

Teacher training in financial education: results of a training course

Formação de professores em educação financeira: resultados de um curso de formação

Formación docente en educación financiera: resultados de un curso de formación

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HOW TO CITE: CASSOLA, N. M.; BECKER, K. L.; VIEIRA, K. M. Teacher training in financial education: results of a training course. *Revista IberoAmericana de Estudos em Educação*, Araraquara, v. 19, e18665, 2024. eISSN: 19825587. DOI: <https://doi.org/10.21723/riaee.v19i00.1866502>

Abstract

This study aimed to analyze how Sumo Educacional's actions have contributed to enhancing teachers' financial knowledge. For this, it examines financial knowledge before and after the project's interventions and aims to observe how this knowledge is transmitted to students. Data collection occurred before the course started and two months after its conclusion. Two questionnaires served as data collection instruments. The first questionnaire comprised questions on financial knowledge, financial behaviors, teacher profiles, and professional experience. The second questionnaire included questions on financial knowledge, expectations regarding applying said knowledge, and perceptions of the topics covered. Data were analyzed using descriptive statistics, the Mann-Whitney test, and panel data analysis. The findings indicated that the course improved the teaching method, positively impacting teachers' learning, expanding students' financial skills, and increasing teachers' confidence while instructing.

Keywords: financial education; training course; teachers; gamification; financial knowledge.

Resumo

O objetivo geral foi analisar como as ações do Sumo Educacional contribuíram para o conhecimento financeiro dos professores, para isso analisaram-se o conhecimento financeiro antes e após as ações do projeto e buscou-se observar como eles repassaram o conhecimento aos alunos. A coleta de dados ocorreu antes do curso e após dois meses do seu término. Foram utilizados dois questionários como instrumento de coleta de dados. O primeiro questionário incluiu perguntas sobre conhecimento financeiro, comportamento financeiro, perfil dos professores e experiência profissional. O segundo continha questões sobre conhecimento financeiro, expectativas em relação à aplicação dos conhecimentos, e percepção dos temas abordados. Os dados foram analisados utilizando estatísticas descritivas, teste de Mann-Whitney e análise de dados em painel. Identificou-se que o curso contribuiu para a melhoria da aprendizagem impactando no método de ensino dos professores e ampliando as habilidades financeiras dos alunos e houve um aumento na confiança ao lecionar.

Palavras-chave: educação financeira; curso de formação; professores; gamificação; conhecimento financeiro.

Resumen

El objetivo general es analizar cómo las acciones de Sumo Educacional contribuyeron al conocimiento financiero de los docentes, para ello analiza el conocimiento financiero antes y después de las acciones del proyecto y busca observar cómo están transmitiendo el conocimiento a los estudiantes. La recogida de datos se realizó antes del curso y dos meses después de su finalización. Se utilizaron dos cuestionarios como instrumentos de recolección de datos. El primer cuestionario incluía preguntas sobre conocimientos financieros, comportamiento financiero, perfil docente y experiencia profesional. El segundo contiene preguntas sobre conocimientos financieros, expectativas respecto de la aplicación de los conocimientos y percepción de los temas tratados. Los datos se analizaron mediante estadística descriptiva, prueba de

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Submitted: November 09, 2023

Reviewed: December 28, 2023

Approved: June 26, 2024

Conflicts of interest: There are no conflicts of interest.

Ethics committee approval: Work approved by the research ethics committee of the Federal University of Santa Maria.

Data availability: Data is available on request from the authors.

Study conducted at the Federal University of Santa Maria (UFSM), Santa Maria, RS, Brazil.



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Mann-Whitney y análisis de datos de panel. Se identificó que el curso contribuyó a mejorar el método de enseñanza, impactando el aprendizaje de los docentes y ampliando las habilidades financieras de los estudiantes y hubo un aumento en la confianza al enseñar.

Palabras clave: educación financiera; curso de formación; maestros; gamificación; conocimiento financiero.

