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Editor's Word

Dear reader, this is the final edition of 2022. I would like to congratulate the authors of the articles that will be published, in addition to thanking all those who submitted their texts, but whose articles unfortunately were not approved. The entire process carried out at REPEC strongly aspires to the quality of the Journal, with the desk reject amounting to 90% of the articles submitted, which equates it to leading international journals. This shows that, despite the rejections in the normal process, there is a great possibility that the final publication will occur due to the quality of the articles when submitted to blind review.

The objective of the first article, written by Kleber de Sousa, is to investigate the spillover effect and the determinants of Brazilian municipalities' accounting information quality. The results showed the existence of spatial clustering and spillover effect of the quality of accounting information in the municipalities. In addition, population size and per capita administrative expenses are negatively correlated, while fiscal autonomy is positively correlated with the quality of accounting information.

The second article presents a case study by Diana Vaz De Lima, Jady Cardoso, Álvaro Mordernell, Rosa Cavalcante and Gabriella Barros and aims to develop actions to disseminate social security education in early childhood and to understand how children can be motivated to develop a citizen awareness on the topic of social security. The organization of the workshops allowed to create a field of collective knowledge to the extent of the children's understanding of the topic, in a controlled environment and with the proper support of adults. I believe this case serves as an example for colleges to implement in the management of their extension activities.

The third article, written by Vitor Hideo Nasu and Breno Gabriel da Silva, aims to analyze the zero score of accounting students on the National Student Performance Exam (Enade) 2018. A very small part of the students scored zero on the general education test (GE) as well as on the specific component (SC). The reason for this is that they handed in a blank exam. Nevertheless, when the exam tests were explored separately, the zero grades became more representative, with a strong concentration in discursive questions. This backs a greater need to motivate students to want to solve discursive accounting exercises. On the other hand, a smaller amount of zero grades was observed in the objective questions. This may be associated with the custom of conducting tests in which objectivity is a predominant characteristic.

The fourth article, by Guilherme Guimarães, Sylvania Nossa, Valcemiro Nossa and Nádia Moreira, aims to analyze the reaction of the Brazilian stock market to the independent audit caveats disclosed in notes to the financial statements. The results found in this research indicate that the Brazilian market reacts negatively when the reservation is issued by external audit companies that are not part of the Big Four in periods that are not marked by economic crisis. These results contribute to the companies by providing empirical evidence that the preparation of financial statements beyond the standards, when identified by the external audit firm and expressed through reservations, can cause a negative market reaction, depending on the quality of the audit and the Brazilian economic scenario.

The fifth article, written by Gilka Da Cruz, Thayna Marques and Giovanna Segantini, aimed to analyze female participation in graduate programs in the area of Applied Social Sciences from 2010 to 2019. The research results indicate the growth of this participation, especially in relation to the master's degree, over the years. Out of all female academic productions, 83.39% were Master's theses and 16.61% were doctoral dissertations. The courses with the largest share of women are public and business administration, accounting and tourism, which together correspond to 28.75% of the publications, and law with 23.71% of productions in that period.

The sixth article, by Nadielli Maria dos Santos Galvão, aims to present an experience report on the adoption of the WebQuest methodology in a commercial accounting subject taught in an accountancy course. As a result, it was verified that the students were satisfied with the interaction through this resource, as its structure is easy and simple to understand. In addition, they considered that the activity promoted creativity and was challenging and interesting. The main difficulty pointed out, however, was the issue of editing the audio, a situation proven at the time of the task assessment, as the teacher, who had proposed WebQuest, noticed that a large part of the groups did not perform this aspect properly for a podcast.

REPeC is a publication linked not only to the area of education, but to several areas, as shown in its objectives, namely: Financial, Management, Public, Audit, taxes, among others.

Acknowledgements to the researchers who submitted their articles and to the always helpful reviewers. Congratulations to those who had the articles approved, as the demand is quite high and the path to final publication tough.

Thank you very much, my dear reader! I wish you and your families, the editorial staff, the journal's Secretariat, the reviewers, the authors and the editorial staff a Merry Christmas full of peace, health and joy.

Academic greetings.

Gerlando Lima, PhD.
Editor-in-chief.

Spillover effect: a spatial analysis of the quality of accounting information in Brazilian municipalities

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Abstract

Objective: To investigate the spillover effect and the determinants of the quality of accounting information in Brazilian municipalities.

Method: The Global and Local Moran Index was used to identify the presence of spatial clustering with a regression model using the Spatial Autoregressive Model with Autoregressive Disturbances to estimate the determinants. Robustness analysis was performed using the ordinary least squares regression methods, Spatial Autoregressive Regression, and Spatial Error Model with comparison by the Akaike Criterion. The sample consisted of 5,504 municipalities with data from 2019. Data were collected from the Brazilian National Treasury Secretariat and the Brazilian Institute of Geography and Statistics (IBGE).

Results: The results showed spatial clustering and spillover effect on the municipalities' quality of accounting information. Furthermore, population size and *per capita* administrative expenses are negatively correlated, while fiscal autonomy is positively correlated with the quality of accounting information.

Contributions: In academic terms, this study showed that a municipality's quality of accounting information is influenced by its neighbors, and in terms of practice, it showed that promising strategies are those that consider sets of municipalities or encourage key municipalities to improve the quality of accounting information.

Keywords: Spillover effect, Accounting information, Fiscal autonomy, Municipalities.

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1. Introduction

This study presents an analysis concerning the spatial correlation of accounting information quality in Brazilian cities. Studies have addressed the management of local governments by focusing on the improvement of public governance and efficiency (Jinsong, Guojian & Song (2009), Wardhani, Rossieta, & Martani, 2017), increased fiscal decentralization (Guedes & Gasparini, 2007; Sousa, Pinhanez, Monte, & Diniz, 2020), and the expansion of public accountability and transparency (Dewi, Azam, & Yusoff, 2019), and a spillover effect has been found. When citizens have benchmarks (neighboring cities), they can control and pressure public managers more effectively (Wang, & Tao, 2019; Li, Ge, Fan, & Zheng, 2021), and cities may start competing with each other (Wu, 2020). Thus, even though municipalities have political, fiscal, and administrative autonomy, the fact that citizens make comparisons and exercise pressure decreases their differences.

In summary, the cities' management is influenced by their neighbors' behaviors. In this context, the quality of accounting information can also be influenced by neighbors because it is an instrument to strengthen institutional and social controls and enable citizens to make comparisons (Coelho, Cruz, & Platt-Neto, 2011; Augustinho & Oliveira, 2014). This study is based on institutional theory. It focuses on the New Institutional Sociology perspective, considering that organizations belong to a larger network and interact with the cultural system (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). Given accounting uncertainties and technical restrictions of local governments' institutional environment (Lopes et al., 2018), the municipalities' accounting practices converge (isomorphism), i.e., there is a spillover effect. In this study, the spillover effect refers to a (positive or negative) influence of a municipal entity's action on its neighbors, mainly through the adoption of new practices resulting from municipal administrations' isomorphic behavior and the competitiveness between local governments.

Previous studies addressing the municipalities' quality of accounting information did not find a spillover effect. Hence, this study seeks to identify this effect and the determinants of accounting information quality among Brazilian municipalities.

Fiscal decentralization is an element that increases local governments' autonomy and enables comparison between municipalities, which encourages competitiveness. The fiscal decentralization mechanism expands the ability of cities to raise funds by exploiting their local tax capacity. As resources are collected and spent locally, closer to needs, citizens are encouraged to participate and exercise control over the public administration. Regarding accounting information, fiscal decentralization can encourage a better qualification of the local governments' accounting numbers, considering that greater citizen involvement in the participation and control of public management demands more from accounting systems (Hayek, 1945; Tiebout, 1956; Oates, 1972).

Accounting information is an instrument that can improve public management by supporting (political or nonpolitical) public managers' decision-making and facilitating the transparency of public accounts. In Brazil, improving the quality of accounting information within the public sector has been pursued since 2008 through efforts to improve and implement new accounting regulations for convergence/harmonization with international accounting standards applied to the public sector (International Public Sector Accounting Standards Board – IPSASB®). In addition, improvement has focused on different points of the public sector accounting systems, such as: standardizing the chart of accounts, improving accounting and tax statements, and establishing the basic requirements of accounting software. However, improved regulations and accounting systems do not necessarily ensure improved accounting information quality (Macêdo & Klann, 2014; Morás & Klann, 2018; Silva & Sanches, 2021).

Quality accounting information is achieved when information is relevant, reliable, representative, comprehensible, well-timed, comparable, and verifiable, as established by the NBC TSP Estrutura Conceitual Aplicada à Contabilidade do Setor Público [NBC TSP Conceptual Framework applied to public sector accounting] (CFC, 2016). The National Treasury Secretariat (STN), aiming to monitor and improve the quality of accounting information, implemented a scoring system to verify accounting and fiscal information sent by the municipalities for accounting consolidation of the National Balance through Siconfi [Information System Accounting and Tax Accounting for the Brazilian Public Sector]. Based on the verifications and scores, the STN created a ranking to classify the Quality of Accounting and Fiscal Information among Brazilian municipalities.

The STN ranking assesses the quality of accounting information provided by the cities. According to Lopes et al. (2018) and Azevedo et al. (2020), Brazilian cities have very distinctive characteristics concerning their administrative structure, information management capacity, and technology access. Knowing how to improve accounting information is relevant, mainly because governments worldwide are already more advanced and compete for investments (Li, Guo, & Di, 2021). In addition, governments are in a new phase, increasingly seeking the integration of government databases (regardless of the field), including federated entities, from the perspective of e-Government modernization (Ritchi, Fetty, & Susanto, 2016). Thus, identifying the spillover effect of the quality of accounting information and its relationship with the municipalities' populations and fiscal profiles is essential for improving accounting applied to the public sector and modernizing public administration in Brazilian local governments.

In addition to this introduction, this paper has section 2, which contains the theoretical framework; section 3, which describes the methodological procedures; section 4, which presents the results; section 5, where the results are discussed; and section 6, which summarizes the findings.

2 Theoretical Framework

2.1 Institutional Theory and accounting applied to the public sector

Accounting practices are commonly investigated in the light of institutional theory. Examples include Dekel-Dachs et al. (2021), Bell (2017) and, specifically, accounting applied to the public sector, Baskerville and Grossi (2019), Argento, Peda, and Grossi (2018) and Gomes, Fernandes, and Carvalho (2015).

The main assumptions of the institutional theory, which emerged from criticisms of the neoclassical economic theory of the firm, are the decision-makers' rational and maximizing behavior and market equilibrium. Thus, institutionalism is born from a disagreement with the orthodox principles of economic thought, which distorts reality through highly abstract and mathematical models without considering the institutional environment that restricts and conditions economic policy and organizations (Matias-Pereira, 2018).

Therefore, the institutional theory shows how an organization and its behaviors meet not only market pressures but also institutional pressure, general social expectations, and the actions of the leading organizations (Greenwood & Hinings, 1996). Therefore, institutionalization stems from pressure exerted by social values that are assumed as rules in the thinking and actions of organizations and individuals in society (Hopwood & Miller, 1994).

This study focuses on one of the three strands of institutional theory, the New Sociological Institutionalism (NSI) (Burns & Scapens, 2000). NIS visualizes a network of relationships formed by organizations and cultural systems. That is, the institutional environment influences the relationship between organizations and the market through their beliefs, norms, and traditions (Meyer, & Rowan, 1977; Dimaggio & Powell, 1983). In other words, one of the basic principles of the NIS is that the organizational structure results from pressures from the organizations' environment. Additionally, to receive support and legitimacy, individuals and organizational entities comply with rules, practices, symbols, beliefs, and normative requirements created in the institutional environment (Soeiro & Wanderley, 2019).

According to Dimaggio and Powell (1983), the institutional theory argues that organizations' compliance with the institutional environment and the incorporation of external rules and norms are beneficial, given the need for survival. This process can occur through reproduction or isomorphism, categorized into three types: coercive, mimetic, and normative.

Coercive isomorphism occurs due to formal and informal pressures exerted by other institutions on which an organization depends and by society's cultural expectations, commonly arising from legal measures. On the other hand, mimetic isomorphism results from symbolic uncertainty or involves a poorly understood technology. Finally, the normative type is based on professionalization, leading the members of a professional class to act similarly (Dimaggio & Powell, 1983).

Accounting research applied to the public sector explains the adoption of the International Public Sector Accounting Standards (IPSASB®) and changes in accounting practices in the light of institutional theory. Mnif Sellamia and Gafsib (2017) investigated the environmental factors associated with the decision of 110 countries to adopt IPSASB® based on institutional theory. The results reveal a positive influence of external public funding (coercive isomorphic pressure), the degree of external openness (mimetic isomorphic pressure), and the importance of public sector organizations in the adoption of IPSASB®.

More recently, Jorge, Nogueira, and Ribeiro (2020) investigated pilot entities in the implementation of public sector accounting reform and identified that for pilot entities to be relevant actors in the reform process, they need to be included in the decision-making process to take better advantage of the new IPSASB®-based system and receive technical, human and financial support.

Based on institutional theory, Lima and Lima (2019) researched the process of adopting IPSASB® in the Brazilian government. They noted that, despite the beginning of the reform in 2008, the process is still incipient, and there is a need for more significant interaction among stakeholders. This indication is in line with Albu, Albu, and Alexander (2014), who suggest that intra-organizational interests and actions are essential for the adoption of IPSASB®. In other words, these studies indicate the need to understand the relationship between entities better. Thus, this study partially fills the gap in the literature by analyzing the spillover effect of the quality of accounting information, i.e., when the quality of the accounting information of a municipality is correlated with neighboring municipalities by isomorphic behavior due to the institutional context.

2.2 The quality of accounting information and local governments' public management

In recent decades, the Brazilian public administration has made an effort to improve its management process, with an emphasis on the Managerial Reform of the State, which sought to make state management more flexible and dynamic, even adopting techniques from the private sector, such as results-based management, and creating and using indicators, and expanding accountability and transparency. Furthermore, in the context of local governments, the improvement of public management is also sought to strengthen it through fiscal decentralization (Bresser-Pereira, 1998; Bresser-Pereira & Spink, 2015). Fiscal decentralization concerns the transfer of fiscal responsibilities from the central government to subnational governments, especially municipalities (Oates, 1972; Akin, Bulut-Cevik, & Neyapti, 2016). Hence, different strategies have been implemented to improve public management.

These strategies to improve public management are based on expanding participation and social control, considering the greater proximity to the collection and expenditure of public resources provided by fiscal decentralization. Additionally, administrative acts' greater disclosure and transparency enable citizens to be better informed and make even greater demands on local managers (Hayek, 1945; Tiebout, 1956; Oates, 1972). In this context, accounting information plays a relevant role since improving its quality allows internal and external control and supports the managers' decision-making processes, enhanced by fiscal decentralization (Which, Zhang, & Liu, 2018). Although tax collection within Brazilian local governments (decentralization) is low in proportion to total revenues, research shows that greater local autonomy is associated with better fiscal responsibility (Cruz, Macedo, & Sauerbronn, 2013; Dantas Junior, Diniz, & Lima, 2019), due to the flypaper effect (Diniz, Lima, & Martins, 2017; Pansani, Serrano, & Ferreira, 2020), among other reasons.

Despite studies conducted in the public and private sectors, there are no clear, precise, and reliable criteria to measure the quality of accounting information. However, the NBC TSP Conceptual Framework defined that the quality of accounting information considers its relevance, reliable representation, understandability, timeliness, comparability, and verifiability (CFC, 2016).

In Brazil, accounting information has been improved in the public sector. Since 2008, regulatory and professional bodies have tried to establish and implement standards that converge and harmonize with the international accounting standards applied to the public sector (International Public Sector Accounting Standards – IPSASB®). The normative changes modernize accounting practice in the public sector, modifying different aspects of the accounting systems, such as the standardization of the chart of accounts, improvement of the accounting and tax statements, and adoption of the accrual basis for equity purposes, without compromising the budget records established by Law No. 4,320/1964 (Macêdo & Klann, 2014; Morás & Klann, 2018; Silva & Sanches, 2021).

At the same time, public management has strengthened its instruments of public transparency, driven by the enactment of Law no. 12.527/2011 (LAI – Law on Access to Information) and Complementary Law No. 131/2009 (Transparency Law), which requires the disclosure of public accounts in a virtual environment with public access via the Internet. However, there is still a need for improvement (Sell, Sampaio, Zonatto, & Lavarda, 2018). In addition, this expanded availability of accounting information increases the number of individuals using accounting information, making it relevant to assess the quality of accounting information; thus, accounting information is important for public management.

Given the need to assess the quality of accounting information, the STN recently created the Accounting and Fiscal Information Quality Ranking, obtained by verifying the items for accounting and fiscal information of public accounts sent by municipal governments for accounting consolidation via Siconfi. After assigning scores, the municipalities are ranked, and their scores are published on the STN institutional website. The Ranking 2020 edition analyzes and assigns scores to accounts corresponding to 2019.

However, it is necessary to advance the knowledge concerning the factors that promote the quality of accounting information. According to Thoa and Van Nhi (2021), financial autonomy has a direct positive effect on the quality of financial accounting information. Setiyawati and Doktoralina (2019) consider that using information technology and applying sound governance principles affect the quality of accounting information. Garcia and García-García (2010) showed that Spanish local governments' size, capital investment, and political competition were positively associated with the degree of online disclosure of financial information.

