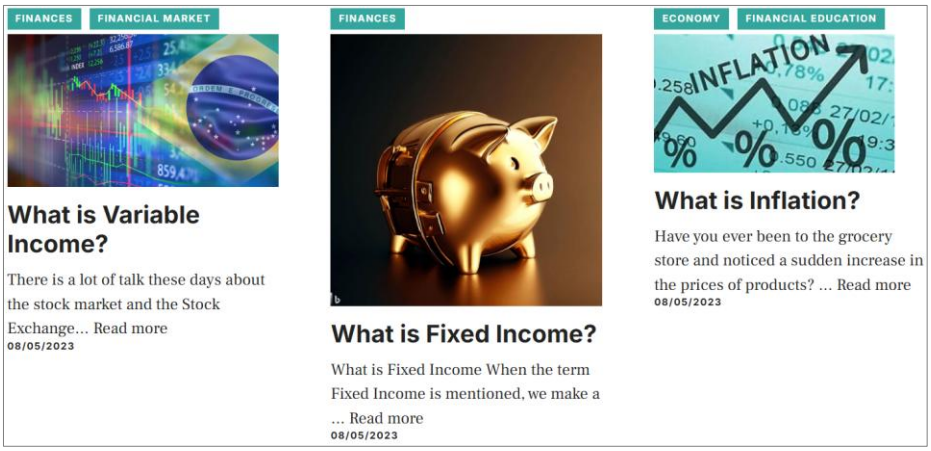


Figure 4: OBInvest Blog (Available at https://blog.obinvest.org; accessed on Jan. 2024)

During the OBInvest, participants had the help of tools that could be used during the exam, and an online course with the participation of financial market managers. In this way, participants were able to develop skills and competencies to learn finance content for their lives before and during the exam.

The investment simulator is an interactive tool that allows you to invest fictitious capital using graphical analysis tools, based on information from the financial market (Figure 5).

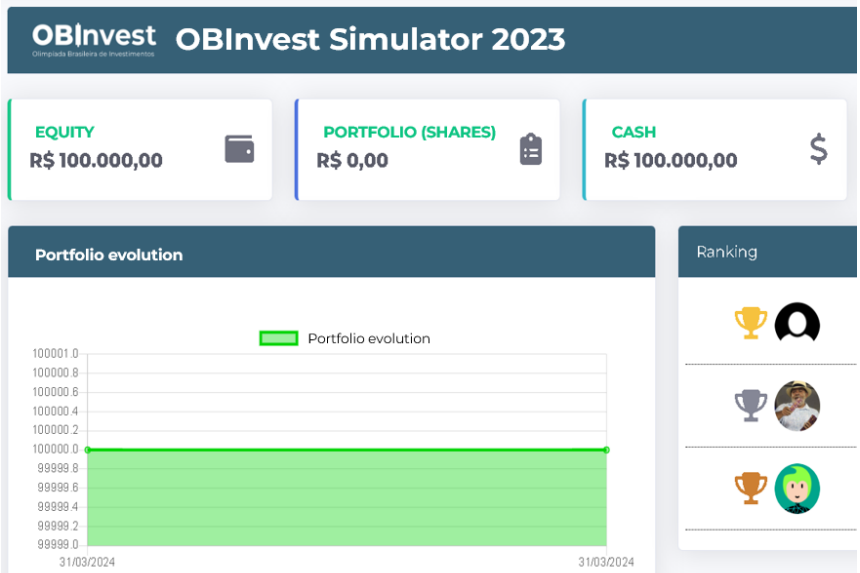


Figure 5: OBInvest 2023 simulator (Available at https://obinvest.realgrana.com.br/painel/informacao-sala.php?s=574)

With regard to the test questions, they were designed in accordance with the BNCC, seeking to develop Mathematical Literacy through the skills and abilities to reason, represent, communicate and argue mathematically, in order to favor the establishment of conjectures and the formulation and resolution of problems in a variety of contexts, using mathematical concepts, procedures, facts and tools (Brasil, 2017).