INTRODUCTION

In the current scenario, factors such as the impoverishment of the population, unemployment, and economic crises, along with a lack of knowledge about financial education among individuals, make it difficult for them to make decisions. This difficulty is compounded by the increasing complexity of the market and financial services, leading to undesirable outcomes such as high levels of indebtedness, misuse of financial products, and a lack of planning for the future. This lack of understanding is particularly problematic for vulnerable groups, including women and individuals with low incomes or low levels of education. Both developed and emerging countries have been addressing this issue by recognizing the role of financial education in promoting financial inclusion (Lusardi; Messy, 2023).

According to Braunstein and Welch (2002), an informed population would contribute to a more competitive market by demanding financial products that better meet their needs. The issue of population indebtedness, often linked to a lack of financial education, highlights the urgency of this matter. The Consumer Indebtedness and Default Survey conducted by the National Confederation of Trade in Goods, Services, and Tourism in 2023 shows that 78.3% of Brazilian families are in debt, a situation exacerbated by limited access to information about financial products (CNC, 2023; Maia, 2007). This lack of savings underscores the significant gap in basic financial knowledge among the population.

The Organization for Economic Cooperation and Development (OECD) emphasizes the importance of addressing financial education from early school years, suggesting that it prepares individuals for adult life with a fundamental understanding of financial products, risks, and opportunities (Organisation for Economic Co-Operation and Development, 2013a). Despite improvements, the Financial Citizenship Report by the Central Bank of Brazil (Banco Central do Brasil, 2021) reveals that, although Brazil showed significant progress in the financial literacy assessment of the International Student Assessment Program (PISA) from 2015 to 2018, its performance remains statistically lower than that of OECD countries. This highlights the complex challenge of advancing financial education among students and the population at large.

Given the increasing necessity for financial knowledge, schools are ideal for introducing young Brazilians to these concepts. However, achieving this requires prepared teachers. The Common National Curriculum Base (BNCC) in Brazil provides a framework for the education system, which includes financial education as one of the suggested themes for classroom work (Brasil, 2018).

In response to the need for improved financial understanding, Projeto Sumo Educacional [Sumo Educational Project] aims to train public school teachers to teach financial education through games. As an extension project of the Federal University of Santa Maria, it seeks to promote educational finance actions with students from the 6th grade of elementary school to high school.

The course methodology employs gamification processes to enhance interaction with the content, thus motivating and inspiring both teachers and students. Learning through games has been shown to aid in understanding the subject matter positively. Kapp (2012) defined gamification as the use of game-inspired elements to engage individuals, stimulate action, facilitate learning, and solve challenges.

Therefore, this study aims to analyze the effectiveness of this initiative by asking the following research question: Have the actions of Sumo Educational contributed to teachers' financial education learning? The goal is to assess the project's contributions to teachers' financial knowledge and understand the generated impacts and encountered difficulties, thereby

contributing to improvements in the teaching method concerning the target audience's learning.

METHODOLOGY

The research was conducted in Rio Grande do Sul State (southern Brazil) and involved 46 public school teachers from the Eighth Regional Education Coordination Office in the city of Santa Maria. These teachers were invited by the coordinating office, with the selection criterion being current employment in at least one of the state schools overseen by the office. The survey was initiated in April 2023 and concluded three months after completing the financial education course. The final phase of the research took place when the teachers were prepared to implement the lessons learned during the course with their students.

Sumo Educacional is an extension program of the Federal University of Santa Maria, established in 2020. It consists of a multidisciplinary team of approximately 30 members, including educators, students, and market professionals, and is dedicated to promoting financial education in Brazil. The course offered by Sumo Educacional trained 46 teachers from 23 municipalities across the state public network between April and August 2023. The teaching materials utilized included the introductory book for the Renda Passiva game, supplementary material on financial topics in the form of slides prepared by Sumo Educacional, and the establishment of a channel for inquiries and feedback via WhatsApp. Gamification was chosen as one of the main methods, utilizing the board game Renda Passiva, which aims to teach financial concepts through a journey toward financial freedom.

The course is segmented into four chapters: The first introduces the Lesson Methodology and the Experiential Learning Cycle, setting a robust foundation for the educational process. The second chapter delves into the game's characters, fostering reflections on diverse lifestyles and encouraging personal planning. The third chapter has participants assess risks and opportunities, preparing them for unexpected events. The fourth and final chapter reviews financial concepts, such as personal budgeting and saving strategies. Ten weekly online meetings were orchestrated, providing a total of 30 hours of instruction.