In addition to better control, the quality of accounting information is associated with better government financial performance. As Dewi, Azam, and Yusoff (2019) point out, the quality of the information in financial statements directly and positively influences the financial responsibility of local governments. In this sense, Bukenya (2014) identified that the reporting of entities where accounting information is perceived as of high quality reflects the highest levels of financial performance.

3. Methodological Procedures

This study adopted quantitative methods. The spillover effect and determinants of the quality of accounting information were estimated using the SARAR model, which has a spatial autoregressive lag and error (SARAR – Spatial Autoregressive Model with Autoregressive Disturbances) (Anselin & Florax, 1995; Kelejian & Prucha, 2010). The SARAR model is defined in equations 1 and 2:

$$y_i = \alpha + \rho W_1 y_i + \beta X_i + v_i, \quad i = 1, \dots, i \quad (1)$$

$$v_i = \lambda W_2 v_i + \varepsilon_i, \quad \varepsilon_i \sim N(0, \sigma^2 I) \quad (2)$$

Where y is the dependent variable of municipality i , X is a matrix of the independent variables of municipality i , α is the model intercept, β is a matrix with the slope of the explanatory variables. ρ (*rho*) is the spatial lag coefficient of the dependent variable y , while λ (*lambda*) is the spatial autoregressive error coefficient. ε_i is a random error of approximately normal distribution, that is, it is considered a Quasi-Maximum Likelihood (QMV) estimator. Nevertheless, the Maximum Likelihood coefficients are asymptotically consistent (Fahrmeir, Tutz, Hennevogl, & Salem, 1994). W_1 and W_2 are spatial weight matrices (W_{ij}) formed by neighboring municipalities of up to second order and normalized by the spatial weight k of neighboring municipalities j (Almeida, 2012), according to equation 3 below:

$$W_{ij}(k) = \frac{W_{ij}(k)}{\sum_1^j W_{ij}(k)} \quad (3)$$

Where $W_{ij}(k)$ is the spatial weight k of municipality i over the influence of neighboring municipalities j of up to second order, so that $\sum_1^j W_{ij}(k)$. The second-order spatial weighting contiguity matrix assumes that the closest neighboring municipalities are more influenced than the more distant ones and that the influence occurs up to the second order of neighborhood (Anselin & Rey, 2014). The georeferencing of the municipalities was obtained from the geometric grid of Brazilian municipalities in 2010 from the Brazilian Institute of Geography and Statistics (IBGE). The QMV uses the concentrated log-likelihood function (Drukker, Prucha, & Raciborski, 2013) defined in equation 4:

$$L_c(y|\lambda, \rho) = -\frac{n}{2}\{\ln(2\pi) + 1\} - \frac{n}{2}\ln(\hat{\sigma}^2(\lambda, \rho)) + \ln\|I - \rho W_1\| + \ln\|I - \lambda W_2\| \quad (4)$$

The concentrated log-likelihood (L_c) function used in the QMV estimates the values $\hat{\rho}$ and $\hat{\lambda}$ and then estimates the values of β and $\hat{\sigma}^2$ of equation 1 such as $\hat{\beta} = \hat{\beta}(\hat{\rho}, \hat{\lambda})$ and $\hat{\sigma}^2 = \hat{\sigma}^2(\hat{\rho}, \hat{\lambda})$. Robustness analysis was performed by estimating the Ordinary Least Squares (OLS), SAR (Spatial Autoregressive Regression), and SEM (Spatial Error Model) models. The Akaike criterion (AIC) indicated the preference for the SARAR model. The empirical model estimated by SARAR was defined in equations 5 and 6:

$$\ln(QualCont_i) = \alpha + \rho W_1 QualContab_i + \beta_1 \ln(Popula\c{c}o_i) + \beta_2 Autonomia_i + \beta_3 DespAdmPerCapita_i + v_i, \quad i = 1, \dots, i \quad (5)$$

$$v_i = \lambda W_2 v_i + \varepsilon_i \quad (6)$$

Where $QualAcci$ is the quality of accounting information for municipality i . $Popula\c{c}o_i$ is the number of inhabitants residing in municipality i . $Autonomia_i$ is the variable that measures fiscal autonomy in relation to revenue from municipality i , measured by tax revenue divided by the total budget revenue. $AdmExpPerCapitai$ is the expense paid in the budget function 04 - Administration divided by the population of the municipality i . α , ρ and λ are parameters estimated by the QMV method, already described in equation 1. ε_i is a random error [$\varepsilon \sim N(0, \sigma^2 I)$]

The population size of a municipality is a variable that can enhance the quality of accounting information, considering that these municipalities have a greater supply of qualified workforce, access to technological and financial resources to maintain their administrative structure, and the best tax conditions. Furthermore, fiscal decentralization is a strategy that can also influence the quality of accounting information because strengthening local tax collection encourages citizens to demand results and better accounting information from public managers. Finally, the spillover effect is also expected in the quality of accounting information because when a municipality improves its accounting numbers, the citizens of neighboring cities can also demand better results from their managers, which may improve the quality of accounting information (Cruz, Macedo, & Sauerbronn, 2013; Marengo, Strohschoen, & Joner, 2017; Grin, Nascimento, Abrucio, & Fernandes, 2018; Dewi, Azam, & Yusoff, 2019). The quality accounting information variable (*QualAcc*) was measured by the STN and obtained from Ranking 2020 - Quality of Accounting Information (data from 2019), available at <https://ranking-municipios.tesouro.gov.br/>. The methodology used by the STN to determine the quality of accounting information consists of assigning scores to four dimensions: i) Dimension I - Information management; ii) Dimension II - Accounting information; iii) Dimension III - Tax information; iv) Dimension IV - Accounting information x Tax information, through 60 (sixty) verifications. The scores assigned to each correct verification are summed by dimension (*d*), and the score of each dimension is obtained by its normalization, as described in equation 7:

$$ND_{id} = \left\{ \left[\frac{AE_{id} - M_d}{D_d} \right] * 10 \right\} + 50 \quad (7)$$

Where *ND_{id}* is the Score of the dimension of municipality *i* in dimension *d*. *AE_{id}* is the number of correct answers obtained by municipality *i* in dimension *d*. *M_d* is the municipalities' average of correct answers in dimension *d*. *D_d* is the standard deviation of the municipalities' correct answers in dimension *d*. The final step for obtaining the final *QualAcc* score for each municipality is performed by adding the scores for each of the four dimensions, according to equation 8:

$$NF_i = \sum_1^4 ND_{id} \quad (8)$$

Where *NF_i* is the Final score of the quality of accounting information for municipality *i*. *ND_{id}* is the score obtained in each dimension *d* of municipality *i*. The univariate spatial dependence analysis was performed using the global and local indexes (LISA) by Moran (1948) and with the help of thematic maps.

Table 1 provides a summarized description of the variables adopted in this study:

Table 1

Description of the variables adopted in this study.

Description of the acronyms	Definition	Expected result	Grounding	Source
Quality of accounting information (QualAcc)	Quality of Accounting and Fiscal information measured by the STN.		Ritchi, Fettry, and Susanto (2016); Dewi, Azam, and Yusoff (2019); Thoa and Van Nhi (2021).	STN ¹
Population (Population)	Number of inhabitants in the municipality.	(+)	Garcia and García-García (2010); Cruz, Macedo, and Sauerbronn, (2013); Marengo, Strohschoen, and Joner (2017); Grin, Nascimento, Abrucio, Fernandes (2018);	IBGE ²
Fiscal autonomy (Autonomy)	The municipality's autonomy in producing revenue, measured by tax revenue divided by the total budget revenue.	(+)	Tiebout (1956); Oates (1972); Sari, Tjahjono, and Turino (2018); Thoa and Van Nhi (2021).	Siconfi ³
Administrative Expense <i>per capita</i> (AdmExpPerCapita)	Budget expense settled in Function 04 – Municipal Administration.	(+)	Marengo, Strohschoen and Joner (2017); Grin, Nascimento, Abrucio, Fernandes (2018); Dewi, Azam, and Yusoff (2019)	Siconfi

Source: developed by the authors.

Note 1 – STN: National Treasury Secretariat; 2 – IBGE: Brazilian Institute of Geography and Statistics; 3 – Siconfi: Information System Accounting and Tax Accounting for the Brazilian Public Sector.

The study sample included 5,504 municipalities, 98.81% of the Brazilian cities. Data are from 2019 and were collected from the IBGE, STN, and Siconfi databases maintained by the STN. Siconfi data were collected through the Application Programming Interface (API)¹ using an algorithm developed in R and the respective statistical package. In addition, data manipulation, statistical tests, and the estimation of econometric models were also performed using R.

Municipalities that did not present a settled budget expenditure in the administration function and with tax collection below zero were excluded, as evidence of inconsistency is clear. Furthermore, Ilhabela (SP) was excluded from the sample because it does not maintain a territorial neighborhood with other municipalities and, as a result, it hinders the estimation of spatial econometric models.

4. Results

4.1 Descriptive statistics

Brazilian municipalities have different characteristics in relation to the quality of accounting information and population and financial aspects. Table 2 presents the descriptive statistics of the variables used in this study. The quality of accounting information has an average of 200.9 points, a standard deviation of 32.9, and a total range of 154.10, i.e., the quality of accounting information varies considerably among Brazilian municipalities. In terms of population, the differences are even greater, which was expected, given the heterogeneity of Brazilian municipalities (Baião, Cunha, & Souza, 2017).

¹ Disponível em <http://apidatalake.tesouro.gov.br/docs/siconfi>

Regarding the share of tax revenue collected in the total budget revenue, note that the municipalities are highly dependent on intergovernmental transfers from federal and state entities; on average, the total budget revenue comprises 7.96% of tax revenue. It is also worth mentioning that *per capita* administrative expenses vary between municipalities and, therefore, suggests that the structure and administrative capacity of the municipalities are also different.

Table 2

Descriptive statistics of the variables used in Brazilian municipalities. 2019

Variables	Mean	Standard-deviation	Minimum	Maximum
Accounting information quality (points)	200.9	32.8	93.6	247.7
Population (unit)	37,443	219,111	781	12,252,053
<i>Per capita</i> tax revenue (R\$)	312.52	367.19	0.00	6,327.73
<i>Per capita</i> budget revenue (R\$)	3,836.80	1,855.66	269.50	36,155.00
Fiscal autonomy (%)	7.96	7.06	0.00	59.73
<i>Per capita</i> administration expenses (R\$)	569.78	525.94	1.10	11,611.56

Source: STN, IBGE and Siconfi.

4.2 Analysis of spatial dependence

After analyzing the descriptive statistics, the investigation proceeded with the analysis of the spatial dependence of the quality of accounting information in Brazilian municipalities. Figure 1 presents the thematic map with the scores obtained by Brazilian municipalities in 2019 on the quality of accounting information. The qualitative analysis in Figure 1 suggests the existence of clusters of municipalities with higher scores (municipalities in green) in the states of Rio Grande do Sul and Santa Catarina, in the states of Pernambuco, Paraíba, and Rio Grande do Norte, and in the municipalities in the interior of São Paulo. The municipalities with lower quality of information (municipalities in red) are grouped in the interior of Brazil, mainly in the macro-region of the Center-West.

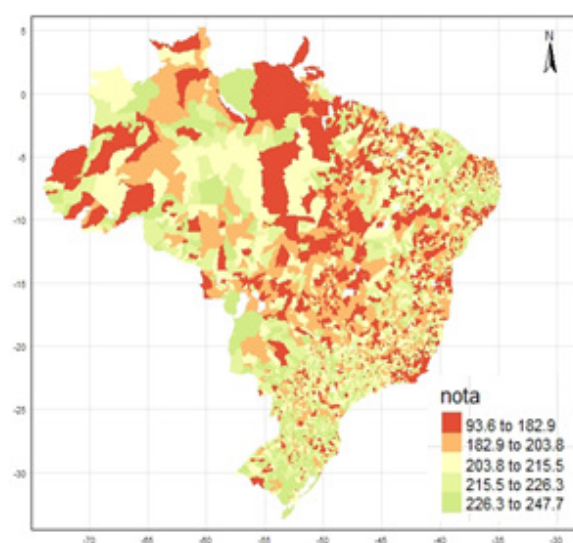


Figure 1. Thematic map concerning scores obtained by Brazilian municipalities in accounting information quality. 2019.

Source: Siconfi.

The quantitative analysis of spatial dependence was performed with the Global Moran Index and resulted in 0.253, statistically significant at 1%. Thus, the municipalities present a characteristic of spatial clustering with a positive sign; that is, the quality of accounting information between groups of municipalities is in the same direction. In other words, the neighbors of a municipality that belongs to a given group and obtained a high score for the quality of accounting information also tend to obtain a high score. Conversely, the municipalities belonging to a group in which low scores are obtained for the quality of accounting information tend to obtain low scores, similar to each other.

Based on these indications, the Local Moran Index was calculated for each municipality in the sample. Figure 2 presents the thematic map of the Local Moran Index of Brazilian municipalities. The municipalities' different shades present potential groups formed with higher (blue and dark blue) and lower (red and light blue) quality of accounting information. Moran's Index Z test was measured for each municipality. Figure 3 presents the thematic map with the p-value of the Z test of Moran's Index per municipality. The municipalities in dark blue and blue present statistical significance at 1% and 5%, respectively. The gray-colored municipalities did not show statistical significance. Thus, the spatial analysis of the quality of accounting information showed spatial clusters of municipalities in different parts of Brazil.

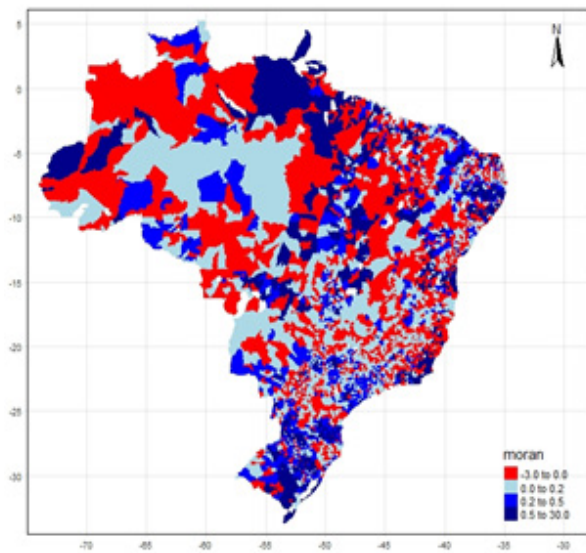


Figure 2. Thematic map of Moran's Index of the quality of accounting information among Brazilian municipalities. 2019.

Source: Siconfi.

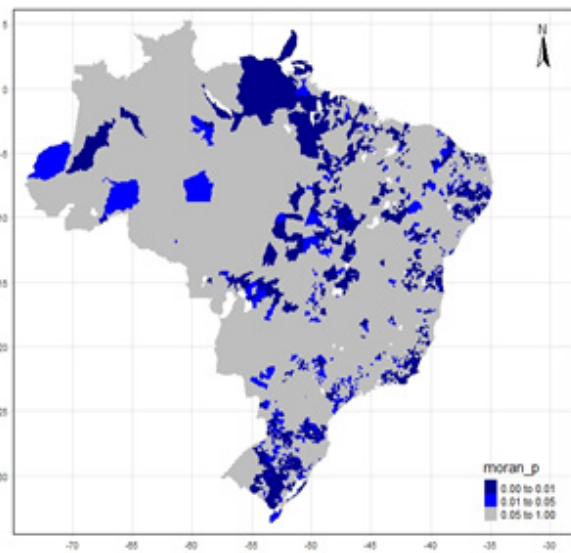


Figure 3. Thematic map of the p-value of the Z Test of Moran's index regarding the quality of accounting information among Brazilian municipalities. 2019.

Source: Siconfi.

4.3 Spatial modeling: the spillover effect of the quality of accounting information

The analysis of the quality of accounting information variable showed the presence of municipalities' spatial clusters. However, it remains to be seen whether the quality of accounting information is spatially dependent when its potential determinants are considered. Table 3 presents the results obtained with the estimation of the OLS, SAR, SEM, and SARAR models to identify the spillover effect and the determinants of accounting information in Brazilian municipalities. The results of the Akaike Information Criterion indicated that the SARAR model is the one that best fits the data. Note that both in the SARAR model and in the SAR model, the spatial dependence of the dependent variable is confirmed (*rho*); that is, there is a spillover effect. Therefore, the quality of a municipality's accounting information is positively influenced by the level of information of its neighbors up to the second order.

Furthermore, the SARAR model confirms that the effects not explained by the variables included in the model are spatially correlated (*lambda*); that is, the results confirm the importance of considering spatial effects in studies addressing municipalities, both due to the potential presence of the spillover effect (confirmed here) and the existence of unknown factors that are spatially correlated and may influence estimations and inferences.