In addition, the test questions sought to develop students' Financial Literacy by proposing problem situations whose aim is to develop skills in dealing with and managing their own money, for example, buying (in cash or in installments), saving or investing. All this without losing sight of the idea that the student would have a learning experience during the test.

As an example of the development of these skills, we present two questions from the OBInvest 2021 first stage exam (Figure 6 and 7). They have an introductory video to the more specific content covered and include real-world contextualizations, with the aim of leading the student towards building an integrated vision of mathematics applied to the reality in which they find themselves.

In this question, we emphasize that the data used was real. The introduction to the problem presents a historical context that brings the student closer to an interdisciplinary approach to mathematical content and the history of Brazil. In the attached video, we explain the concept of purchasing power and how the calculation should be carried out.

In addition, the question opens up the possibility of discussing the social impact of inflation on families' ability to consume the basic food basket. Therefore, approaching this question provides students with a vision that involves the social, political and economic

dimensions of the current situations of consumption, work and money, as advocated by the BNCC.

Question 10

YouTube video

The basic food basket was created by a decree issued by the Getúlio Vargas government in 1938. The central idea was to assign the value of a basic food basket as one of the main components in defining the value of the minimum wage.
The idea was to provide workers with a minimum wage where they could afford basic food for survival, as well as other living costs such as housing. (...) It's important to know that a basic food basket normally provides for a family of up to 4 people for a maximum of around 10 days.

https://sbsrj.org.br/historia-cesta-basica-brasil/

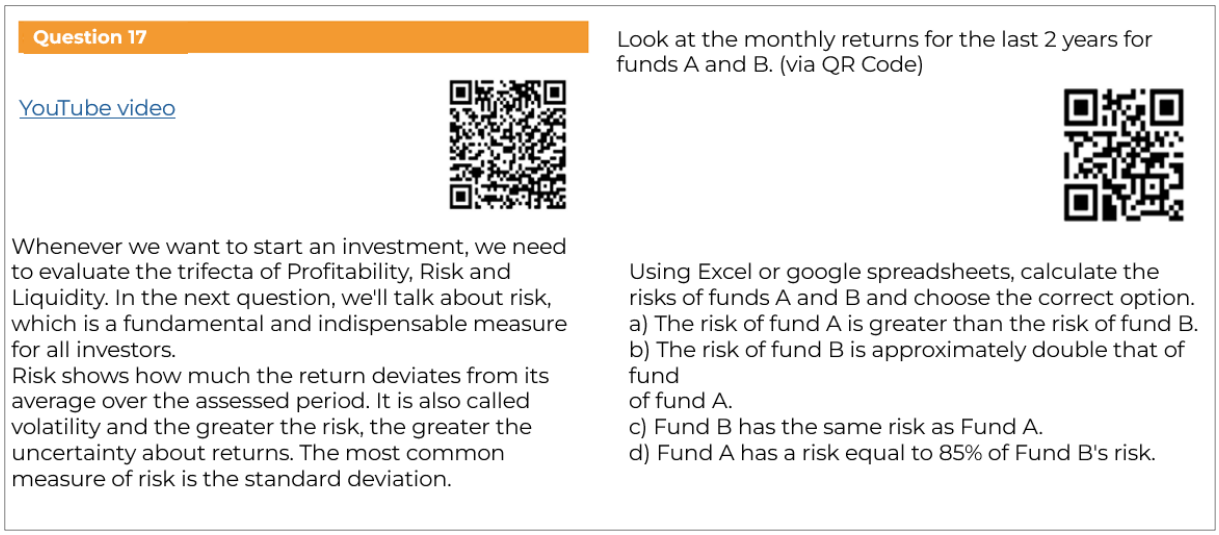
According to DIEESE (Intersindical Department of Statistics and Socioeconomic Studies), the price of the basic food basket in Rio de Janeiro varied from R$ 252.24 in January 2011 to R$ 621.09 in December 2020, and the minimum wage in the same period varied from R$ 545.00 to R$ 1045.00, as shown in the table below.