Two questionnaires were employed to gather data. The first questionnaire, administered before the commencement of the course, consisted of three blocks of questions. It was based on the indicator known as the Financial Literacy Thermometer developed by Potrich, Vieira and Kirch (2016). The initial section focused on financial knowledge, comprising 21 multiple-choice questions adapted from sources including Van Rooij et al. (2011), OECD (Organisation for Economic Co-Operation and Development, 2013b), Klapper et al. (2013), and the National Financial Capability Study (2013), aimed at gauging knowledge on various economic concepts, with correct answers scored as 1 and incorrect as 0.

The second block probed into financial behavior using a Likert-type scale, an instrument derived from the scales of Shockey (2002), O'Neill and Xiao (2012), and the OECD (Organisation for Economic Co-Operation and Development, 2013b), with a range from 0 (totally disagree) to 10 (totally agree), aimed at understanding individuals' financial management assessments.

In the third segment, questions related to the respondents' profile, professional experience, and academic background were posed. Profile variables included income, age, and sex. Questions regarding professional experience focused on duration and field of work. The final block addressed methods through which respondents gained financial education knowledge and experience, thus combining questions on financial knowledge (n = 21), financial behavior (n = 37), profile (n = 4), and experience (n = 11) into a comprehensive 73-question construct.

The second instrument, applied at the training's conclusion, included seven sections, with the first revisiting the financial knowledge questions from the first questionnaire to analyze improvements in the financial knowledge index.

The next section comprises questions about teachers' expectations regarding the application of knowledge acquired in the course within the classroom. It includes inquiries about the structure and resources available at the school where the teacher is employed. At this stage,

teachers are also asked about their confidence level in applying and understanding the topics covered in the Financial Education course. This section consists of 8 questions utilizing a Likert scale ranging from 1 to 5, where 1 represents "Strongly disagree" and 5 represents "Strongly agree." Using Likert-type scales, two questions address inflation, investment, financing, interest rates, consumption, risk, financial balance, employment, and income. Regarding teaching these topics, the scale ranges from "Not at all confident" to "Completely confident." To gauge knowledge improvement, a question was formulated with a scale from "No improvement" to "Total improvement." A total of 10 questions were prepared, adapted from the study *Os temas transversais na Base Nacional Comum Curricular: da legislação à prática* [Cross-cutting themes in the Common National Curriculum Base: from legislation to practice] by Vieira et al. (2022).

When the second questionnaire was administered, some teachers had already begun implementing the methodology in the classroom, while others had not. Therefore, the questionnaire includes a filter question in Section 3, directing respondents to either Section 4 or 5 based on their answer to whether they have started the application. Section 4, tailored for those who have begun the application, aims to capture the teacher's perception of the application's impact and student learning. It comprises 5 questions on a Likert scale from 1 to 5, where 1 is "Strongly disagree" and 5 is "Strongly agree." This section contains a question aimed at understanding the outcomes of implementing the Financial Education theme in classes compared to other themes, with a scale from "Much worse than other themes" to "Much better than other themes."

Section 5, for those who have not yet started the application, consists of a single question, allowing for multiple responses. It seeks to identify what is lacking so the teacher can feel more prepared to teach financial education. Subsequently, information is collected about the teacher's name, the name of the institution where they work, the classes they teach, and their level of satisfaction with the course, using a Likert scale from 0 to 10, where 0 represents "Very dissatisfied" and 10 "Very satisfied." The question posed was: "What is your level of satisfaction with Sumo Educacional's Financial Education course?" In addition to the Likert scale satisfaction question, participants were also invited to share opinions, criticisms, or suggestions regarding their experience with Sumo Educacional's Financial Education course through an open-ended question. By summarizing the questions on financial knowledge (n = 21), expectations (n = 18), profile (n = 2), experience (n = 1), and satisfaction (n = 2), the construct was measured using 44 questions.