Table 3

Results of the regression model estimated by the OLS, SAR, SEM, and SARAR to identify the determinants of the quality of accounting information among Brazilian municipalities. 2019

Variables	OLS ¹	SAR ²	SEM ³	SARAR ⁴
Population (ln)	-0.031***	-0.010***	-0.005	-0,007***
Fiscal autonomy (%)	0.651***	0.293***	0.286***	0,170***
Per capita administration expenses (ln)	-0.029***	-0.015***	-0.009*	-0,014***
Constant	5.706***	1.872***	5.368***	0,716***
Rho (ρ)		0.677***		0,891***
Lambda (λ)			0.6929***	-0,824***
R ² /Pseudo R ² (Nagelkerke)	0.034	0.181	0.179	0,196
Log-likelihood		1,823.17	1,816.64	1,872.38
Akaike criterion	-2,728.41	-3,634.30	-3,621.30	-3,730.80

Source: STN, IBGE and Siconfi.

Note: 1 – OLS: Ordinary Least Squares; 2 – SAR: Spatial Autoregressive Regression; 3 – SEM: Spatial Error Model; 4 – SARAR: Spatial Autoregressive Model with Autoregressive Disturbances. *p<0.10; **p<0.05; ***p<0.01.

Regarding the determinants, the results of the SARAR model presented in Table 3 showed that cities with larger populations negatively correlate with the quality of accounting information, *ceteris paribus*. On the other hand, fiscal autonomy was positively correlated with the quality of accounting information, confirming the theoretical indications of studies addressing fiscal decentralization that higher local tax collection strengthens local public management. In turn, per capita administrative expenses were negatively correlated with the quality of accounting information; that is, administrative expenses are not associated with the municipalities' improved quality of accounting information.

5. Discussion

This study analyzed the spillover effect and the determinants of the quality of accounting information in Brazilian municipalities. The results showed the spillover effect of accounting information quality, considering that the quality of the municipalities' accounting information is spatially correlated. This finding suggests mimetic isomorphism (Dimaggio & Powell, 1983), considering that the municipality's institutional environment is characterized by workforce shortages and uncertainty (Lopes et al., 2018). Thus, improving the quality of accounting information is a regionalized process in which actions can be directed to groups of neighboring municipalities, such as training and information sharing. Furthermore, the institutional theory helps understand this context of the implementation of new accounting standards and practices since organizational change based only on the technical development of legal instruments, without taking into account the cities' institutional environment, results in mere formality that lacks legitimacy, which naturally does not support the achievement of the desired results. Therefore, the improvement of key municipalities needs to be encouraged in regions with low accounting information quality because it may reflect on their neighbors. Hence, it highlights the need for class councils, accounting bodies (STN), and state courts of accounts to take action considering the municipalities' regional criteria. Such actions can prevent incomplete modernization of accounting in the public sector, as has already happened with other organizational changes, as highlighted by Lino, Carvalho, Aquino, and Azevedo (2019).

Regarding the determinants of the quality of accounting information, population was negatively correlated with the quality of accounting information. This result contradicts the initial expectation that larger municipalities would have better technological, human, and financial conditions to improve accounting information. A potential explanation is that the management of larger municipalities is more complex. In other words, larger municipalities deal with more complex management structures and face greater difficulties in changing and modernizing administrative procedures, since the accounting system is affected by the municipality's capacity and level of governance. Unfavorable managerial practices harm the quality of accounting information (Marengo, Strohschoen, & Joner, 2017; Grin et al., 2018).

Regarding fiscal autonomy, the results confirmed the theoretical expectation. The positive correlation between fiscal autonomy, measured by a larger share of tax revenue of total revenue, and the quality of accounting information shows that municipalities need to increase tax collection, not only to explore their tax bases and improve financial results but also to encourage greater citizen involvement in participation, control and social demand for improved public management (Hayek, 1945; Tiebout, 1956; Oates, 1972).

On the other hand, the *per capita* administrative expense was negatively correlated with the quality of accounting information; that is, higher administrative expenses are not necessarily associated with improved accounting information. On the contrary, it negatively affects it. Hence, it is important to establish planned requirements and procedures directed to the aspects harming the accounting information quality. The variable per capita administrative expenditure comprises expenditures as a whole, which can be positively correlated with other management aspects, such as transparency and efficiency. However, the results indicate the need to investigate and improve administrative expenses to direct and improve the quality of accounting information (Medeiros, Albuquerque, Diniz, Alencar, & Tavares, 2014; Marengo, Strohschoen, & Joner, 2017).

Additionally, it is worth noting that the measurement of the quality of accounting information established by the STN adopted in this study presents methodological limitations, mainly due to its scope predominantly related to the conformity of information between the financial and tax statements and sending/resubmitting deadlines. Therefore, further studies are needed to improve the measurement of the quality of accounting information and fully understand the characteristics established by the NBC TSP Conceptual Structure, such as relevance, reliable representation, understandability, timeliness, comparability, and verifiability, focusing on making accounting information more helpful to users.

Finally, it is important to note this study's exploratory nature. The variables included in the models were those that initially presented the best theoretical-empirical explanation. Thus, further research is needed for regulatory bodies, control institutions, and professional accounting professionals to support the continuous improvement of the public sector accounting systems.

6. Conclusion

This study investigated the spillover effect and the determinants of the quality of accounting information in Brazilian municipalities. The results indicate that the quality of accounting information has a spillover effect in Brazilian municipalities. Furthermore, the population size and *per capita* administrative expenses are negatively correlated with the quality of accounting information, while fiscal decentralization is positively correlated. This study's contribution includes identifying that the quality of accounting information should be treated by grouping municipalities and that any actions regulatory, control, and professional bodies design need to consider this characteristic. From a theoretical point of view, this study observed that the accounting practice of municipalities assumes mimetic, isomorphic behavior when implementing accounting rules aimed at improving the quality of accounting information.

This study's main limitations were that aspects of compliance with accounting standards and manuals, the cross-tabulation of accounting and tax data, and deadlines strongly guide the quality of accounting information measured by the STN and adopted here. Additionally, administration expenditure does not only contain expenses directly related to municipal accounting systems.

The results indicate that future studies can identify the situations that cause spatial dependence between municipalities; investigate the quality of accounting information and the spillover effect over time; improve the metrics of accounting information quality considering the peculiarities of Brazilian local governments; and consider variables such as competition between accountants and accounting companies in the municipalities, the use of different software and the interest of managers in improving the provision of accounting information publicly.

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Social Security Education in Early Childhood to Promote Conscious Citizenship

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Abstract

Objective: To develop actions to disseminate social security education in early childhood and understand how children can be motivated to develop conscious citizenship regarding social security. Early childhood is a phase seldom explored to address social security issues. The conception of the Life Cycle Theory, which is frequently invoked to explain the motivations for people to heed the long-term demands concerning retirement and financial behaviors as they age (Neri, 2007), includes the assumption that, in general, people have a more or less defined pattern in the accumulation of wealth (Modigliani, 1986).

Method: After the Institutional Review Board at the University of Brasília approved the project (CEP/CHS/UnB), four face-to-face pedagogical workshops were held in April and May 2021, including 12 children aged five and six enrolled in kindergarten. The book *O Tesouro do Vovô* [Grandpa's Treasure] by Álvaro Borba Modernell was adopted to support and enhance the children's creative ability and learning. The workshops were held on Thursdays, the day reserved for art classes. The workshops were held at the classes' final 40 minutes and were distributed into four meetings of 50 minutes each (on April 8th, 22nd, 29th, and May 6th, 2021).

Results: The workshops enabled the creation of a collective knowledge field as the children understood the topic in a controlled environment with the support of adults.

Contributions: This study showed the importance of introducing the learning phase in the Life Cycle Theory.

Keywords: Retirement, Social Security Education, Pedagogical Workshops, Social Security, Early Childhood.

1. Introduction

Identifying the factors that determine the sustainability of social security systems in Brazil and worldwide is a challenge researchers have faced. Recommendations include reforming social security systems to mitigate the effects of the demographic dynamics and their impact on governments (Grech, 2013; Lima & Matias-Pereira, 2014; Zhao & Mi, 2019), in addition to providing financial and social security education (D'Aquino & Cerbasi, 2008; Souza, 2016; Silva, Reis, Martins & Fornari, 2019).

According to the Organization for Economic Cooperation and Development (OCDE), financial education sensitizes individuals to the opportunities and risks of financial concepts and products, consistently promoting responsible societies committed to the future (OECD, 2005). Financial education has been a growing concern in various countries, encouraging a more in-depth focus on this subject (Savoia, Saito & Santana, 2007; Vieira & Pessoa, 2020).

Aiming to understand how individuals plan their spending and saving behavior throughout life, Modigliani and Brumberg developed the Life Cycle Theory, according to which people make intelligent choices of how much they want to spend according to the resources they have in each stage of life (Modigliani & Brumberg, 1954). Researchers agree that people adapt their consumption patterns to their needs in different stages, regardless of their income, giving up a portion of consumption during their earning years to stabilize their consumption patterns later in life. A time when, in general, an individual's job performance declines (Modigliani & Brumberg, 1954; Neri, Carvalho & Nascimento, 1999; Deaton, 2005; Neri, 2007; Melo, Texeira, Ferreira & Silva, 2018).

Silva (2012) and Silva (2019) argue that the life cycle can be divided into three phases: (a) pre-work; (b) job, and (c) post-work. Hence, individuals spend more than what they earn in phases (a) and (c) while they earn more than they spend in phase (b). Furthermore, researchers note that the duration of each phase differs among individuals as several aspects influence it: biological factors, society's economic structure, educational opportunities, family needs and expectations, and health, among others.

There is a consensus in the literature that financial education enables individuals to acquire knowledge to make better decisions regarding their financial lives and prepare for different moments in life (Souza, 2016; Silva, Reis, Martins & Fornari, 2019). D'Aquino and Cerbasi (2008) believe that providing financial education during childhood help children build the basis to manage money well during adulthood.

Financial education applied to social security favors a long-term savings culture and facilitates understanding retirement-related issues. Bassil (2018) reinforces the notion that social security education is an aspect of financial education, and the population must learn about the need to be included in the social security system, besides the actual dimension of the social security system and its relevance to workers and their families.

Note that social security education in the context of financial education is also vital for individual and collective decisions concerning spending and saving. It is an aspect addressed in the Brazilian Federal Constitution in its 6th article "Education, health, job, housing, leisure, safety, social security, mother and child protection, assistance to the homeless are social rights." Ejdelsberg and Ribeiro (2009) state that social security education is the most specific financial education literacy related to pension funds and their respective effects on individual wealth.

In 2003, the Ministry of Social Security implemented the *Programa de Educação Previdenciária (PEP)* [Social Security Education Program] to sensitize and educate society about its rights and duties toward social security. However, studies show a low level of financial education, especially among youths (Lusardi, Mitchell & Curto, 2010; Atkinson & Messy, 2012; Vieira, Kunkel, Campara & Paraboni, 2016).

Therefore, understanding that life is a succession of intertemporal choices and only intelligent choices enable individuals to deal with the challenges and opportunities throughout the different stages of life (Modigliani & Brumberg, 1954; Giannetti, 2005) and that a consistent social pact is needed to protect life and promote engaged citizenship, mobilizing a national effort to make the social security system to face future challenges (Magalhães & Alves, 2019), this study's objective was to devise actions to disseminate social security education in early childhood and understand how such actions can be disseminated to promote increased awareness of the topic.

For this study's purposes, early childhood is considered the period covering the first six complete years or 72 months of a child, according to article 2nd of Law No. 13.257, from March 8th, 2016, which establishes public policies for early childhood in Brazil.

2. Literature Review

2.1 Early Childhood and the Life Cycle Theory

According to Oliveira Lima and Nóbile (2020), there is a consensus in the literature about the importance of the early years of life in human development, given the abundant number of synapses and neural connections taking place. For this reason, there are more efficient responses to stimuli provided to children during this phase, influencing an individual's life cycle. One of the conclusions is that critical and reflective awareness, inherent to scientific thinking, is based on the elementary logical structures of a child's thinking. Moreover, in this phase, intelligence and logic are connected with other cognitive functions such as memory, language, and perception (Piaget, 1993; Montangero et al., 1998; Oliveira Lima & Nóbile, 2020).

According to Papalia and Feldman (2013) and Gonçalves (2016), the characteristics of childhood differ according to age, presenting some specificities: (i) from birth to 3 years old, in this phase, in addition to rapid growth, the child acquires two skills that are critical for survival, the ability to walk and speak; (ii) from 3 to 6 is a phase when children rapidly acquire gross and fine motor skills, developing more complex action systems; and (iii) from 6 to 11 is a phase in which children are less egocentric and more competent to perform tasks that require logical reasoning such as establishing spatial relationships, causality, categorization, inductive and deductive thinking, and conservation. Piaget (1986) notes that acquisitions during childhood are essential for children to know themselves better, distinguish themselves from others, and interact socially.

As for social security, early childhood is usually a phase of life that is seldom explored. According to the Life Cycle Theory, which is often invoked to explain individuals' motivations for heeding long-term demands such as retirement and financial behavior as they age (Neri, 2007), people, in general, have a more or less defined pattern of wealth accumulation throughout their life cycle (Modigliani, 1986).

For the financial planner Levy (2019), an individual's involvement with finances can gradually start at the age of three, according to his/her understanding of money. The literature shows that the ideal age for developing a conscious spending mentality and financial education is between five to eight years old, as this is when cognitive relationships are formed, providing the basis for a child's development (Kassardjian, 2013).

Therefore, from this perspective, this study considers that the Life Cycle Theory can be revisited to address financial education even before an individual enters the “Income” phase (Income), a phase that can be called “Learning” (Figures 1 and 2).

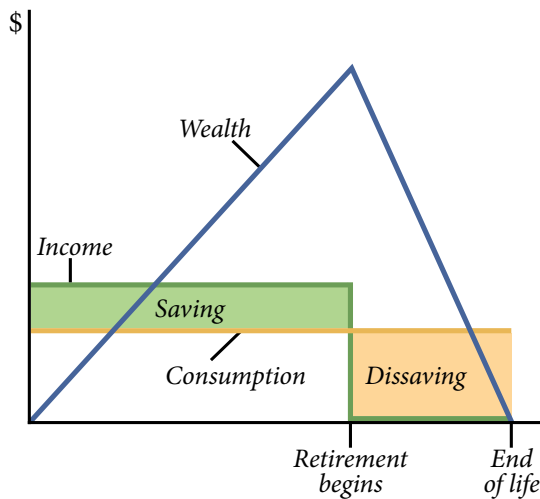


Figure 1. Life Cycle Theory

Source: Modigliani (1986).

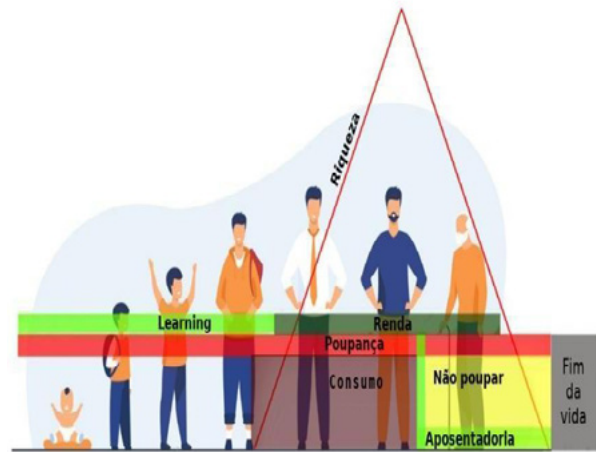


Figure 2. Life Cycle Theory adapted from Modigliani (1986)

Source: developed by the authors based on Modigliani (1986).

Godfrey (2013) suggests that a strategy to involve children with finances is considering the four main learning age groups: from 5 to 8; 9 to 12; 13 to 15; and from 16 to 18 years old, based on what is called “10 basic principles of money”, such as: (1) how to save; (2) how to keep money under control; (3) how to be rewarded what you deserve; (4) how to spend wisely; (5) how to talk about money; (6) how to deal with a limited budget; (7) how to invest; (8) how to exercise an entrepreneurial spirit; (9) how to deal with credit; and (10) how to use the money to change the world.

Godfrey (2013) and Kassardjian (2013) consider that one has to see whether teachings are appropriate to a child’s age, noting that 5 to 8-year-old children are usually extremely curious, literal, and energetic, while they may occasionally fail to pay attention and even show egocentrism. Kassardjian (2013) considers that the primary financial skills that should be encouraged at this age include counting coins and bills, understanding the purposes of money, learning the differences between wants and needs, and developing a sense of ethics and justice.

The literature is clear about the notion that learning starts with the beginning of life (Piaget, 1993; Montangero et al., 1998) and financial education should also begin at this stage (Godfrey, 2013; Kassardjian, 2013; Levy, 2019; Oliveira Lima & Nóbile, 2020). Thus, early childhood can be propitious to provide social security education in the context of children and at school.

Thus, early childhood is a good opportunity to encourage saving and planning behavior. The literature shows that a lack of financial education in the teaching environment may be one of the factors for youths to think excessively about the present, relegating the future to later. Such behavior results in a generation of millions of people who do not save, do not invest, and do not think about retirement as much as they should (Borges, 2014; Gallo, 2018).

2.2 Conscious Citizenship: financial and social security education

Financial education is a learning process associated with personal finances, in which society has the opportunity to gain a critical view of the use of money, enabling consumers to budget and manage their income, saving and investing (Cordeiro, Costa & Silva, 2018; Cordeiro, Maia & Silva, 2019). Gallery, Gallery, Brown, and Palm (2011, p.288) note that financial education concerns “the ability to make intelligent judgments and efficient decisions regarding money use and management.”