	Basic food basket	Minimum wage
jan/11	252,24	545,00
Dec/20	621,09	1.045,00

We can correctly state that the purchasing power of the minimum wage in relation to food baskets over this 10-year period was

a) increased by approximately 10%.
b) decreased by approximately 20%.
c) decreased by approximately 10%.
d) remained the same as in 2011.

Figure 6: Example of a question from the first phase of OBInvest 2021. Question 10 (Purchasing power). (Available at https://obinvest.org/prova1fase.pdf; accessed on Jan. 2024)



Question 17

YouTube video

Whenever we want to start an investment, we need to evaluate the trifecta of Profitability, Risk and Liquidity. In the next question, we'll talk about risk, which is a fundamental and indispensable measure for all investors.
Risk shows how much the return deviates from its average over the assessed period. It is also called volatility and the greater the risk, the greater the uncertainty about returns. The most common measure of risk is the standard deviation.

Look at the monthly returns for the last 2 years for funds A and B. (via QR Code)

Using Excel or google spreadsheets, calculate the risks of funds A and B and choose the correct option.
a) The risk of fund A is greater than the risk of fund B.
b) The risk of fund B is approximately double that of fund
of fund A.
c) Fund B has the same risk as Fund A.
d) Fund A has a risk equal to 85% of Fund B's risk.

Figure 7: Example of a question from the first phase of OBInvest 2021. Question 17 (Risk and volatility) (Available at https://obinvest.org/prova1fase.pdf; accessed on Jan. 2024)

In this question, we emphasize once again that real data was used. In the introduction to the problem, we mentioned some finance concepts such as Profitability, Liquidity and Risk, the latter of which is covered and explained in depth in the text and also in the attached video. In the video, we explain the concept of Risk and its connection to Mathematics through the calculation of percentage variations and more specifically in the calculation of the statistical measure of Standard Deviation using a spreadsheet.

In addition, this question opens up the possibility of discussion and an active search for learning on the part of the students about the other concepts mentioned in the introduction, such as Profitability and Liquidity. Therefore, the approach of the question provides the student with a vision that develops various potentialities, in particular, skill EM13MAT203 of the BNCC, which says: “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 for simple and compound interest calculations, among others), to make decisions" (Brasil, 2017, p. 543).

OBInvest offers a free content channel on Instagram (@obinvestbrasil) and YouTube (Olimpíada Brasileira de Investimentos), so that students can have access to live interviews, videos on topics related to Finance, solved questions, as well as study tips so that they have adequate and applicable support in their lives, especially if they want to take part in the Olympics.

We also make various tools available on our own platform, such as: a compound interest calculator, a *home broker* simulator, as well as past exams and mock exams for better learning of this school subject, which is so important for training individuals in the 21st century, via our official website https://obinvest.org.

4 Discussion and analysis of test data

The 1st Brazilian Investment Olympics (OBInvest, 2021) was held entirely virtually, with two phases:

- First phase (objective): held from May 3 to 10, 2021;
- Second phase (objective and discursive): held from July 19 to August 4, 2021.

After a publicity campaign on social media, with no subsidies or financial aid, we received 3,658 entries in the Official category, which covers secondary schools and the 9th year of primary school, as well as 670 entries in the Open category, aimed at anyone interested in taking part, for a total of 4,328 entries. The distribution of registrants among Brazilian regions occurred as shown in Figure 8.