The study was submitted to the Brazil Platform and approved by the ethics and research committee of the Federal University of Santa Maria under CAAE number 67713723.3.0000.5346. The analysis employed descriptive statistics, non-parametric statistical tests, and panel data analysis techniques. Descriptive statistics described the course participants' profile, perceptions, and behavior. The data from the questionnaires were analyzed using the SPSS and Stata software.

The Mann-Whitney test, which assesses whether two independent samples differ in their distributions (McKnight; Najab, 2010), was utilized to evaluate differences in the variation of financial education knowledge, satisfaction, perception of knowledge improvement, and confidence in teaching based on the respondents' profile characteristics. These included their activity area, financial education experience, sex, educational background, and income.

To explore how Sumo Educacional contributed to teachers' financial education knowledge, a panel data model was estimated using information from 46 teachers collected before and after the course. This model enables the control of unobserved individual effects constant over time, potentially influencing teachers' financial knowledge (Wooldridge, 2010). The F-test, used to test for the presence of such effects, presupposes in its null hypothesis that all constant terms are equal. Once individual effects are confirmed, the model can be estimated through either fixed or random effects.

The fixed effects model accounts for the impact of omitted variables varying between cross-section units and constant over time, assuming the intercept varies among units but remains constant over time, with parameters β constant across units (Greene, 2003). The random effects model shares assumptions with the fixed effects model, except it treats the intercept

differently. In the random effects model, the error comprises two terms, i and ϵ_{it} , capturing differences between individuals as a random error term (i) rather than as a fixed parameter.

RESULTS AND DISCUSSION

Upon analyzing the profile of the respondents (Table 1), we found that most participants are female (84.8%). Regarding age, more than half of the respondents are up to 50 (67.4%), 30.4% are between 51 and 60, and only 2.2% are over 61. This indicates that most teachers are younger. When asked about their income, 73.9% reported earning between BRL 2,605.00 and BRL 5,208.00, while only 6.5% reported earning more than BRL 6,511.00.

Table 1. Profile of teachers according to variables: sex, age, income, level of education, area of training, and experience.

Variable	Alternative	n	%
Sex	Male	7	15.2
	Female	39	84.8
Level of education completed	Higher education	16	34.8
	Master's degree or specialization/MBA	29	63.0
	PhD	1	2.2
Income (in BRL)	1,303.00–2,604.00	7	15.2
	2,605.00–3,906.00	18	39.1
	3,907.00–5,208.00	16	34.8
	5,209.00–5,510.00	2	4.3
	>6,511.00	3	6.5
Age (years)	21–35	14	30.4
	36–50	17	37.0
	51–60	16	30.4
	>61	1	2.2
Years of experience as a teacher	0–5	16	34.8
	6–10	5	10.9
	11–15	5	10.9
	>15	20	43.5
Teaching area	Mathematics and its technologies	37	80.4
	Human sciences	6	13.0
	Natural sciences	2	4.3
	Languages	1	2.2
Experience in financial education	I have no experience	21	45.7
	I teach financial education topics in a specific subject	15	32.6
	I teach financial education as part of a subject in another area	10	21.7

Source: Survey results (2023).

Next, the financial knowledge index was investigated. This stage aimed to assess participants' familiarity with and understanding of concepts and practices related to financial matters.

To achieve this, the questionnaire included specific questions addressing various aspects of financial education, such as personal budgeting, savings, investments, indebtedness, and conscious consumption, among others. In the first section, financial knowledge questions were listed, based on multiple-choice questions adapted from Van Rooij et al. (2011), OECD (Organisation for Economic Co-Operation and Development, 2013b), Klapper et al. (2013), and the National Financial Capability Study (2013). The financial knowledge measure consists of 21 questions aimed at exploring the knowledge index in relation to questions about inflation, interest rates, financing, investments, the stock market, and credit. A score of 1 was assigned to correct answers and 0 to incorrect answers. Thus, the financial knowledge index ranged from 0 (if the individual got all the questions wrong) to 21 (if the individual got all the questions right).