Pena (2008) and Silva (2012) define financial education as the individuals’ ability to make proper choices when managing their finances throughout the life cycle, seeking society’s material well-being. In practice, it comprises a large set of guidelines and clarifications on the proper behaviors and attitudes when planning and using personal financial resources.

According to the Organization for Economic Cooperation and Development (OCDE), financial education enables individuals and societies to improve their understanding of financial concepts and products, develop values and competencies to make well-informed choices, know where to seek help, and implement other actions to improve their well-being. Hence, financial education can more consistently contribute to responsible individuals and societies committed to the future (OECD, 2005).

One aspect of financial education concerns issues related to long-term savings and retirement, already in the final stages of the life cycle. According to information from the booklet, “*Educação Previdenciária: planeje seu futuro*” [Social Security Education: plan your future] prepared by *Programa de Educação Financeira e Previdenciária do Sebrae Previdência* [Sebrae Previdência’s Financial and Social Security Education Program], conscious and responsible spending throughout the life cycle favors enjoying pleasures in the present and ensuring security for the future. Therefore, knowing how to determine how much should be spent currently and how much should be saved and invested in pensions, ensuring a balance between these needs, is one of the most significant demonstrations of financial education that a person can give (Sebrae, 2012).

The Brazilian Federal Constitution from 1988, article 6th, determines that “Social rights include education, health, employment, housing, leisure, safety, social security, maternity and childhood protection, assistance to the needy, in the form of this Constitution,” showing the importance of the topic for the Brazilian society. Therefore, people must be educated regarding their rights and the purpose of the social security system, which demands monetary contributions from those who have paid jobs (Matos, 2012).

According to Magalhães and Alves (2019), social security protects citizens from the social risks faced throughout life. However, a portion of the population is unaware of such protection mechanisms and remains on the margins of social security coverage due to misinformation. Such misinformation undermines the social guarantees offered by the State, an essential step in building a more engaged society. Therefore, according to the authors above, promoting active citizenship toward social security issues represents a milestone to be achieved by all governmental spheres.

Ejdelsberg and Ribeiro (2009) note that the “financial education” term is used to refer to the knowledge an individual uses to make decisions concerning investments, while “social security education” implies more specific financial knowledge related to the functioning of pension funds and their impact on an individual’s wealth.

One of the initiatives developed to provide social security education to the Brazilian population is the *Programa de Educação Previdenciária (PEP)* [Social Security Education Program] developed by the Federal Government in 2000 to expand, disseminate, and propagate social security protection. The program consists of courses, individual guidance, and radio and TV programs, with the primary objective of informing and sensitizing about social security rights and duties (Magalhães & Alves, 2019).

As for its origin and legal basis, up to 2003, the PEP was called *Programa de Estabilidade Social* [Social Stability Program]. However, with the organizational structure of the *Instituto Nacional do Seguro Social* [National Institute of Social Security] approved by Decree No. 5,870, from August 8th, 2006, PEP ceased to be part of the Ministry of Social Security and became part of the INSS Board (Magalhães & Alves, 2019). Sales (2014) notes that this change was intended to promote awareness, foster debate, and create a “culture of transparency,” making Brazilians finally understand that the social security administration is theirs and everyone’s, making their participation more interesting, using a language and format that better reach the target audience.

The information provided on the INSS website shows that PEP seeks to include workers in the social service system, disseminate public policies, and promote engaged citizenship, among others, expanding the level of social security coverage and enabling citizens to understand and exercise their rights. Among the PEP actions, the individual assistance provided to citizens stands out. Such assistance is provided in public squares, fairs, exhibitions, collective actions, and efforts in rural areas or together with the assistance provided by Mobile Units (PREVBarco and PREVMóvel) (INSS, 2020).

Another initiative of the Brazilian government was the *Estratégia Nacional de Educação Financeira* (ENEF) [National Strategy for Financial Education], which integrates social security education to promote financial and social security education and promote active citizenship, the efficiency and dependability of the Brazilian financial system, and consumers’ conscious decision-making. Information provided on its website shows that ENEF is a mobilization around promoting actions concerning financial, insurance, social security, and tax education in Brazil. ENEF was created by Federal Decree No. 10,393/2020, the expectation of which is to promote active citizenship by providing and supporting actions that enable the population to make autonomous and conscious financial decisions.

Despite the measures implemented by PEP and other initiatives such as ENEF, people usually are not prepared to specifically plan their retirement. The level of financial education and knowledge among young people is low. Hence, social security planning is essential for young individuals, as they may need this resource in the future or even in the present.

2.3 Learning cycle: awakening learning in early childhood

Encouraging children to explore the world, whether through their senses or arts, by using colors, sounds, or pictures, is necessary to boost their creative potential and learning (Fröebel apud Cambi, 1999; Siufi, 2018). The previous authors note that playing is the first path toward learning, as it enables one to represent and understand the world better.

Fröebel (apud Cambi, 1999) and Siufi (2018) argue that kindergartens are not merely places to welcome children during early childhood but are places developed and structured with playful tasks, group activities (such as games) to sharpen the children’s interests for varied activities.

According to the previous authors, educators should give children opportunities to express spontaneous initiatives, showing that education is a process in which individuals develop their thinking, connecting the inner world to the outer world. Based on this notion, the more active a child’s mind, the more receptive s/he is to new knowledge (Fröebel apud Cambi, 1999; Siufi, 2018).

Siufi (2018) notes that for Piaget, each phase highlights certain forms of mental organization that suggest a relationship with games. Piaget argued that playful activities were the cradle of a child's intellectual activities; hence, they are an indispensable practice in the educational process. "[...] by engaging in types of play, children reflect their level of cognitive development and build up knowledge" (Piaget apud Kishimoto, 2011, p. 36). Therefore, as members of the social milieu, children need experiences and learning to build collective knowledge and social relationships (Siufi, 2018). Therefore, from the author's perspective, ludic culture enables experiences to be accumulated from the beginning of a child's life in which social interaction, in general, takes place.

According to Coelho (2000), one of the mechanisms used to materialize the learning process in early childhood is literature; considered an essential task to serve as a training agent, be it experienced in the spontaneous interaction between reader/book or in the dialogue between reader/text promoted at school. According to the author above, children's literature is the ideal agent to form a new and pressing mentality. However, transforming children's mentality is only possible if the adults who surround children (e.g., parents, educators, and teachers) are conscious of their responsibility, reorganize their knowledge, and assume the task (Machado, 2002; Tavares, 2010).

Machado (2002) argues that "[...] listening or reading stories initiates a child in the process of constructing language, ideas, values, and feelings, which help the child to develop his/her cultural background as an individual and citizen". Therefore, for children's literature to support the education of children, it needs to be adapted to the children's social and cultural context as well as that of the adults with whom they interact in the educational process and respect the stages of child development (Tavares, 2010).

From the learning cycle perspective, in which teaching is ordered in a sequence of annual grades (or levels), such a subject can be introduced in early childhood and addressed again in subsequent years. That is, teaching is applied over annual periods, which can be organized in cycles of two, three, four, or more years, considering the students' different paces (Perrenoud; 2004; Silva, 2017).

3. Methodological Procedures

The sequential mixed methods approach (Terrell, 2012; Mele & Belardinelli, 2019) was adopted to develop actions to disseminate social security education in early childhood, intending to promote citizens who are aware of the topic. This approach comprises five stages:

- i. The project was submitted to the Institutional Review Board at the University of Brasília (CEP/CHS- UnB);
- ii. An early childhood school was selected for the project after contacting the principal and pedagogical coordinator and establishing the conditions under which the workshops would take place;
- iii. The workshops were planned, establishing how the study would be applied, selecting the classes, and determining which resources would be used;
- iv. The author of the book chosen to be the main resource was contacted to adapt the book to the study's phenomenon (social security education in early education); and
- v. Workshops were performed and the information collected was systematized.

Because the study involved children's participation, the project was submitted to the Institutional Review Board at the University of Brasília (CEP/CHS-UnB). The research team met in mid-November 2020 to arrange the documents necessary for the project submission. As a result, the following documents were submitted on December 4th, 2020:

- a. Declaration of acknowledgment and agreement of the participant institution;
- b. Data use commitment statement;
- c. Confidentiality agreement;
- d. Consent term to use the minors' voices;
- e. Free and informed consent form to be signed by the parents or legal guardians;
- f. Cover page; and
- g. Detailed project.

On December 10th, 2020, the Institutional Review Board released the first opinion report, listing the following pending documents:

- h. Referral letter;
- i. Updated Schedule dd/mm/yyyy;
- j. Ethics review letter;
- k. CVs of all researchers involved;
- l. Assent form or justification for not sending it;
- m. Free and informed consent form including the e-mail and telephone of CEP/CHS, in addition to the first author's telephone;
- n. Data collection instrument or justification for not sending it;
- o. Cover page signed by the proposing institution; and
- p. Institutional Acceptance.

Additional information was submitted on February 4th, 2021, and the second opinion report made new recommendations:

- q. Free and informed consent form aimed at the underage participants; and
- r. Clarification of the methodological procedures and respective explanations.

After meeting all recommendations, the Institutional Review Board emitted its final opinion report on March 17th, 2021. Hence, the research team resumed the activities regarding the planning of the workshops. Note that the choice of the workshop as a methodological strategy was based on the literature. Accordingly, workshops are adopted among different populations to work with social movements (especially among younger individuals). Workshops are also used in other contexts where a participatory approach is intended to promote social transformation (Spink, Menegon, & Medrado, 2014).

In general terms, Spink, Menegon, and Medrado (2014) show that workshops are privileged ethical-political tools, as they facilitate the creation of dialogical spaces for symbolic exchanges and the co-construction of other possibilities of meanings concerning the topics discussed. Moreover, these authors consider that the effects of workshops are not limited to the uses researchers can make of them. However, there are also potential transformations in the discursive practices generated in such a context, in an inseparable fusion between what is conventionally called "collection of information and production of information."

3.1 The school object of this case study

Initially, the project provided that the workshops would be held in a child education unit of the Government of the Federal District (GDF) public education network. The objective was to analyze the children's skills involving financial and social security education, which would be addressed later, and understand how these children would be motivated to develop conscious citizenship. However, due to the Covid-19 pandemic, the GDF issued Decree No. 40,509 on March 11th, 2020, suspending educational activities in all public and private schools, universities, and colleges, among others. Decree No. 40,939, on July 2nd, 2020, authorized that face-to-face classes be resumed from July 27th, 2020, among private schools only. Thus, public schools in the Federal District remained closed until the completion of this study.

For this reason, we opted to conduct the workshops in a private school in the Federal District, addressing students of the same age group. Furthermore, because the project's conception involves the development of conscious citizenship among children and the age group determined in the original project would be addressed, the research team considered that the results would not be compromised. Hence, a child education school in Brasília was contacted via telephone, and a face-to-face meeting was held with the pedagogical coordinator in November 2020, when the project was presented.

Considering the possibility of using children's literature addressing the topic, the book *O Tesouro do Vovô* [Grandpa's Treasure] by Álvaro Borba Modernell, published by Mais Ativos, was chosen because it had already been launched in 2011 in the official program of the main supplementary pension plan event in Brazil, the Annual Congress of the Brazilian Association of Private Pension Funds (Abrapp).

To achieve this study's objectives, the pedagogical coordinator of the school, the object of this case study, determined that the workshop would be held in a studio already used for art classes. The research team verified that the space was adequate for the workshops. As the discussions on the implementation of the workshops advanced, it was established that the art teacher responsible for the studio would help conduct the workshop. Thus, she received training and was accompanied by the research team, and the approach previously planned was implemented together with resources defined for this study. Such resources included the book adapted to the research phenomenon (social security education in early childhood) and the systematization of the information collected.

3.2 Planning and Implementing the Workshops

Silveira Kroeff, Silva, and Maraschin (2016) consider workshops important research tools. The reason is that workshops create an interesting collective field to enhance a shared creative space and enable monitoring processes from a participatory perspective. For Siqueira and Siqueira (2020), workshops constitute a methodological device that enables the collective construction of knowledge and analysis of real life, implying the exercise of listening, which deconstructs the hierarchy of relationships and knowledge.

Hence, workshops in research addressing children consider them to be individuals in development, who play, fantasize, imagine, opine, criticize, suggest, and therefore assume language that is adequate to their specificities, according to their age, interests, and conditions for them to feel safe and welcome (Kroeff, Silva, & Maraschin, 2016; Siqueira & Siqueira, 2020).

In this movement, the literature states that a literary book is an object that potentially mediates conversations, the exchange of ideas and experiences, and may expand “the possibilities of knowing oneself, and others and a little more of the world beyond what is already know, to organize experiences, imagine and create, think, be moved, and appreciate the aesthetics of verbal and visual texts and their interrelationships” (Corsino, 2017; Siqueira & Siqueira, 2020).

Based on this perspective, the workshops were planned together with the team at the participating school. Thus, a face-to-face meeting was held on February 25th, 2021, to determine how the study would be applied, which classes would be selected, and what resources would be used, including the adaptation of the book *O Tesouro do Vovô* [Grandpa's Treasure] to the age range selected for the workshops.

Regarding which classes to select, the school, the object of this case study, separates early childhood education according to four age groups: (a) phase I, up to 3 years old; (b) phase II, between three and four; (c) phase III, between four and five; and (d) phase IV, between five and six. Based on the literature and the time restrictions, the workshop focused on a single phase IV group (five and six years old) composed of 12 children.

The children's verbal and non-verbal behaviors were recorded in all the workshops' first minutes, and we assessed how the children's understanding of the subject progressed before and after the workshops. The workshops were held on Thursdays, the day of the week reserved for art classes in that class. The workshops were held in the final 40 minutes of the class and were divided into four meetings of 50 minutes each (April 8th, 22nd, 29th, and May 6th, 2021), according to the dynamics shown in Table 1.

Table 1

Workshop dynamics

Date	Guidelines and Bases of Education	Theme Introduced	Resources Used
Workshop 1: 8/April/2021	EI03EF01) Express ideas, desires, and feelings regarding their experiences through oral and written language (spontaneous writing), photos, drawing, and other forms of expression.	Children's perception regarding the subject of social security based on the keywords: job, retirement contribution, government, past time, elderly, retirement, etc. Life Cycle Theory: introduction of the concept of elderly using FaceAPP.	- A4 sheets; -printed photos; -voice recorder (mobile); -permanent markers; -watercolor or ink; and - FaceAPP.
Workshop 2: 22/April/2021	(EI03EO03) Expand interpersonal relationships, and develop participation and cooperation attitudes. (EI03EO06) Express interest and respect toward different cultures and ways of life.	Retirement concept and a government's box (social security): reading the book and presenting three trees representing retirement.	-1 tree; -printed adapted book; -3 sheets of brown paper; - Álvaro's box (covered with brown paper); -permanent marker; e - video call with the author, Álvaro Borba Modernell, or a recorded video.
Workshop 3: 29/April/2021	(EI03EO04) Communicate ideas and feelings toward people and diverse groups. (EI03EO07) Use strategies based on mutual respect to deal with conflicts in interactions with children and adults.	Relationship between work and retirement: the children would "work" for the school and get "paid" for the services provided.	-box; -play money; and -a camera (mobile).
Workshop 4: 6/May/2021	(EI03CG01) Create with the body diverse forms of expression of feelings, sensations, and emotions in everyday situations, games, dance, theater, and music.	Enjoying retirement: the children characterized as elderly are allowed to open the box, take the amount collected, and exchange it for benefits (games or snacks available).	-15 m of <i>chita</i> fabric; -Baby powder; -fruits and popcorn.

Source: developed by the authors.

Workshops' commands. Specific commands were established for each workshop. Teacher Gabriela helped us to implement the dynamics. In Workshop 1, the students were asked to sit in a circle to introduce themselves and discuss social security and their perception of it. This presentation revealed their level of understanding regarding the topic. In Workshop 2, the students received clarification regarding the introductory concepts concerning social security, read the book *O Tesouro do Vovô* [Grandpa's Treasure], and immediately after reading the book, a video call was held with the book's author for the children to learn more and clarify doubts. Workshop 3 dynamically addressed the relationship between work and retirement, after which the students were gathered, and "jobs" were distributed among them. At the end of this task, the children were "paid" for the jobs performed and left a portion of their pay in the "government's box." Finally, in Workshop 4, we gathered the children and characterized them as elderly, so they could get their pensions from the government's box and enjoy the benefit.

Regarding the book's message. The story unfolds in a family context in which the main character is Grandpa João. Through his grandson's lens, Grandpa has an inexhaustible treasure, conquered in adventures in his youth, because, unlike his grandson's parents, Grandpa does not work but always has some money to meet his needs. At this point, the concepts and fundamentals of social and complementary security, the sources of retirees' income, are presented. According to the book's author, *O Tesouro do Vovô* [Grandpa's Treasure] is recommended, among others, to introduce and support financial education at home and schools, highlighting social security education issues. In its original conception, the book is suggested for early childhood education, suitable for children from 7 years old. Hence, we contacted the writer and asked him about the possibility of adapting it to children between 4 and 6, according to the age range adopted by the participant school. Additionally, the author was asked about including concepts specific to social security, such as passive income, social security contribution, and retirement age, among others, to which Álvaro Borba Modernell readily accepted and responded.