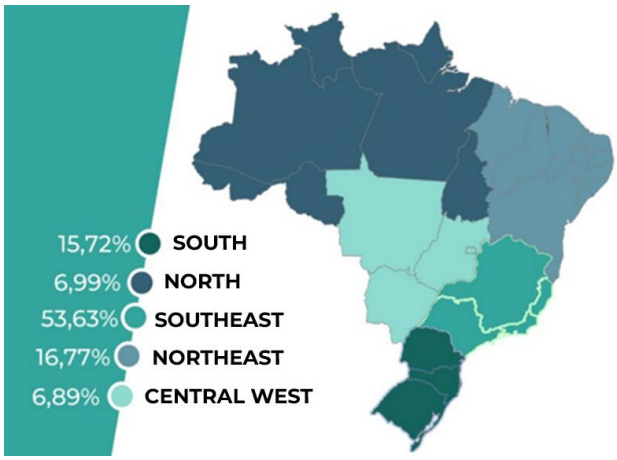


Figure 8: Number of OBInvest registrants by region (Own elaboration)

The first phase consisted of 20 objective questions, and the second phase consisted of 15 objective questions and 1 discursive question. The discursive question asked the student to put together an investment portfolio for a given investor profile, justifying all their allocations with their expectations.

Overall, OBInvest awarded 96 students with 10 gold medals, 20 silver medals, 20 bronze medals and 46 Honorable Mention certificates. In addition, certificates were sent to all participants in the event.

Among the winners, we would highlight the Southeast region, with 60 awards; followed

by the Northeast region with 15; the South region with 11; the Midwest with 7 and the North with 3. We would also point out that 32 of the winners are students from public schools.

As for the students' feedback, some comments (Figure 9) indicate that the test methodology and the experience provided contributed to the formation of new knowledge and stimulated the search for more knowledge.

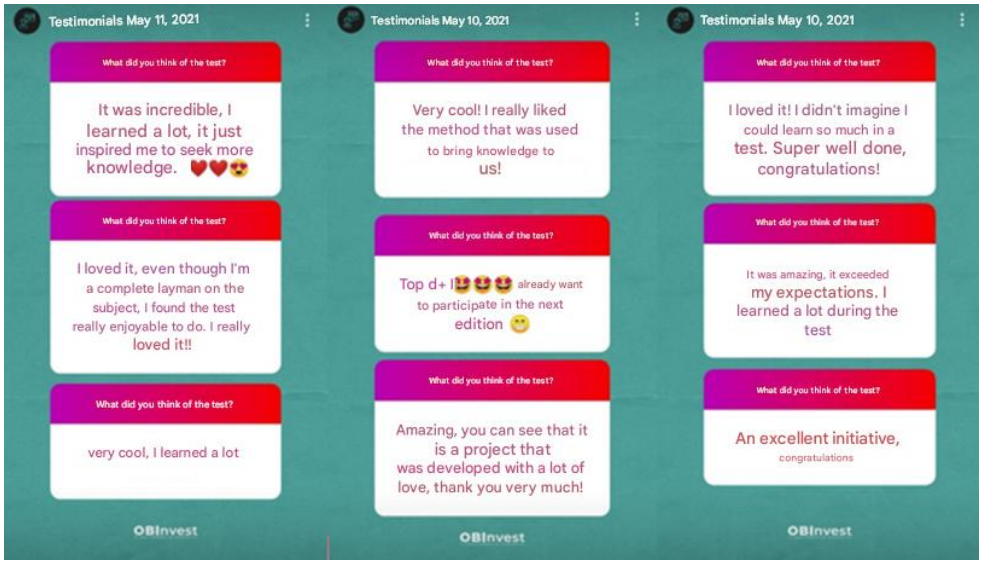


Figure 9: Some comments from participants in the 1st Edition of OBInvest (Data collected on the platform)

The students' learning is evident in their comments. Expressions such as the *method* or the *way of approaching* it indicate a perception of learning and satisfaction with what they have learned. The stimulus to the production of knowledge, in their view, did in fact occur.