The number of correct answers per respondent was evaluated to quantify knowledge, as outlined in the literature (Chen; Volpe, 1998; Potrich; Vieira; Kirch, 2016). If a respondent has 0–12 correct answers, they are classified as having a low knowledge index. This group includes 15.2% of respondents. From 13 to 16 correct answers, the knowledge index is considered medium, encompassing 54.4% of respondents. A respondent would have to achieve more than 16 correct answers to be classified as having high financial knowledge; in this study, 30.4% of the respondents are classified in this group. In the second questionnaire, there was a slight reduction in the percentage of the mean knowledge index and an increase in the number of respondents with a knowledge index considered high (Table 2).

Table 2. Number of correct answers per respondent, valid percentage, score percentage, classification, and cumulative (Questionnaires 1 and 2).

Score	Frequency (Q1)	Frequency (Q2)	% (Q1)	% (Q2)	Classification	Cumulative percentage (Q1)	Cumulative percentage (Q2)
10.00	1	1	2	2.2	Low		
11.00	2	3	4	6.5	Low	15.2	15.2
12.00	4	3	9	6.5	Low		
13.00	9	-	20	-	Medium		
14.00	5	4	11	8.7	Medium		
15.00	2	6	4	13.0	Medium	54.2	52.2
16.00	9	14	20	30.4	Medium		
17.00	6	2	13	4.3	High		
18.00	5	6	11	13.0	High		
19.00	-	6	-	13.0	High	30.45	32.6
20.00	3	-	6.5	-	High		
21.00	-	1	-	2.2	High		

Source: Survey results (2023).

A Likert-type scale was utilized to analyze financial behavior, employing an instrument based on the scales of Shockey (2002), O’Neill and Xiao (2012), and the OECD (Organisation for Economic Co-Operation and Development, 2013b). It comprises 37 questions, with an agreement scale ranging from 0 to 10, where 0 represents “totally disagree,” and 10 represents “totally agree.” This scale is aimed at identifying how individuals assess their financial management.

The variable with the highest mean indicates that respondents consider it important to set goals for the future, with a mean of 9.48. This is followed by the statement, “I pay my credit card bills in full to avoid being charged interest,” which has a mean of 9.39. The variable indicating that individuals pay their bills on time also had a mean above 9.

Conversely, the statement “I often borrow money from family or friends to pay bills” had the lowest mean (1.09), suggesting that respondents do not usually turn to family or friends for loans to pay their bills. Another variable with a considerably low mean (2.26) was “I do not worry about the future; I just live in the present.” In this case, the analysis should be reversed because it is a question that represents poor financial behavior, and the lower the mean, the better. This suggests that respondents are concerned about planning or preparing for the future. Figure 1 shows the distribution of the teachers’ responses to the behavioral questions.

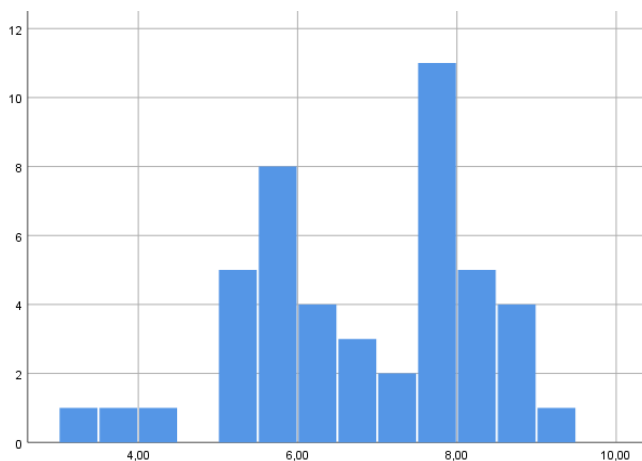


Figure 1. The mean financial behavior of each respondent.
Source: Survey results (2023).

The total mean response was 6.81, with an asymmetrical distribution and a standard deviation of 1.41. The highest frequency of responses fell in the range between 5.72 and 6.44. This indicates that most teachers rated their behavior as relatively neutral to progressively positive. There were some lower results, such as values around 3.14 and 3.72, representing a small proportion of teachers with significantly lower means in relation to the overall mean. In contrast, some higher responses, such as values around 8 and 9, showed that a small proportion of teachers rate their financial behavior as more positive.