Involvement of teachers/researchers. During the workshops, the school's art teacher and the researchers observed the children to assess their level of knowledge on the subject. With this knowledge, the remaining resources were implemented to encourage a reflection based on the knowledge provided, preserving the children's autonomy. At this stage, we understood that the children needed to appropriate the concepts addressed to be able to establish reasoning and an active posture according to their natural curiosity at this stage of life.

Data Recording. All the steps implemented in the workshops were duly recorded by the teacher and the researchers, highlighting details about the children's verbal and non-verbal behavior during the discussions. The findings at this point were compared to those recorded before the workshops. The objective was to verify whether the children's understanding of the subject had improved. Each workshop was recorded using the resources previously selected by the research team: drawings, audio recordings, and photos of the drawings were taken using the research team's mobiles, following the recommendations provided in the opinion report by the Institutional Review Board at the University of Brasília (CEP/CHS-UnB).

4. Results

Some keywords were introduced in the **first workshop** (i.e., retirement, bank, life cycle, money, old age) to identify the children's previous knowledge about the topic. The children were quite receptive, revealing favorable conditions to advance with the planned stages. Next, the children were asked to draw what they understood of these keywords; they were very excited, and Figure 3 presents the resulting images.



Figure 3. Images taken at Workshop 1

Source: material collected by the research team.

In this workshop, while the children were drawing, they would say: “I’m drawing my grandpa,” “look at my bank,” or “is it pretty?” In general, they became involved with the tasks proposed in Workshop 1, though a few were shy.

The **second workshop** started by reading the book *O Tesouro do Vovô* [Grandpa’s Treasure], properly adapted by Álvaro Borba Modernell, to the age range of the children participating in the workshop. The children were fascinated by the story of the little grandchild who believed that his grandpa had an inexhaustible treasure conquered in youthful adventures. They would become increasingly interested and excited with each page and when they commented on the book outcome. Next, the research team made a video call with the book’s author, and the children were allowed to ask questions. At this point, the children’s involvement and excitement with the story and the interaction with the book’s author became apparent (Figure 4).



Figure 4. Images taken at Workshop 2

Source: material collected by the research team.

The author kindly lent a mascot representing money (Figure 5), and the children could touch and see it. In the second workshop, the children also had contact with a blackberry sapling to understand how the cycle of life works, in which we are born, grow, age, and die. Again, the children were excited, played with the sapling branches, and wanted to see the plant up close.



Figure 5. Images collected in Workshop 2

Source: material collected by the research team.

The **third workshop** was reserved for showing the relationship between work and retirement. The children were “hired” to work in activities such as separating lids, folding pieces of fabric, and working on a make-believe office (Figure 6) and were duly remunerated. They interacted among them during the entire workshop, and we noted that they were committed to doing their jobs well because they knew that their “salary” depended on it.



Figura 6. Images collected in Workshop 3

Source: material collected by the research team.

In this workshop, the children were taken to the schoolyard to ask about the profession of the people there. They earned a bonus for asking about these people’s professions. When they returned to the classroom, they helped create the “government’s box – social security” and put part of the money they had received in this box. Most children were aware of the purpose of the money they were depositing and were curious about when they would receive the money back (Figure 7).



Figure 7. Images collected in Workshop 3

Source: material collected by the research team.

At this point, the children realized that the money they currently have is on account of their parents and know that they will have to work in the future; again, they were very receptive to the activity and became involved in each proposed task. The children also became excited with the idea of being able to retire someday, realizing that they needed to work before retiring.

We initiated the **fourth workshop** by reviewing the teachings and concepts learned in the previous three workshops: “what did we talk about in the previous meetings? What did we talk about?” Next, the children were asked, “What do you have to do to retire?” One of the children answered, “we have to get old,” and another mentioned, “work for many, many, many years.” Then, to make the moment more believable, the children were “transformed” into elderly individuals using baby powder and scarves made of *chita* fabric (Figure 8).

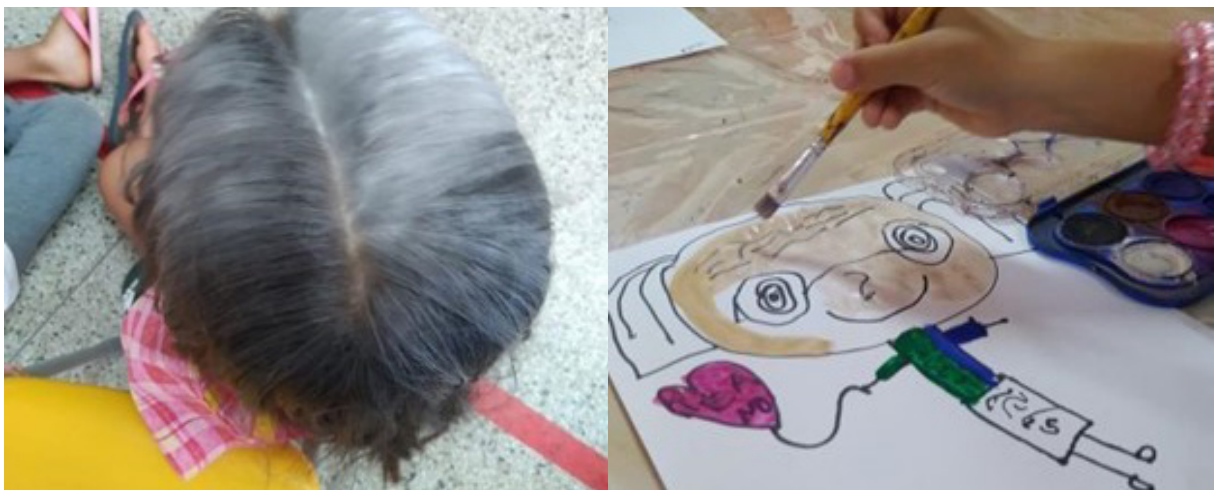


Figure 8. Images collected in Workshop 4

Source: material collected by the research team.

After being characterized as the elderly, the children opened the “government’s box,” and the retirement money was distributed. Then, the children were asked to organize in line while we brought them the snacks they could “buy” with the money they had just received. They were very excited about this workshop from the time they were characterized as elderly to the moment when they could enjoy their pensions. The snacks available for them to “buy” were popcorn and grape, which were chosen by the school to not interfere with their diets (Figure 9).

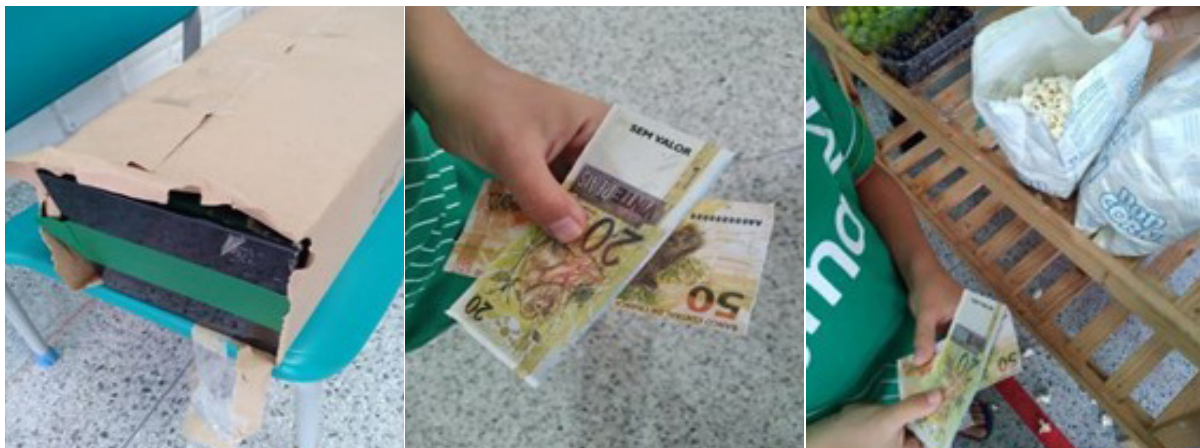


Figure 9. Imagens colhidas na Oficina 4

Source: maternal collected by the research team.

At the end of the workshops, the research team verified that the methodological strategy chosen with the workshops and the book *O Tesouro do Vovô* [Grandpa's Treasure] chosen as supporting literature corroborated the findings of previous studies, revealing that this experience can be an alternative to develop a public policy directed to teach social security education during early childhood.

4.1 Developing conscious citizenship

During the workshops, we could observe the children's awakening to the topic and about being active citizens. For example, after the **first workshop**, when the children learned the keywords, precisely the word "elderly," the children started to refer to older individuals as the elderly because they were sensitized to the fact that calling them old was disrespectful.

In the **second** and **third workshops**, the children realized they would need to work to get a retirement pension. They also understood the concepts and keywords provided in the first and second workshops. For example, they reproduced what they learned in the third workshop and other conversations and dialogues. Such knowledge was perceived at the beginning of the workshop when the research team informed them what they would do at the time and asked, "what do you need to do to retire?" the children answered, "have money," "work," "save money in the bank," all of them talking at the same time.

In the **fourth workshop**, we recalled the teachings of the three previous meetings, reviewing the concepts learned: "what did we talk about in the last meetings? What did we chat about?" One of the children answered, "retirement," and we asked, "what is it?" They answered: "put money in a bank," "get money in the bank." To which we replied: "get your money when?" and one of the children answered: "when we become elderly." They also commented, "we were working in the INSS" (note that we explained a little about the INSS in the first workshop). Hence, we noticed that the content provided in the first workshop remained until the last workshop. The children mentioned that "INSS is where you keep money," another child said, "when we get older, we will work in a bank." These comments show that the children memorized the subject addressed during the workshops. We asked them what was meant by government, which was one of the keywords mentioned in the first workshop, and one of the children answered, "it is where we work."

For Piaget (1986), among the essential characteristics of the phase between 3 to 6 years old, which is the object of this study, is the ability of children to use their imagination and play make-believe when they show that they have appropriate much of knowledge that integrates their physical and social contexts. Furthermore, Piaget understands that what children acquire during this phase is essential to learn about themselves, distinguishing themselves from others, and interacting socially.

5. Final Considerations

This study's objective was to develop actions to disseminate social security education in early childhood and understand how children can be motivated to develop an awareness of social security. Thus, four pedagogical workshops were held between April and May 2021 with 12 children aged 5 and 6 enrolled in a kindergarten located in Brasília, Brazil.

Initially, the project determined that the workshops would be organized in a child education school that belonged to the public network of the Government of Federal District (GDF). The objective was to analyze the children's financial and social security education skills and understand how they could be motivated to develop an awareness about the topic. Due to the Covid-19 pandemic, the GDF issued Decree No. 40,509 on March 11th, 2020, suspending the educational activities of all public and private schools, universities, and colleges in the Federal District. Decree No. 40,939, on July 2nd, 2020, authorized that only the schools from the private network resumed their activities from July 27th; the public schools remained closed up to the conclusion of this study.

For this reason, as for the methodological choice, we opted for implementing the workshops in a private school, addressing the same age group. Considering that the project involves the development of conscious citizenship and that the children's age would be the same as proposed in the original model, we expected that the results would not be compromised, which in fact proved to be true.

To boost the children's creative ability and learn about the topic, we used the book *O Tesouro do Vovô* [Grandpa's Treasure] by Álvaro Borba Modernell, published by Mais Ativos, which the author himself correctly adapted to the age range addressed here. For this study's purposes, early childhood comprises the first complete six years or 72 months of a child's life, as provided by article 2nd of Law No. 13,257, from March 8th, 2016, which established the public policies for early childhood in Brazil.

The literature review showed a need to adapt the Life Cycle Theory to accommodate the "learning" phase based on the observation that the involvement of children with finances can start during early childhood. Experts consider this phase ideal for developing a conscious spending mentality and financial education because, in this period, cognitive relationships are developed and lay down the basis for a child's future development.

The literature review also showed that to promote children's creative abilities and learning, they need to be encouraged to learn about the world through their senses and arts, which can be explored through colors, shapes, sounds, or pictures. In addition, one of the mechanisms used to materialize the learning process in early childhood is literature; a fundamental task to serve as a training agent, whether in a spontaneous reader/book interaction or a reader/text dialogue encouraged at school. However, this task must be carried out by the adults who take care of children (i.e., parents, educators, and teachers), who, aware of their responsibility, reorganize their knowledge about the subject to do so.

At the end of the four workshops, we verified that this environment, used as the methodological choice, enabled the creation of a field of collective knowledge as children understood the topic of social security in a controlled environment with the due support of adults. Furthermore, this experience revealed an alternative to developing a public policy directed at social security education in early childhood.

Future studies are recommended to apply this methodology to age groups different from the one addressed here, considering each age specificity, in public schools to verify whether the findings corroborate the results presented here.

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Zero Score, Now What? Analysis of Zero Scores obtained by Accounting Students in the ENADE

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Abstract

Objective: To analyze the zero scores obtained by accounting students on the ENADE 2018 based on the literature addressing the quality of accounting education and the purpose of the Enade.

Method: This is an archival study in which microdata was collected from the INEP's website. In total, 52,847 observations were analyzed using descriptive analysis and binary regression models.

Results: A micro portion of the students scored zero both in the general knowledge (FG) and specific content (CE) portions of the exam. The reason for these students having scored zero is that they left the answers blank. Nevertheless, when these portions were explored separately, zero scores became more representative and were mainly concentrated on open-ended questions. This finding suggests a greater need to motivate students to solve accounting-related open-ended questions. On the other hand, a lower number of zero scores was found among the close-ended questions, which may be associated with the students being more used to tests predominantly presenting close-ended questions. Gender, age, program modality (brick-and-mortar vs. distance learning), and region were relevant to explain the students' likelihood of scoring zero points.

Contributions: Zero scores provide some lessons, especially regarding the students' motivations and variables, which can either increase or decrease the probability of zero scores. Likewise, it encourages a critical reflection on the importance of the ENADE and how to motivate students to perform it, including a debate on regulatory implications.

Keywords: Grade; Academic performance; Higher education; Accounting; ENADE.

1. Introduction

Previous studies verified whether the quality of undergraduate accounting programs has declined over time (Fogarty, Zimmerman, & Richardson, 2016; Madsen, 2015). One of the main criticisms concerns a failure to teach key skills that accountants need in practice (Madsen, 2015). Recently, some actions were suggested to improve accounting education (Boyle & Hermanson, 2020; Brink & Reichert, 2020; Jordan & Samuels, 2020; Madsen, 2020). Madsen (2020), for instance, suggests emphasizing greater integration of research into accounting education.

The quality of Accounting programs in Brazil has also been criticized. The primary evidence supporting such criticism concerns the students' poor academic performance and low approval rates in national assessments, such as the Enade (National Student Performance Examination) and the Federal Accounting Council (CFC) Sufficiency Exam. Studies analyzing the variables that impact academic performance tend to highlight the factors that positively affect it. For example, Ahinful, Tauringana, Bansah, and Essuman (2019) examined the determinants of academic performance among accounting students in Ghana, reporting that the variables Expectation, Will, Academic Interest, and Learning Attitude were positively related to student performance, except for one (Level), which showed a negative relationship.

On the other hand, less attention has been paid to investigations addressing students' poor performances. In many cases, these students fail their courses and professional qualification tests. In fact, repeating students are commonly excluded from such analyses (Coetzee, Schmulian, & Coetzee, 2018; Elikai & Schuhmann, 2010; Papageorgiou & Callaghan, 2020). This study does not suggest that excluding repeating students from analyses is inappropriate, only that less attention is usually given to negative academic aspects, such as failure, poor academic performance, and absence from tests. Analyzing errors is also important (Sanchez, 2019) because a deeper understanding of such phenomena can support professors' decision-making and actions, as well as coordinators and educational institutions.

We should remember that some studies focus on repeating students and other "negative aspects." For example, Xiang and Hinchliffe (2019) analyzed the determinants of repetition in an introductory accounting course among more than 600 students attending a university in the Midwest of the United States. The results showed that the general accumulated mean score, the student's intention to major in accounting sciences, motivation, and determination are significantly associated with failing in a discipline. To broaden the investigation of negative aspects, this study aims to *analyze zero scores obtained by Accounting Science students in the Enade 2018*. Hence, two specific objectives are outlined: (a) understand how zero scores behave and the primary reasons for students to score zero points on the test, and (b) assess the likelihood of obtaining a zero score based on the students' and contextual variables.

Zero scores in the Enade have severe consequences for Brazilian accounting education. First, zero scores negatively affect the evaluation of undergraduate programs because the grades students obtain on the exam are one of the components composing quality indicators. Hence, it influences the institutions' reputation. Second, it is an indication that there is a misalignment between the programs' curricula and what is required by the exam. Third, it reflects students' potential lack of effort and interest in performing well in the Enade, suggesting boycott practices. Finally, there is a regulatory consequence in these cases, as we discuss later.

Although studies address the performance of Accounting Science students, analyzing and discussing zero scores is uncommon. Based on the literature and these authors' knowledge, this is the first paper focusing on zero grades. Hence, the research gap we highlight here is based on Sanchez (2019), who argues that mistakes teach important lessons. From this perspective, the analysis of zero scores allows us to propose more critical reflections and devise potential treatments for the causes, aiming to improve the learning of Accounting Sciences students. Similarly to successful cases, failures can and should be analyzed so that we can at least decrease their occurrence.