In addition to the students' comments, we also received some feedback from teachers who were satisfied with our proposal and methodology. We highlight the comments of two teachers below:

> *Good morning!!! I would very much like to commend your test. A score of 1000! The sensitivity in thinking and organizing the 20 questions.... giving room for all levels of students (especially for 9th graders and high school students). My students are in love with everything that has happened .... And, of course, they have now found a sense of why they should study certain subjects at school!!! Gratitude indeed.... congratulations to the entire organization and to everyone who thought up and made this Olympiad happen in the midst of this Pandemic....one thing I can guarantee..... seeing students with eyes shining in remote mode and choosing to take part in the Olympiad of their own free will, full of desire and curiosity....seeking to understand and comprehend every detail, every number, every drop, every rise and best of all noticing the interdisciplinarity and understanding that the solution is social development and that we do need people who know how to work with money* (Teacher JCM).

> *Congratulations.... congratulations and congratulations 👏👏💚 you have transformed several students in this country and you have certainly made several teachers believe again that it is possible to change and use the remote and technologies in our favor.... leaving the student as the protagonist !!! 💚💚🌎🌎 Thank you very much verdade🙏 obs: I am a Geography teacher and since this Olympiad started my classes have never been the same and you have woken up the sleeping giant that was in these 14, 15 and 16 year olds!!! 👏🤣* (Teacher AMG).

5 Considerations and perspectives

With its own methodology, OBInvest began its mission of disseminating finance knowledge to high school students from public and private schools. It also sought to explore

the interdisciplinary links between finance and the content of the basic high school curriculum, as well as presenting a new job market in finance as a possibility for young people.

Our mission is to transform the lives of young people through Financial Education, providing an integrated vision of Finance with other subjects that make up the Basic Education curriculum. With this mission in mind, OBInvest provides a free channel of content, interviews and study tips so that students have adequate study support for the Olympiad editions.

In addition, our own platform offers a range of tools such as calculators, past tests and mock exams to help you develop this skill, which is so important for training individuals in the 21st century. We're counting on you to be part of our story. If you're a high school student — or even a university student or professional interested in new knowledge — sign up!

The structure of the test includes questions that focus on learning while doing. The videos are a means of understanding concepts, stimulating learning and anchoring the knowledge produced in the preparation phase. You learn by doing and interacting during the test.

In this way, we understand that the OBInvest questions are designed to engage with Mathematics and the Humanities and Applied Social Sciences, enabling a broader view of the objects of study. The issue of savings is closely linked to conditions of income distribution, persistence, food insecurity, vision of the future, family habits, among others. We always have bills and accounts!

There is also the didactic-pedagogical aspect, which reinforces the interdisciplinarity of school content, as well as its applications in the various areas of the social universe. Above all, we aim for intellectual autonomy, which results from logical-scientific reasoning.

OBInvest also has the potential to contribute to Mathematics Education in at least three ways. The first is in the cognitive sense, seeking to understand the operations mobilized by students to solve problems; the conceptual fields constructed; the mathematics produced by different groups and their socio-economic contexts; the strategies used and the logic of these operations. The second direction seeks to analyze the students' speeches, identifying which non-mathematical aspects they take into account when analyzing and making decisions about the problems presented.

Still in relation to Mathematics Education, there is a broad field of research into the role of digital tools in task design and student interaction with simulators and videos, both to learn topics and to analyze and answer questions. This is a two-way street, in which studies on mathematical thinking and the use of digital technology can contribute to understanding how participants use technology to learn and think about test questions and situations. In addition, this interaction with videos and simulators to study and think about financial issues can raise new questions that have not yet been explored in Mathematics Education, especially with regard to the use of digital media to learn and solve problems involving mathematical and non-mathematical aspects.

We believe that schools have a role to play in providing an environment that encourages students to think critically, freely and in an informed manner, with a view to their cognitive, social and economic development.

That's why we hope that OBInvest will help to expand investment culture, protection, understanding of economic issues and critical positioning in the face of pitfalls and opportunities. More broadly, we hope that OBInvest will contribute to the creation of environments, especially School Financial Education Environments, which connect the

classroom and virtual learning spaces with financial topics, including savings, investment, risk protection and intertemporal exchanges, so that we can form critical and participatory citizens in society.