Regarding the participants’ answers to the question about their level of satisfaction with the Financial Education course, most participants reported satisfaction levels above 6, with a mean satisfaction level of 8.28 and a standard deviation of 1.89 (Figure 2). A Likert scale from 0 to 10 was used, where 0 represents “Very dissatisfied” and 10 represents “Very satisfied.”

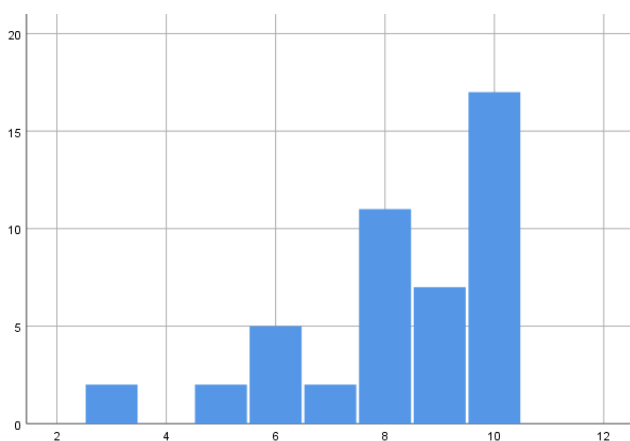


Figure 2. Level of satisfaction with the Financial Education course.
Source: Survey results (2023).

The open answers to the questions about opinions, criticisms, or suggestions reveal valuable insights for improving the quality of the Financial Education course, as summarized in Chart 1.

Chart 1. Open answers to questions about opinions, criticisms, or suggestions.

Opinions, criticisms, and suggestions about the Financial Education Course	
General course reception	"I thought the course with the game was very good." (Teacher 5)
	"The course was good overall." (Teacher 29)
	"I loved the course. Thank you." (Teacher 40)
	"I really enjoyed the course offered to the teachers." (Teacher 27)
Course structure and content	"The course could address thematic units such as inflation, investments, and consumption in a more specific way." (Teacher 9)
	"There was a lack of material with financial mathematics content before the games were applied." (Teacher 46)
	"I want another classroom lesson." (Teacher 42)
	"The course could be longer." (Teacher 16)
Course format and modality	"Working online was very confusing, and I often did not immediately understand what was being proposed." (Teacher 13)
	"More in-person practical classes would be useful." (Teacher 26)
	"A course that brings more knowledge to a subject that is extremely important and takes very little work." (Teacher 33)
Classroom application	"The students are being very receptive to the topics covered during the lessons on Financial Education." (Teacher 27)
	"Unfortunately, I could not attend regularly for private reasons, so I do not think I am qualified to teach yet." (Teacher 39)
Suggestions for improvement	"The course could address thematic units in a more specific way." (Teacher 15)
	"More face-to-face practical classes." (Teacher 17)
	"Before applying the games, access to material with financial mathematics content should be provided." (Teacher 2)

Source: Survey results (2023).

The positive feedback suggests that the practical approach was well received, while suggestions for additional classes on specific topics could further enrich the learning experience. Criticism is also valuable, as it highlights areas that may require adjustments, such as the organization of the material. This direct feedback from participants can guide future initiatives to develop the course. The interest expressed by participants in having more face-to-face classes indicates that direct contact and the physical environment play a crucial role in the learning experience. Face-to-face interaction can provide a space for deeper discussions and immediate clarification of doubts.

Nevertheless, it is important to consider that while there is a demand for more face-to-face interactions, adopting online approaches is also necessary to accommodate the needs and circumstances of different participants. To cater to those participants who cannot reconcile their schedules with class times, the inclusion of asynchronous classes could be considered. This teaching method does not require being in a specific location or accessing the educational content at the same time. Instead, the teaching material is made available online, allowing participants to access and complete the activities according to their schedule and pace.

The BNCC underscores the study of basic economic and financial concepts, aiming at financial education. These include inflation, financing, interest rates, investments, consumption, risk, financial balance, employment, and income. However, these topics are often far removed from the basic curricular areas and contents in which teachers specialize, leading to insecurity and

inexperience in teaching these contents (Vieira et al., 2022). In light of this, teachers were asked to assess the level of confidence in teaching each subject after participating in the course.