The Enade 2018 database available on the Inep website was used to achieve the objective proposed here. Overall, 52,847 observations were analyzed using descriptive statistics and binary regression models. Among the primary findings, we note that 26 students completed failed the entire test. Many zero scores were found when open-ended questions were analyzed though. Students seem to take more time and pay greater attention to close-ended questions. Furthermore, male students and those attending brick-and-mortar programs are more likely to score zero in open-ended questions addressing general knowledge but less likely to score zero in questions addressing specific content. Older students are more likely to score zero than younger students, and, in general, students from the Northeast and Midwest are more likely to score zero points.

This study presents two main contributions. The first is theoretical and concerns the development of a critical discussion about zero scores and potential strategies, including regulatory implications, to decrease or avoid such poor performance among Accountancy students, especially evaluations external to Higher Education Institutions (IES). This critical discussion and the regulatory implications addressed here may be especially relevant for professors and the HEIs in the Northeast and Midwest, considering the findings presented here.

The second contribution is practical, as we draw the attention of professors and coordinators of Accounting Sciences programs toward students with poor performance, especially those with zero scores. Even though repeating students and those scoring zero and who present poor academic performance are outnumbered, they deserve to be monitored. Usually, these students demand attention because they need help to improve their performance. In the same way that studies examining mean or median academic performance provide valuable findings, looking to extreme values (in this case, zero scores) may indicate potential practices that can be adopted or avoided to improve the quality of accounting education and training.

The remainder of the paper is structured as follows: section 2 discusses the quality of accounting education and the Enade; section 3 describes the methodological procedures; section 4 reports and discusses the results; and section 5 readdresses the objective, summarizes the findings, and discusses implications, highlighting limitations and research suggestions.

2. Theoretical Framework

2.1. The Quality of Accounting Education

HEIs need to be considered when we debate the quality of accounting education. Fogarty et al. (2016) state that HEIs play two leading social roles, and the first is to provide education to the population. This social role is mostly perceived when we verify the success of HEIs in preparing students for their professional careers. The second role is related to expanding formal knowledge; HEIs are expected to allocate resources to research activities that can change thinking in their professors' and researchers' fields of knowledge. Hence, the reputation of an HEI should reflect the quality and quantity of teaching and research. Therefore, HEIs are subject to more scathing criticism when they fail to provide quality teaching and expand knowledge.

Zero scores are more strongly associated with the HEIs' first role and suggest significant flaws in the teaching process. According to Madsen (2015), the supposed decline in the quality of accounting education has concerned scholars, practitioners, and professional associations. One of the primary symptoms that suggest such a decline is deficient teaching of fundamental skills (Madsen, 2015). For this reason, HEIs have often been harshly questioned for not teaching the critical skills required by a professional career in accounting. Additionally, there is evidence that the expectations of companies and those of Accounting undergraduate students regarding what skills are needed from an accountant differ, particularly regarding soft skills (Dolce, Emanuel, Cisi, & Ghislieri, 2020; Jackling & De Lange, 2009).

Despite these apparent setbacks, Madsen's (2015) historical analysis did not identify evidence of a decrease in the quality of accounting education in the United States compared to other fields of knowledge; nevertheless, strategies have been proposed to strengthen it. Boyle and Hermanson (2020) discuss, for instance, faculty development, focusing on preparation provided in doctoral programs, performance assessment, rewards, and compensation, among others. Jordan and Samuels (2020), in turn, discuss effective learning, especially content and curricula, teaching methods, changes in the students' sociodemographic variables, and ways to measure performance and learning.

There are similar concerns and criticism toward Brazilian accounting education. Advancements in the incorporation of technological resources into the profession pressure Accounting programs to introduce disciplines that focus on developing technological skills, which professional associations have been increasingly considered relevant (Chartered Global Management Accountant, 2019; International Federation of Accountants, 2019; Pathways Commission, 2012). Although the curricula commonly include "Accounting Laboratory", "Information Systems", or "Computerized Accounting", some more recent content, such as data analytics, big data, and cloud computing, are not taught in these programs or are addressed only superficially. As suggested by Jackling and De Lange (2009), this aspect may be one of the reasons why Accounting undergraduate students perceive that they lack essential skills when they enter the job market.

According to data from the *Sinopse Estatística da Educação Superior* [Statistical Synopsis of Higher Education], developed by Inep (INEP, 2019), Accountancy programs rank fourth or fifth in the number of enrollments, first-year students, and graduates since 2009, the year when the first *Sinopse* was issued. In 2009, there were 235,142 enrollments (fourth place), 83,990 new entrants (fourth place), and 34,557 graduates (fifth place). In 2019, 358,240 enrollments were recorded (fourth place), along with 155,259 new entrants (fourth place) and 49,957 graduates (fourth place). Although Accounting is the program most frequently sought in Brazil, there are doubts about its quality.

The quantitative expansion of Accounting Science programs does not necessarily indicate that the quality of the programs has improved or at least remained the same. Therefore, these programs need to be supervised to remain updated and relevant, mainly due to changes that affect the theory and practice of the profession (Brink & Reichert, 2020; Jordan & Samuels, 2020; Pincus, Stout, Sorensen, Stocks, & Lawson, 2017). One of the ways to assess the quality of undergraduate programs is through the Enade. Students' performance in this large-scale exam indicates various factors to be improved, particularly regarding the HEIs' primary social role, as noted by Fogarty et al. (2016).

2.2. Enade – National Student Performance Exam

Enade was established as part of the Sinaes (Brazilian Higher Education Assessment System), based on Law No. 10.861, on April 14th, 2004 (Brasil, 2004) and has been administered by Inep ever since. According to § 1st of article 5th, Enade

will assess the students' performance on content provided by the curricular guidelines of the respective program, their skills to adjust the requirements arising from the development of knowledge and competencies to understand topics outside the specific scope of their profession, linked to the Brazilian and world context and other fields of knowledge (Brasil, 2004, §1st of article 5th).

The same article also mentions that the Enade will be applied regularly, with a maximum frequency of three years, and will be accompanied by an instrument designed to collect data from students, considering the value of such data to support an understanding of the exam's results (Brasil, 2004). This survey has been performed via the Student Questionnaire. It is important to remember that the Enade has changed since its establishment (Miranda, Leal, Gama, & Miranda, 2018). In 2009, its scope ceased to be a sample and became population-based, and in 2011, it began to be applied only to graduates of undergraduate courses (Miranda et al., 2018). Accounting Science students took the Enade in 2006, 2009, 2012, 2015, and 2018.

There seems to be a consensus on the importance of assessing undergraduate programs to support an analysis of the development of the education system. However, there are criticisms regarding the incentives and the way such exams are implemented, especially regarding student participation (Leitão, Moriconi, Abrão, & Silva, 2010). Leitão et al. (2010) note, "Brazil is the only country to apply a mandatory national exam to students as one of the main instruments that make up the higher education assessment system." (p. 22). Taking Enade is mandatory for students to graduate, but students do not need to obtain a minimum score. Therefore, students who oppose the application of the Enade or perceive little or no value in taking it can boycott it. The most common forms of boycott include protests and returning the exam completely blank (see Leitão et al., 2010). Such behavior may harm the analysis and relevance of this type of assessment.

This study focuses on Enade's zero scores. Even though such scores suggest boycott behavior, other motivations may exist. This study seeks to shed light on such poor performance, which is usually considered negative but can point out aspects that need to be better addressed, such as incentives for implementing external academic assessments and students' motivation (Miranda et al., 2018).

3. Methodological Procedures

3.1. Data Collection

Consistent with this study's object, microdata concerning the Enade 2018 were collected from Inep's website (INEP, 2020). It was the last edition that Accounting students attended, and data are available. This exam presents some advantages. First, it is a large-scale exam, providing a database with many observations. Second, microdata is public; third, it involves many students so that zero scores are easily found, which would be difficult otherwise.

The 2018 exam lasted four hours and was composed of three parts¹. The first corresponds to a set of questions addressing general knowledge (FG), which involves content on technological advancements, globalization, and social responsibility. These are questions common to all students, regardless of the program. There are ten FG questions; two are open-ended (weight 40%) and eight multiple-choice questions (weight 60%). The second part corresponds to a set of specific content questions (CE), which involves accounting theory, financial accounting, and management accounting in the case of Accountancy (INEP, 2015). There are 30 CE questions, three of which are open-ended (weight 15%) and 27 close-ended questions (weight 85%). The third and last part corresponds to ten questions addressing the students' perception of the exam's difficulty. Although these questions are not scored, they must be answered within the test's stipulated time. The final grade (overall grade) in the Enade 2018 represents the weighted average of the grades obtained in the FG (25% weight) and EC (75% weight) portions of the exam. In addition to the exam, participants complete the Student Questionnaire, in which they provide answers to dozens of questions addressing sociodemographic and academic information.

The Enade 2018 database includes a total of 62,475 Accounting undergraduate students, 9,628 of whom were excluded for being absent (code 222²), inappropriate participation (code 334), absence due to double graduation (code 444), the student attended the exam but his/her grade was disregarded by the applicator (code 556), and N/A. Thus, 52,847 students (84.6%) had their performances validated (code 555). Table 1 presents the frequencies and percentages.

Table 1

Sampling: valid observations

Item	Frequency	%
Population	62,475	100.0%
Type of presence in ENADE		
(-) Invalid Results Excluded (codes 222, 334, 444, 556, and N/A)	(9,628)	(15.4%)
Type of presence – Valid Results (code 555)	52,847	84.6%

Note that more than the performance of more than 15% of the students was not valid. Although these exclusions are not the focus of this study, future research could look into it in depth because it may indicate a lack of interest and impact the exam's educational value.

1 On the cover of the ENADE 2018 (INEP, 2018), the questions are classified into five parts: general knowledge open-ended questions, general knowledge close-ended questions, specific component open-ended questions, specific component close-ended questions, and the test perception questionnaire. In this study, three parts were considered: a general knowledge test, a specific component test, and a test perception questionnaire.

2 These codes were prepared by INEP (INEP, 2020) and belong to its registration system. They can be consulted in ENADE's Dictionary of Microdata Variables. The dictionary file is downloaded via the INEP website along with microdata.

After determining the sample, the research variables were selected. The performance of Accounting undergraduate students at the Enade is represented in three ways: (i) score obtained in the FG portion, (ii) in the CE portion, and (iii) general score. These grades are originally on a 0 to 100-point scale. However, this study modified this scale to focus on zero scores. Hence, the scores were coded as binary, with 1 representing a zero score and 0 otherwise (any score above zero). This procedure was also performed for the type of question, considering that the FG and CE tests both present open- and closed-ended questions.

In addition to the performance variables, data were collected from the Student Questionnaire, such as gender, age, and the program's modality (online vs. brick-and-mortar) and region. The literature suggests that these variables are relevant to explain student performance (Ahinful et al., 2019; Chen, Jones, & Moreland, 2013; Daymont & Blau, 2008; Gracia & Jenkins, 2003; Miranda, Lemos, Oliveira, & Ferreira, 2015; Nasu, 2020; Nasu, Silva, Borges, & Melo, 2021). While gender and age refer to students, the region and the modality in which the program is delivered provide a sense of context (Nasu et al., 2021). Table 2 shows the study variables.

Table 2
Study variables

Acronym	Description	Measurement
NTGE	Overall score	1 = Zero score; 0 = otherwise
NTFG	Score obtained in the general knowledge portion	1 = Zero score; 0 = otherwise
NTCE	Score obtained in the specific content portion	1 = Zero score; 0 = otherwise
NTDISFG	Score obtained in the general knowledge open-ended questions	1 = Zero score; 0 = otherwise
NTOBJFG	Score obtained in the general knowledge close-ended questions	1 = Zero score; 0 = otherwise
NTDISCE	Score obtained in the specific content portion	1 = Zero score; 0 = otherwise
NTOBJCE	Score obtained in the specific content close-ended questions	1 = Zero score; 0 = otherwise
SEX	Student's sex	1 = Male; 0 = Female.
IDD	Student's age	In years
MOD	Program modality	1 = brick-and-mortar; 0 = Distance learning
REG	Program region	Southeast (baseline), South, Midwest, Northeast, and North

Authors note that the sociodemographic profile of students entering higher education has changed (Jordan & Samuels, 2020; Pincus et al., 2017). For this reason, even though previous studies considered such variables in their analyses, we need to monitor this information over time, especially for comparative purposes.

3.2. Analysis Techniques

Data analysis was divided into two parts. First, zero and non-zero scores were analyzed according to their frequencies, besides histograms (not reported here). The descriptive analysis showed that a relevant portion of zero scores was obtained in the open-ended questions, both in the FG and CE portions of the exam. This finding motivated the second part of the analysis, which involved a more detailed investigation of NTDISFG and NTDISCE using binary regression models. Four link functions were tested, as shown in Table 3:

Table 3

Link function, scale of the response variable and odds ratio

Model	Link function	Scale of the response variable	Odds Ratio
Logit	$\log\left(\frac{\pi_i}{1-\pi_i}\right) = \beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}$	$\pi_i = \frac{e^{\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}}}{1 + e^{\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}}}$	e^{β_p}
Probit	$\Phi^{-1} = \beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}$	$\pi_i = \Phi(\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip})$	$\frac{\Phi(\beta_0 + \beta_p)}{1 - \Phi(\beta_0 + \beta_p)} \times \frac{1 - \Phi(\beta_0)}{\Phi(\beta_0)}$
Cauchit	$\tan(\pi(\pi_i - 0.5)) = \beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}$	$\pi_i = \frac{1}{\pi} \arctan(\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}) + 0.5$	$\frac{\frac{1}{\pi} \arctan(\beta_0 + \beta_1(x+1) + \dots + \beta_p x_{ip}) + 0.5}{1 - \frac{1}{\pi} \arctan(\beta_0 + \beta_1(x+1) + \dots + \beta_p x_{ip}) + 0.5} \times \frac{\frac{1}{\pi} \arctan(\beta_0 + \beta_1(x) + \dots + \beta_p x_{ip}) + 0.5}{1 - \frac{1}{\pi} \arctan(\beta_0 + \beta_1(x) + \dots + \beta_p x_{ip}) + 0.5}$
Cloglog	$\log[-\log(1 - \pi_i)] = \beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}$	$\pi_i = 1 - e^{-e^{(\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip})}}$	$\frac{1 - e^{-e^{(\beta_0 + \beta_1(x+1) + \dots + \beta_p x_{ip})}}}{1 - \{1 - e^{-e^{(\beta_0 + \beta_1(x+1) + \dots + \beta_p x_{ip})}}\}} \times \frac{1 - e^{-e^{(\beta_0 + \beta_1(x) + \dots + \beta_p x_{ip})}}}{1 - \{1 - e^{-e^{(\beta_0 + \beta_1(x) + \dots + \beta_p x_{ip})}}\}}$

Note. Developed by the authors based on Huayanay (2019) and Anyosa(2017).

The link functions are logit, probit, cauchit, and cloglog and their respective odds ratios are calculated by estimating (see results tables) and applying the formula in the odds ratios column in Table 3. The linear predictors of the logit, probit, cauchit, and cloglog models are specified in equations 1 to 4, respectively

$$\eta_i = g(\pi_i) = \log\left(\frac{\pi_i}{1 - \pi_i}\right) = \beta_0 + \beta_1 \text{SEX}_{i1} + \beta_2 \text{IDD}_{i2} + \beta_3 \text{MOD}_{i3} + \beta_4 \text{REG}_{i4} \quad (1)$$

$$\eta_i = g(\pi_i) = \phi^{-1} = \beta_0 + \beta_1 \text{SEX}_{i1} + \beta_2 \text{IDD}_{i2} + \beta_3 \text{MOD}_{i3} + \beta_4 \text{REG}_{i4} \quad (2)$$

$$\eta_i = g(\pi_i) = \tan(\pi(\pi_i - 0.5)) = \beta_0 + \beta_1 \text{SEX}_{i1} + \beta_2 \text{IDD}_{i2} + \beta_3 \text{MOD}_{i3} + \beta_4 \text{REG}_{i4} \quad (3)$$

$$\eta_i = g(\pi_i) = \log[-\log(1 - \pi_i)] = \beta_0 + \beta_1 \text{SEX}_{i1} + \beta_2 \text{IDD}_{i2} + \beta_3 \text{MOD}_{i3} + \beta_4 \text{REG}_{i4} \quad (4)$$

where the dependent variables are NTDISFG and NTDISCE, SEX is the student's gender, IDD is the student's age, MOD refers to the program's modality, and REG concerns the region where the program is located. According to Table 2, the baseline (reference categories) of the variables SEX, MOD, and REG are, respectively, female, distance learning (DE), and Southeast. The regression models' suitability was verified using Pearson residuals (Cordeiro & Simas, 2009) and deviance residuals (Ben & Yohai, 2004). The results indicate that the models did not present goodness of fit problems (see appendix for more details). The analyses were performed using R, version 4.0.2 (R Core Team, 2020).

4. Results

4.1 Descriptive analysis

Table 4 shows the frequencies of students who scored zero in the FG or CE portions of the exam and those who scored zero in both (total score). The results show that 26 students (0.05%) scored zero, and 52,821 (99.95%) scored higher than zero in the Enade 2018. A total of 240 students (0.45%) scored zero in the FG portion, while 52,607 (99.55%) obtained higher scores. Eighty-one (0.15%) students scored zero in the CE portion, while 52,766 (99.85%) scored higher. These findings indicate that a tiny portion of Accounting students scored zero and should not be of concern. According to Leitão et al. (2010), Accounting students are among the ones that least boycott the exam.