Note

The translation of this paper from Portuguese into English was funded by the Minas Gerais State Research Foundation (Fapemig — *Fundação de Amparo à Pesquisa do Estado de Minas Gerais*), under Call for Proposals 8/2023.

References

APREA, Carmela; WUTTKE, Eveline; BREUER, Klaus; KOH, Noi Keng; DAVIES, Peter; LOPUS, Jane Stone. BETTINA, Greimel-Fuhrmann. *International Handbook of Financial Literacy*. Singapore: Springer, 2016

BRASIL. Ministério da Educação. Secretaria de Educação Básica. *Base Nacional Curricular Comum:* Educação Infantil e Ensino Fundamental. Brasília: MEC/SEB, 2017.

CORDEIRO, Nilton José Neves; COSTA, Manoel Guto Vasconcelos; SILVA, Márcio Nascimento. Educação Financeira no Brasil: uma perspectiva panorâmica. *Ensino da Matemática em Debate*, v. 5, n. 1, p. 69-84, 2018.

ENEF — Estratégia Nacional de Educação Financeira. *Orientação para Educação Financeira nas Escolas*. Brasília: ENEF, 2010.

KAHNEMAN, Daniel. *Rápido e devagar*: duas formas de pensar. Translated by Cássio de Arantes Leite. Rio de Janeiro: Objetiva, 2012.

MARIM, Vlademir; SILVA, Maxwell Gomes. Educação Financeira: abordagem nos livros didáticos de Matemática para o Ensino Médio. *Educação Matemática Debate*, v. 4, n. 10, p. 1–26, 2020. https://doi.org/10.24116/emd.e202005

MUNIZ, Ivail Junior. À vista ou a prazo? Análise de financiamentos e investimentos no Ensino Médio. In: *Anais do IX Encontro Nacional de Educação Matemática*. Belo Horizonte, 2007, p. 1-11.

MUNIZ, Ivail Junior. *Econs ou Humanos?* Um estudo sobre a tomada de decisão em Ambientes de Educação Financeira Escolar. 2016a. 416f. Tese (Doutorado em Engenharia de Produção). Universidade Federal do Rio de Janeiro. Rio de Janeiro.

MUNIZ, Ivail Junior. Educação Financeira e a sala de aula de Matemática: conexões entre a pesquisa acadêmica e a prática docente. In: *Anais do XII Encontro Nacional de Educação Matemática*. São Paulo, 2016b, p. 1-12.

PESSOA, Cristiane Azevêdo dos Santos; MUNIZ, Ivail Junior; KISTEMANN JR., Marco Aurélio. Cenários sobre Educação Financeira Escolar: entrelaçamentos entre a pesquisa, o currículo e a sala de aula de Matemática. *Em Teia*, v. 9, n. 1, p. 1-28, 2018. https://doi.org/10.36397/emteia.v9i1.236528

PESSOA, Cristiane Azevedo Silva; MUNIZ, Ivail Junior. Educação Financeira Escolar:

construções, caminhos, pesquisas e potencialidades para o século XXI. *Em Teia*, v. 12, n. 2, 1-18. 2021. https://doi.org/10.51359/2177-9309.2021.251007

SILVA, Amarildo Melchiades; POWELL, Arthur Belford. Um programa de Educação Financeira para a Matemática Escolar da Educação Básica. In: *Anais do XI Encontro Nacional de Educação Matemática*. Paraná, 2013, p. 1-17.

STEPHANI, Marcos. *Educação Financeira*: uma perspectiva interdisciplinar na construção da autonomia do aluno. 2005. 79f. Dissertação (Mestrado em Educação em Ciências e Matemática). Pontifícia Universidade Católica do Rio Grande do Sul. Porto Alegre.