Confidence to teach was assessed on a Likert scale, in which 1 - Not at all confident, 2 - Not very confident, 3 - Confident, 4 - Very confident, and 5 - Completely confident. The results, as shown in Table 3, indicate that teachers generally feel confident about the themes. The results suggest that teachers showed less confidence in teaching about inflation, financing, investments, and risk, while they felt slightly more confident when addressing financial balance, consumption, employment and income, and interest rates.

Table 3. Teachers' perceived confidence in teaching financial education.

Themes of financial education	Mean	Responses (%)				
		Not confident	Not very confident	Confident	Very confident	Completely confident
Inflation	2.540	10.9	47.8	23.9	10.9	6.5
Financing	2.720	13.0	37.0	26.1	13.0	10.9
Interest rate	3.000	8.7	19.6	45.7	13.0	13.0
Investments	2.610	15.2	34.8	30.4	13.0	6.5
Consumption	3.130	2.2	23.9	43.5	19.6	10.9
Risk	2.650	10.9	41.3	26.1	15.2	6.5
Financial balance	3.090	2.2	28.3	39.1	17.4	13.0
Employment and income	3.000	4.3	28.3	37.0	21.7	8.7

Source: Survey results (2023).

Regarding the participants' mean confidence in teaching across all themes, most participants reported confidence levels above 2.00, with a mean of 2.84 and a standard deviation of 0.92. To analyze the teachers' perception of their knowledge of financial education topics after the course, a Likert-type scale was employed, including the following options: 1 - Improved very little, 2 - Slightly improved, 3 - Improved, 4 - Considerably improved, 5 - Significantly improved (Table 4).

Table 4. Teachers' perceptions of knowledge of financial education after the course.

Themes of financial education	Mean	Responses (%)				
		Improved very little	Slightly improved	Improved	Considerably improved	Significantly improved
Inflation	3.330	8.7	17.4	32.6	28.3	13.0
Financing	3.390	8.7	19.6	26.1	30.4	15.2
Interest rate	3.480	8.7	15.2	30.4	32.6	13.0
Investments	3.570	4.3	15.2	32.6	37.0	10.9
Consumption	3.800	0.0	13.0	28.3	39.1	19.6
Risk	3.500	8.7	13.0	30.4	32.6	15.2
Financial balance	3.590	2.2	15.2	32.6	30.4	19.6
Employment and Income	3.540	6.5	13.0	28.3	32.6	19.6

Source: Survey results (2023).

Table 4 indicates that most teachers believe their knowledge significantly improved after the course. The area where the highest percentage of teachers felt they had seen notable improvement was in consumption knowledge, followed by Financial Balance (mean of 3.59). Subsequent analysis of the participants' individual means revealed that most teachers reported an improvement above 3.00, demonstrating a positive overall perception. The aggregate mean of the responses was 3.52, with a standard deviation of 1.17, highlighting the consistency of the responses within the group.

The Mann-Whitney tests revealed no statistically significant differences across variables (sex, level of education, income, area of work, and previous experience with the subject) in terms of knowledge of financial education, satisfaction with the course, confidence in teaching the subject, and perception of improved knowledge. This suggests that these factors do not significantly affect the dimensions examined.

A panel data model was estimated to evaluate Sumo Educacional course's contribution to teachers' financial education knowledge. An initial F-test for joint significance indicated the presence of unobserved individual effects in teachers that influence financial knowledge, as it was possible to reject the hypothesis of constant effects with a p-value of 0.0038.

Table 5 presents the results from fixed effects and random effects regression analyses, both demonstrating similar, positive, and significant outcomes. This leads to the conclusion that Sumo Educacional's financial education course increased the teachers' financial knowledge index by 0.717 points, meaning, on mean, the participating teachers answered approximately one additional question correctly out of a total of 21 questions that comprise the index.

Table 5. Results of the panel data model estimates for the contribution of Sumo Educacional to teachers' knowledge of financial education.