Table 4

Frequencies of zero scores and ratios according to content and reasons for scoring zero points

Type of content	NTGE		NTFG		NTCE	
	> Zero	= Zero	> Zero	= Zero	> Zero	= Zero
Frequency	52,821	26	52,607	240	52,766	81
Reasons for scoring zero points	Total Score		FG	CE		
Blank test (code 333)	26		26	26		
Incorrect answers (code 555)			214	55		
Total	26		240	81		

Table 4 shows that zero scores result from two reasons: the exam is either completely blank or incorrect answers are provided. All 26 students who scored zero in the Enade returned a completely blank exam. Twenty-six of the 240 students who scored zero in the FG portion returned it blank, while 214 answered at least one question. Additionally, 26 of the 81 students who scored zero in the CE portion returned it blank, while 55 answered at least one question. Therefore, the students who scored zero points in the FG or CE part tried to answer one or more questions but still got them wrong.

Table 5 shows the frequency of the scores obtained by the students who scored zero points in the open- and close-ended questions provided in the FG portion and their respective reasons. Note that the frequencies become more representative. For example, regarding the FG open-ended questions, 6,988 students (13.22%) scored zero points, and 45,859 (86.78%) scored higher. A total of 1,184 students (2.24%) scored zero on the close-ended questions, while 51,663 (97.76%) scored above zero.

Table 5

Frequency of zero scores obtained in the FG part according to the type of question

Test	General knowledge (FG)			
	Open-ended (NTDISFG)		Close-ended (NTOBJFG)	
	> Zero	= Zero	> Zero	= Zero
Frequency	45,859	6,988	51,663	1,184
Reasons for scoring zero points	Open-ended		Close-ended	
Blank test (code 333)	6,218		61	
Incorrect answers (code 555)	770		1,123	
Total	6,988		1,184	

The two primary reasons are blank tests and incorrect answers. Regarding the open-ended questions, 6,218 students handed in a blank test, and 770 tried to answer at least one of the questions. Regarding the close-ended questions, 61 students returned a blank test, and 1,123 tried to answer at least one question. These findings suggest that students tended to hand in a blank test when it addressed open-ended questions. This fact may be explained by the effort each type of question demands, besides its weight in the final grade. Open-ended questions usually require more time, as no ready answer is available, while multiple-choice questions are more easily answered. This type of question allows students to take a guess and choose a random answer.

Table 6 presents the frequency of the scores of those students who scored zero in open-ended or close-ended questions in the EC portion and their respective reasons. Note that the frequencies become more representative and relevant. A total of 19,996 students (37.83%) scored zero points in the EC open-end questions, while 32,851 (62.17%) did not; 133 students (0.25%) scored zero in the close-ended questions, while 52,714 (99.75%) did not.

Table 6

Frequency of zero scores in the CE part according to the type of question

Test	Specific Content (CE)				
	Type of question	Open-ended		Close-ended	
		> Zero	= Zero	> Zero	= Zero
Frequency	32.851	19.996	52.714	133	
Reasons for scoring zero points		Open-ended		Close-ended	
Blank test (code 333)		11,939		46	
Incorrect answers (code 555)		8,057		87	
Total		19,996		133	

The students scored zero for two reasons: blank tests and incorrect answers. A total of 11,939 students returned the EC open-ended questions blank. It is a large number of students and is of concern. On the contrary, 8,057 students answered at least one question, though incorrectly. Forty-six students left the close-ended questions of the EC portion blank, and 87 provided incorrect answers. These results suggest that students are more likely to answer close-ended than open-ended questions. Since there is no mandatory minimum score to be approved in the Enade, students may return the test blank, especially if questions demand laborious answers.

Similarities and differences are found in the comparison between the results presented in Table 5 and Table 6. Similarities include the fact that most of the students handed in open-ended questions blank, while most students who scored zero answered at least one of the close-ended questions. Regarding differences, 6,218 students left the FG open-ended questions blank, while 11,939 did the same for the EC open-ended questions; i.e., almost double the students did not answer the open-ended questions of the EC portion. This finding suggests that students tend to ignore open-ended questions addressing accounting content compared to general knowledge questions. However, it may also be associated with the way and the order in which the questions were presented. For example, in the Enade 2018 test addressing the Accounting Sciences programs (INEP, 2018), the FG open-ended questions were presented first, while the CE open-ended questions were presented later. Phillips, Lobdell, and Neigum (2020) found evidence that a student's academic performance may vary significantly depending on how questions are presented, especially those questions that include texts in the questions' wording.

Another visible difference concerns the "incorrect answers" reason, i.e. when the students answer the question incorrectly. For the FG portion, 1,184 students scored zero because they answered the questions incorrectly, while only 87 students scored zero for answering the EC portion incorrectly. This finding shows that more students scored zero due to incorrectly answering close-ended questions of the FG portion than of the EC portion, which is possibly explained by the number of questions. The FG portion contained eight multiple-choice questions with five alternatives, while the EC test comprised 27. Therefore, from a probability perspective, it is easier to score zero in the portion with the lowest number of close-ended questions. For example, a student answering the FG close-ended questions randomly was 16.7% more likely (0.8 to the power of eight) to score zero than if s/he randomly answered the close-ended questions in the EC portion; the likelihood of scoring zero, in this case, was 0.24% (0.8 to the power of 27).

The results show that a few students scored zero points in both the FG and CE portions. The 26 students with a total score equal to zero handed the exam completely blank. However, the analysis of zero scores according to the content and type of questions revealed representative numbers, some of which are quite expressive. This is the case of zero scores obtained in the open-ended questions, which a considerable portion of the students left blank. The same problem was not found for the close-ended questions, in which a significantly lower number of students scored zero.

Scoring zero and having a poor performance in the Enade often results from a lack of incentive for students to make an effort to do it well (Leitão et al., 2010; Miranda et al., 2018). Additionally, the exam is based on a consequentialist perspective, in which one assumes that students will perform well if the undergraduate programs they attended are high quality. However, students lack incentives to do well in the exam, while their training before entering HEIs is not equivalent (Leitão et al., 2010); hence, such an assumption may not hold. The Enade is an evaluation mechanism that is sometimes

contested by the students and institutions for being too dependent on the students. The media publishes statements from students claiming that the weight this exam places on them is unfair, considering that the final objective is to evaluate the program, not the students. On the other hand, some higher education institutions complain that students have no incentive to do their best in the exam, which affects the results of their programs (Leitão et al., 2010, p. 22).

To further motivate Accounting students to take the Enade, Miranda et al. (2018) propose that the score obtained in the exam be used as a criterion for later stages of the undergraduate program, such as, for example, in public tenders, in the admission to graduate programs, in the registration of the diploma or the CFC sufficiency exam. Miranda et al. (2018) showed that these possibilities for using the Enade significantly increase the motivation for students to do it well. Therefore, the regulatory consequence mentioned in this study's introduction precisely refers to these possibilities. The CFC can consider these possibilities to encourage students to take the exam and make the Enade results more accurate so that coordinators and professors can make more accurate decisions. Other related entities (such as the Instituto dos Auditores Independentes do Brasil, Associação Nacional de Programas de Pós-Graduação em Ciências Contábeis, a Fundação de Apoio ao Comitê de Pronunciamentos Contábeis, among others) may pressure regulatory agencies (Federal Accounting Council) to adopt these strategies.

4.2. Analysis of the Binary Regression Models

The descriptive analyses revealed a large number of zero scores for the close-ended questions included in the FG (6,988, which corresponds to 13.22% of the total observations) and EC portions (19,996, which corresponds to 37.84%). Thus, greater attention was paid to these findings, resulting in the following binary regression analyses. First, we interpret findings concerning the NTDISFG model and, later, those of the NTDISCE model.

Table 7 shows the estimates, standard errors (in parentheses), significance level, Akaike's information criterion (AIC), and four coefficients of determination (Kulback Leibler, residual sum of squares, likelihood ratio, and corrected likelihood ratio) for each of the models (logit, probit, cauchit, and cloglog), whose response variable is NTDISFG. Except for REG–North, all estimates were significant ($p < 0.01$). Note that the estimates for males are positive, indicating a higher probability of men scoring zero points in the FG open-ended questions. Positive estimates were also found for age. Older students were more likely to score zero points than younger students. Similarly, students attending brick-and-mortar programs were more likely to score zero than distance-learning students; positive estimates were found. Regarding region, students from the South were less likely to score zero than those from the Southeast. Students from the Northeast and Midwest were more likely to score zero than those from the Southeast. Furthermore, students from the North were also more likely to score zero than those in the Southeast. The coefficients of determination were low, but it does not mean that the models are inadequate. However, it indicates that the model's predictive power is restricted. Zhang (2017) notes that it is not uncommon for such coefficients to present low values.

Table 7

Results of the binary regression model considering NTDISFG

Model	Logit (AIC=40942)	Probit (AIC=40937)	Cauchit (AIC=40980)	Cloglog (AIC=40945)
Variables	Estimate (Standard error)	Estimate (Standard error)	Estimate (Standard error)	Estimate (Standard error)
Intercept	-2.89*** (0.06)	-1.67*** (0.03)	-4.00*** (0.13)	-2.87*** (0.06)
SEX - Male	0.08*** (0.02)	0.04*** (0.01)	0.15*** (0.05)	0.08*** (0.02)
IDD	0.02*** (0.001)	0.01*** (0.0009)	0.04*** (0.002)	0.02*** (0.001)
MOD - Brick-and-mortar	0.27*** (0.03)	0.14*** (0.02)	0.50*** (0.08)	0.24*** (0.03)
REG - South	-0.09*** (0.03)	-0.05*** (0.01)	-0.24*** (0.08)	-0.09*** (0.03)
REG - North	-0.03 (0.05)	-0.01 (0.02)	-0.07 (0.12)	-0.03 (0.05)
REG - Northeast	0.15*** (0.03)	0.08*** (0.01)	0.32*** (0.07)	0.14*** (0.03)
REG - Midwest	0.25*** (0.04)	0.14*** (0.01)	0.47*** (0.08)	0.23*** (0.04)
Kulback Leibler (Colin Cameron & Windmeijer, 1997)	0.008	0.008	0.007	0.008
Residuals Sum of Squares (Efron, 1978)	0.006	0.006	0.005	0.006
Likelihood Ratio (Cox & Snell. 1989; Maddala. 1983; Magee. 1990)	0.006	0.006	0.006	0.006
Correct Likelihood Ratio (Nagelkerke. 1991)	0.012	0.012	0.011	0.012

Note. AIC = Akaike's information criterion. ***p < 0.01; **p < 0.05; *p < 0.10.

Table 8 shows the estimates, standard errors (in parentheses), significance level, AIC, and four coefficients of determination (Kulback Leibler, residual sum of squares, likelihood ratio, and corrected likelihood ratio) for each one of the models (logit, probit, cauchit, and cloglog), the response variable of which is NTDISCE. All estimates are significant ($p < 0.01$). The estimates for men were negative and indicate that men are less likely than women to score zero points in the EC open-ended questions. This result contrasts with the previous analysis, in which men were more likely to score zero. The age estimates were positive, supporting the notion that older students were more likely to score zero than their younger counterparts. This result is consistent with the previous analysis. Regarding the program's modality, the estimates are negative and indicate that students attending brick-and-mortar programs were less likely to score zero than distance-education students, a result that differs from the previous finding. The estimates are positive for the programs' region. Thus, these findings indicate that students from the South, North, Northeast, and Midwest were more likely to score zero points than those from the Southeast in the EC open-ended questions.

Table 8
Results of the binary regression model considering NTDISCE

Model	Logit (AIC=40942)	Probit (AIC=40937)	Cauchit (AIC=40980)	Cloglog (AIC=40945)
Variables	Estimate (Standard error)	Estimate (Standard error)	Estimate (Standard error)	Estimate (Standard error)
Intercept	-1.11*** (0.04)	-0.69*** (0.03)	-0.93*** (0.04)	-1.19*** (0.03)
SEX - Male	-0.25*** (0.01)	-0.15*** (0.01)	-0.22*** (0.01)	-0.20*** (0.01)
IDD	0.03*** (0.001)	0.01*** (0.0008)	0.02*** (0.001)	0.02*** (0.0009)
MOD - Brick-and-mortar	-0.52*** (0.02)	-0.32*** (0.01)	-0.44*** (0.02)	-0.40*** (0.01)
REG - South	0.07*** (0.02)	0.04*** (0.01)	0.07*** (0.02)	0.06*** (0.01)
REG - North	0.71*** (0.03)	0.43*** (0.02)	0.62*** (0.03)	0.55*** (0.02)
REG - Northeast	0.48*** (0.02)	0.29*** (0.01)	0.44*** (0.02)	0.38*** (0.02)
REG - Midwest	0.39*** (0.03)	0.24*** (0.02)	0.35*** (0.03)	0.30*** (0.02)
Kulback Leibler (Colin Cameron & Windmeijer, 1997)	0.029	0.029	0.029	0.029
Residuals Sum of Squares (Efron, 1978)	0.038	0.038	0.038	0.038
Likelihood Ratio (Cox & Snell, 1989; Maddala, 1983; Magee, 1990)	0.038	0.038	0.037	0.037
Correct Likelihood Ratio (Nagelkerke, 1991)	0.052	0.052	0.051	0.051

Note. AIC = Akaike's information criterion. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The regression models addressing the results presented in Tables 7 and 8 found mixed results for the variable SEX. While male students were more likely to score zero in the FG open-ended questions, the opposite was found for the EC open-ended questions. These findings suggest that male students put more effort into solving accounting content questions. Consequently, they may have paid less attention to general knowledge questions, making them more likely to fail this portion of the exam. Conversely, female students spent more effort to solve general knowledge questions and may have made less effort to solve accounting content questions. Therefore, they were more likely to score zero on the EC open-ended questions. The literature reports mixed results (Miranda et al., 2015; Nasu, 2020). The literature reviews by Miranda et al. (2015) and Nasu (2020) show studies in which results favor both males and females, while other studies found that gender is irrelevant to explain student performance. Ahinful et al. (2019), for example, found that male students performed better than their female counterparts. On the other hand, Gracia and Jenkins (2003) found evidence that women performed better than men. No studies were found discussing zero scores according to sex.

Age generated similar results for NTDISFG and NTDISCE. In general, older students were more likely to score zero, supporting the notion that younger students may be more committed to completing the open-ended portion of the Enade, decreasing their likelihood of scoring zero points. HEIs may want to encourage older students to decrease their likelihood of scoring zero points. One way is by implementing institutional policies to assign additional credits according to the performance obtained in the Enade or allow more study hours dedicated to the exam. Studies associating age with student performance also found mixed results (Miranda et al., 2015).

Regarding the programs' modality, the regression models showed conflicting results. Students attending brick-and-mortar programs were more likely to score zero points in NTDISFG, while distance-learning students were more likely to score zero in the NTDISCE. Similar to sex, these findings indicate that the attention and effort of students attending programs in different modalities (brick-and-mortar vs. distance learning) reside in different aspects. Students attending brick-and-mortar programs seem to focus more frequently on accounting content questions; hence, they are more likely to score zero in the general knowledge portion as they pay less attention to it. In contrast, distance-learning students seem to put more effort into solving general knowledge questions; hence, they pay less attention to accounting-related questions and are more likely to score zero in this exam portion. Even though historically, Brazilian brick-and-mortar Accounting programs are more frequently associated with high student performance compared to distance-learning programs, recent international studies show that the gap between these modalities is decreasing (Chiu, Gershberg, Sannella, & Vasarhelyi, 2014; Fortin, Viger, Deslandes, Callimaci, & Desforges, 2019). Due to the Covid-19 pandemic, teaching strategies similar to those used in distance education were widely adopted, which may have improved its effectiveness. Future studies should monitor how a program's modality is associated with student performance.

The results concerning the regions show that, in general, students from the Southeast were less likely to score zero, especially in the EC open-ended questions. The greatest concern is with students from the Northeast and Midwest, who were significantly more likely to score zero points than their counterparts in the Southeast for NTDISFG and NTDISCE. It is also noteworthy that the students in the North were much more likely than the students in the Southeast to score zero on the EC open-ended questions. Therefore, the HEIs and professors in these regions should highly encourage their students to take the Enade. Similar to Nasu et al. (2021), these discrepant probabilities may be linked to socio-educational differences across Brazilian regions.

5. Conclusion

This study's objective was to analyze zero scores obtained by accounting undergraduate students in the Enade 2018 based on a theoretical framework addressing the quality of accounting education and the purpose of this exam. Microdata was downloaded from the Inep website (INEP, 2020), and a population of 62,475 accounting students was found. Of these, 9,628 were excluded due to invalid performance, essentially because they missed the exam. Thus, the analysis included 52,847 students (84.6% of the population) with valid performances and focused on those who scored zero. The first specific objective was achieved by performing a descriptive analysis of the zero scores, which showed how these scores behaved and their respective reasons. The second specific objective was achieved by performing binary regression analyses. Finally, the probabilities of zero scores were estimated considering the students' (sex and age) and contextual (modality and region) variables.