	Fixed effect	Random effects
After the course	0.717* (0.412)	0.717* (0.412)
Constant	14.348*** (0.651)	14.348*** (0.691)
Observations	92	92
R ²	0.023	0.023

Source: Survey results (2023).

Note: Significance of coefficients: ***1%;and *10%. The standard deviation is between parentheses.

Based on the results, it can be inferred that the course contributes to an improvement in teachers' financial knowledge, which is in line with the studies presented by Park et al. (2021) and Bruhn et al. (2016). Although the increase in the financial knowledge index may seem modest at first glance, it may be influenced by several factors. Firstly, Sumo Educacional is in its initial phase, which may imply that adjustments and improvements are still needed to maximize the course's results. In addition, the sample represents the first class of teachers to receive the course, suggesting that the effect may become more significant over time as more teachers participate and the program is refined. Other factors, such as the predominance of remote classes, may also have influenced the results since the learning environment plays a significant role in teaching effectiveness (Holanda; Pinheiro; Pagliuca, 2013). Hence, it is essential to consider these aspects when interpreting the results and planning the next stages of the project.

In addition, programs such as Sumo Educacional have the potential to have a far-reaching influence on the population's financial education since young people who learn about financial education at school actively share this knowledge with their parents. This phenomenon reflects the importance of the school environment as a starting point for disseminating essential

financial principles beyond the classroom. When young people improve their financial knowledge, they acquire valuable life skills, as they are encouraged to change consumption habits and recognize sustainable initiatives. They can also find new ways of placing themselves in the world, including acting as agents of change and influencing their family's financial knowledge and practices (Zhu, 2020).

FINAL CONSIDERATIONS

This study analyzed a financial education initiative, the Sumo Educacional Project, evaluating teachers' knowledge of financial education and their financial behavior before and after the project's actions. It also investigated how teachers are passing on and using the acquired knowledge and resources from the course.

Sumo Educacional, an initiative utilizing gamification as a teaching strategy, proved to be an effective approach for engaging and motivating participants. This resulted in more solid learning and a better understanding of financial concepts.

The research was conducted in the state of Rio Grande do Sul (southern Brazil), involving public school teachers from the Eighth Regional Education Coordination Office in Santa Maria over four months, with data collection conducted before and after participation in the course. Two questionnaires served as data collection instruments; the first was applied before the course to assess financial knowledge, financial behavior, teacher profile, and professional experience, and the second after the course to capture changes in financial knowledge, expectations regarding the application of knowledge, and perception of the topics covered.

Statistical analyses, which included descriptive statistics, the Mann-Whitney test, and panel data analysis, revealed that the course significantly improved the teachers' teaching methods. This specifically affected learning and expanded the teachers' financial skills. The results suggest that using games as a teaching strategy can be important in developing financial education in schools.

Given this, it is clear that teacher training through initiatives like Sumo Educacional plays a fundamental role in promoting financial education. The participants' opinions and constructive suggestions demonstrate the relevance of this approach. The combination of face-to-face and online interactions can effectively balance participants' diverse preferences and constraints. Generally, an increase in teachers' confidence in teaching was observed, indicating a positive outcome of the project's actions in pedagogical training, albeit with varying levels of confidence in financial education topics. The study can contribute to expanding and improving financial education programs in schools, highlighting the importance of investing in teacher training and using innovative approaches, such as gamification, to achieve positive results.

This study is subject to some limitations, including a limited sample size, as the course is part of a financial education project that is still in its initial phase. The limited sample size may affect the representativeness of the results since it does not cover a wide range of teachers. Additionally, the difficulty in contacting and obtaining responses from participating teachers is a relevant limitation. This difficulty may introduce selection bias, as the teachers who participated in the course may differ from those who chose not to participate or did not answer the questionnaire.

Future research could advance by replicating this study in other institutions that seek to teach financial education, as well as seeking to identify other factors that may contribute to better learning. Longitudinal and comparative studies of the results involving both teachers' and students' learning gains are also promising.

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NMC, KLB, KMV: Conceptualization, Formal analysis, Investigation, Methodology, Validation, Writing - original draft, Writing - revision and editing.

Editor: Prof. Dr. José Luís Bizelli