The results indicated that 26 students obtained a total zero score, while 240 and 81 students scored zero in the FG and CE portions, respectively. The reason is that these students left the answers unanswered. Zero scores were found when the portions of the exam were explored separately. We found that zero scores were concentrated in open-ended questions for both the FG and CE portions. More than 8,000 students tried to answer the EC open-ended questions but provided incorrect answers. This finding shows that students need to be motivated to answer open-ended questions addressing accounting content. On the other hand, few students scored zero in the EC close-ended questions, possibly indicating that students are more used to or find this format easier to answer, consequently, are less likely to score zero.

A more detailed analysis of open-ended questions using binary regression models showed that male students were more likely to score zero in the FG open-ended questions than their female counterparts. However, they were less likely to score zero points in the CE portion. These findings suggest that male and female students paid attention to different portions of the Enade. Regarding age, older students were more likely to score zero points. Therefore, HEIs and professors may want to talk privately with older students to understand their difficulties and motivations to improve their performance in the Enade. Similarly to gender, the results concerning the programs' modality are conflicting, suggesting that students attending brick-and-mortar programs and distance-learning education pay attention to different portions of the test. Finally, students from the Northeast and Midwest were more likely to score zero in general. Furthermore, the probability of scoring zero points in the EC open-ended questions is of concern, especially among students from the North, who require closer monitoring by professors and HEIs.

Some implications emerge from these results. First, students who scored zero in the FG and CE portions of the exam should not be of immediate concern. These students represent less than 1% of the students with valid performances. Second, a significant portion of the students left open-ended questions blank, suggesting that these students lacked the motivation to answer this type of question, which usually requires more effort than multiple-choice questions. Third, a significant portion of the students answered the EC open-ended questions incorrectly. While this may result from a lack of interest, there may be instances where students genuinely tried to solve the questions but failed. According to Leitão et al. (2010), Accounting students are among those who least frequently boycott the Enade. Thus, we suggest that accounting professors include more open-ended questions in their assessments. Fourth, a zero score obtained, for whatever reason, indicates a deficiency in teaching or the evaluation exam. In the first case, the HEIs' social role of teaching the population needs to be improved. As discussed in section 2, there are strategies for improving accounting education. In the second case, students should receive more incentives. Miranda et al. (2018) discuss some possibilities the regulator of the accounting profession may consider. Finally, decisions should be based not solely on the analysis of zero scores; other findings should also be considered.

This study presents two main limitations. The first is related to literature. There are few studies in Accounting Sciences analyzing zero scores. For this reason, the discussion of results presented by the literature is restricted. The second limitation refers to data. Two reasons for the students' scoring zero points were found (returning a blank test and answering the questions incorrectly), and we could not break down these reasons to provide a more detailed analysis.

Finally, future studies could conduct in-depth interviews for students to report the motivations that led them to score zero points in the Enade. Additionally, longitudinal analyses are encouraged, especially to monitor the proportion of students who score zero compared to the total number of students with valid performances. The last recommendation is to compare the proportion of zero scores among students from different programs, especially in the FG portion, in which the questions are common to all the students, regardless of the program.

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Appendix

Here the diagnostic analyzes of the NTDISFG and NTDISCE binary regression models are reported. Pearson residuals and deviance residuals were examined, which are commonly used to ascertain the suitability of a generalized linear model (GLM) (Ben & Yohai, 2004; Cordeiro & Simas, 2009). The results in Table 9 show that the models are adequate ($p > 0.05$).

Table 9

Degrees of freedom, deviance residual, Pearson's , and p-values

NTDISFG	logit	probit	cauchit	cloglog
Degrees of freedom	52839	52839	52839	52839
Deviance Residual	40926	40921	40964	40929
p	0.99	0.99	0.99	0.99
	52738	52760	52569	52732
p	0.62	0.59	0.8	0.62
NTDISCE	logit	probit	cauchit	cloglog
Degrees of freedom	52839	52839	52839	52839
Deviance Residual	68028	68022	68069	68069
p	0.99	0.99	0.99	0.99
	52784	52797	52692	52738
p	0.56	0.55	0.67	0.62

Furthermore, Pearson residuals are graphically reported (Figures 1 and 2). Note that they are random and homogeneous, which is compatible with the tests above and indicates an absence of a relevant problem in the models' goodness of fit to data.

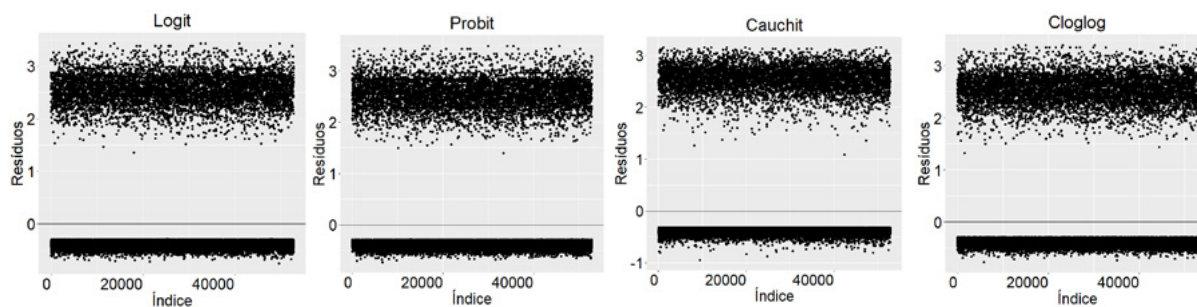


Figure 1. Pearson residuals of the NTDISFG models

Source: Study data

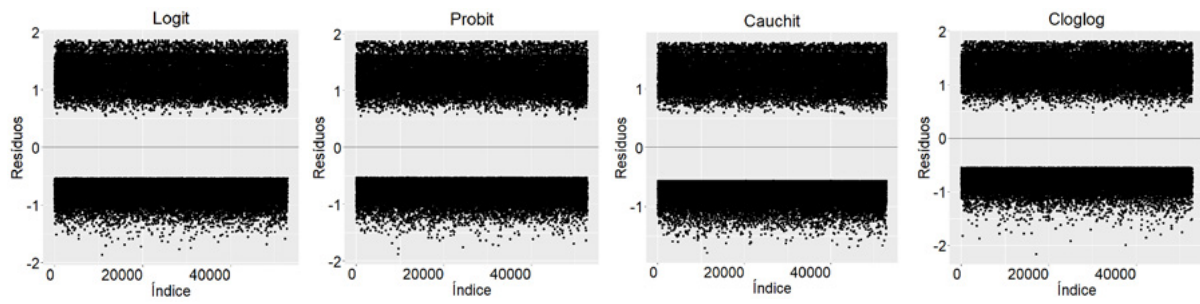


Figure 2. Pearson residuals of the NTDISCE models

Source: Study data

Experience report concerning the application of WebQuest in a Commercial Accounting course

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Abstract

Objective: To present an experience report regarding the WebQuest strategy adopted in the Commercial Accounting course of an undergraduate program in Accountancy.

Method: This study was conducted in the Commercial Accounting course of the Accountancy program at the Federal University of Sergipe at Itabaiana. WebQuest was used to address “Taxes: why and what for?” and the students were asked to develop a podcast on the subject.

Results: The students were satisfied with the interaction WebQuest provided, considering its user-friendly structure. Additionally, the students considered that the activity was challenging and exciting and promoted creativity. The main difficulty concerned audio editing though. This matter was verified when the professor who proposed WebQuest found that most groups did not perform this aspect appropriately for a podcast.

Contributions: This study may encourage other professors to adopt this strategy in their pedagogical practice, selecting teaching-learning strategies more aligned with modern cognitive demands.

Keywords: Learning. Podcast. WebQuest.

1. Introduction

The first computer network, ARPANET, was created in 1969 and initially connected four independent nodes located in American universities. In 1983, however, this network was separated into ARPANET and MILNET. The first remained the network backbone and later became the network of networks, henceforth called the Internet (Castells, 2020).

The information revolution the Internet caused sets society to a new era in which technology is increasingly pervasive, ubiquitous, and sentient (Lemos, 2005), creating a new space, which Castells (2020) calls a space of flows, in which geographic boundaries are no longer very significant. Hence, distances are measured by the frequency of connections via the network through which interactions occur in real-time.

Lévy (1999) also conceptualized this space of flows as cyberspace, which refers to a new form of communication mediated by the computer network, composed of physical devices and people interacting in this network. Such relationships lead to a language of its own, new habits and practices, and customs, thus creating cyberculture.

Cyberspace has mainly been inhabited by the so-called digital natives, those who had access to devices such as smartphones, pen drives, digital TVs, and wireless Internet from an early age. There are also digital immigrants though, i.e., those who accessed these new technologies later and, therefore, need to go through an adaptation process to deal with these devices (Coelho, Costa & Mattar Neto, 2018).

Prensky (2001), a researcher who coined the term “digital natives”, warned that this new student profile demands new educational practices which educators, still digital immigrants, are often unprepared to deal with. So the author asks: should digital natives learn the old-fashioned way? Or should professors learn a new way of teaching?

The author above answers these questions by stating that trying to impose the old ways of learning on digital natives goes against social evolution itself. Furthermore, the brain of digital natives may work cognitively differently from previous generations (Presky, 2001).

Therefore, we need to think about new teaching-learning strategies using digital technologies. Moran (1997) has said for years that the Internet attracts students because they like to browse and discover new concepts, but that, at the same time, they may get lost in this universe of information.

Thus, professors need to adapt the use of the Internet in the classroom and provide a pedagogical process aligned with the new demands, guiding students, so they do not browse aimlessly on the net. Such an abundance of information may generate saturation and make it difficult to establish what is significant and what is not (Giovanela, Bertolini & Silveira, 2021).

A strategy that may be relevant in this context is WebQuest, created by Dodge (1995). WebQuest is a research-oriented activity in which some or all of the information students need is on the Internet. This strategy is based on solving tasks and is intended to make students feel challenged. The professor presents a list of resources - website links, videos, podcasts, e-books - to help the students find reliable information.

WebQuest is a tool with high potential in all fields and levels of education (Silva & Mueller, 2010), though its use is incipient in higher education (Bottentuit Junior & Coutinho, 2008). It is even more evident in Accountancy. A survey conducted in June 2022 addressing journals in the field of education revealed only one paper addressing this topic applied in the accounting field, written by Bottentuit and Coutinho (2010). Furthermore, a survey conducted in accounting journals listed on the National Association of Graduate Programs in Accountancy (Anpcont) website did not reveal any paper published on the subject.

Thus, there is an urgent need for accounting professors to reflect on teaching-learning strategies that can be applied in the classroom to provide a pedagogical practice that is more aligned with the current context. Professors teaching undergraduate programs did not have contact with such topics in their training. By choosing academic life, they need to learn to teach in a way pertinent to the context students belong to. Hence, this study's objective is to present an experience report on using the WebQuest strategy in the Commercial Accounting course of an undergraduate program in Accountancy.

This study is justified by the need to awaken accounting professors who should understand that knowing the technical content of science is insufficient to become a professor. Therefore, besides the inclusion of digital technologies, pedagogical practices, teaching strategies, and learning modes are necessary for this process. Furthermore, such inclusion should not be restricted to using computers, data projectors, or slides to transmit content; technological tools should promote student autonomy and critical and reflective training, enabling students to find answers to the proposed problems.

This study is expected to show accounting professors how to create a WebQuest task and apply it in a real-world teaching-learning context so that they can adapt the methodology for their classes. Thus, this study will contribute to professors who will learn about this strategy and students who will interact with a tool aligned with modern digital demands when experiencing and learning via WebQuest.

This study is divided into four sections. The first is this introduction, in which the research context and objectives are presented. Next, the literature review presents relevant concepts necessary to facilitate understanding. The third section highlights the methodology used to achieve the objective, while the fourth section presents the results. The last section concludes with the final considerations.

2. Literature Review

2.1 The Pedagogical Training of College Professors

The Brazilian legislation establishes that the training of university professors must be conducted at the graduate level, preferably through master's and doctoral courses, while the training of basic education teachers requires a minimum of 300 hours of teaching practice. Such practice is optional in higher education though (Brasil, 1996).

As a result, most professors teaching in colleges and universities have bachelor's degrees but never attended pedagogical training to work as educators. Thus, professors need to be sensitized that mastering a specific training field is not enough and that developing pedagogical skills is crucial for professors to analyze, interpret, criticize and even design their strategies (Junges & Behrens, 2015). One must be careful and not conform to presenting him/herself as someone who is "(...) an expert in a specific field of knowledge, though (s)he does not master the pedagogical and educational field" (Sanches, Scielo & Yaegashi, 2018, p.87).

Thus, even though the Brazilian legislation does not demand graduate programs to provide courses that prepare students to teach in higher education institutions, these courses are now common and are a way to provide pedagogical training (Leitinho, 2008). These curricular components do not always significantly impact classroom practice though. For instance, Silva *et al.* (2019) and Fernandes, Araújo, and Cavalcanti (2021) report that the training of professors in the accounting field often includes optional courses addressing ‘Teaching Methodologies’ in Master’s and doctoral programs. The students attending these courses perceive them as not providing the necessary skills for them to feel self-assured, however.

In this context, higher education professors at the beginning of their careers tend to reproduce the method, pedagogical resources, and particularities of the professors who taught them. Often, they fail to perform a critical analysis or consider their personalities and the profile of their students. For this reason, these new professors need to be awakened to the need for continuous education and knowledge acquisition about pedagogical practices (Santos & Batista, 2019).

Therefore, professors must understand how students learn and consider the students’ professional lives rather than preparing classes from their perspective and perception of what is best, making an effort to encourage students to learn (Santos & Cária, 2019).

Ramos and Farias (2018) note that the training provided to college professors contributes to them changing their teaching attitudes and behaviors, even if slightly and occasionally. Hence, there is a need for institutional policies to promote pedagogical training to higher education professors, considering the comprehensive training of college students.

Nonetheless, another way for teachers to acquire knowledge about teaching-learning methods, assessment strategies, and pedagogical resources is by reading scientific papers reporting the experience of other professors, which can be adapted and modeled for their contexts. Therefore, in this study, we propose a specific methodology – WebQuest – to be adopted in an undergraduate program in Accountancy. In the following subsection, the conceptual aspects of this strategy are presented for those unfamiliar with it to understand its basic assumptions.

2.2 WebQuest Conceptual Aspects

The WebQuest methodology, developed by Dodge (1995), is an inquiry-oriented task in which some or all information students need is available on the Internet. According to Zoch and Vanz (2018), its fundamental aspect is providing students the opportunity to take an active role in their learning-teaching process.

WebQuest differs from other tasks because it presents a well-defined structure: introduction, task, process, resources, assessment, conclusion, and teacher's page (Bottentuit Junior & Coutinho, 2010), which are synthesized in Table 1.

Table 1

WebQuest's components

Component	Concept
Introduction	Brief text highlighting the research topic, emphasizing the context in which the project will be developed, sharpening the students' curiosity.
Task	Refers to what the students are supposed to do, suggesting students develop a meaningful product.
Process	Refers to the stages the students have to perform to accomplish the task.
Resources	References that help students to understand the topic, learn and perform the task proposed.
Assessment	Qualitative and quantitative criteria are assessed to verify the students' performance.
Conclusion	Brief text summarizing the topic's essential aspects, leading students to reflect upon new contexts based on what they just learned.
Teacher's page	The references adopted for developing the WebQuest class are presented, besides the contact of the professor who developed the task.

Source: adapted from Bottentuit Júnior and Santos (2014).

The professor adopting WebQuest must pay special attention to the component "Task" to develop a product that makes sense in the students' context and goes beyond simply memorizing concepts. Instead, the task is supposed to be challenging (Silva & Mueller, 2010).

Initially, Dodge (1995) conceived WebQuest as a group task, which Bottentuit Junior and Coutinho (2010) and Santos and Zanoni (2018) agree, considering that a group task promotes teamwork and cooperation. This is optional though, and one can develop WebQuest to be performed individually (Yoshimoto & Yoshimoto, 2018).

Hence, the educator must have well-established educational objectives to develop a WebQuest that meets his/her plan. In this sense, Santos and Zanoni (2018) highlighted that, regardless of the content or how the task is performed, WebQuest plays its role when it is used as a strategy that leads students to analyze information critically while thinking from a digital perspective.

WebQuest is also relevant because it leads students to critically seek information on the Internet, seeking the best resources, with responsibility and discretion (Tiraboschi, 2019). At the same time, it encourages students to work creatively to solve the task at hand (Zoch & Vanz, 2018).

2.3 State of the Art

Figure 1 outlines some studies that adopted the WebQuest methodology as a teaching-learning strategy. This survey was conducted in June 2022 and included periodicals in the field of education classified in 2013-2016 as Qualis Capes A1, A2, B1, B2, B3, B4, and B5. Note that most studies (considering a total of 19 studies) that met the inclusion criteria referred to experiences from basic education, specifically middle school (7 studies); only four were conducted in the higher education context.

Only one study specifically addressed Accountancy, Bottentuit and Coutinho (2010), in which the topic “Accounting Fields” was discussed in the course Complementary Activities 1. The WebQuest task proposed that students develop a presentation for a fictitious character to choose a specialization in the accounting field to pursue after graduating from college. The authors concluded that the students were satisfied with the methodology adopted.

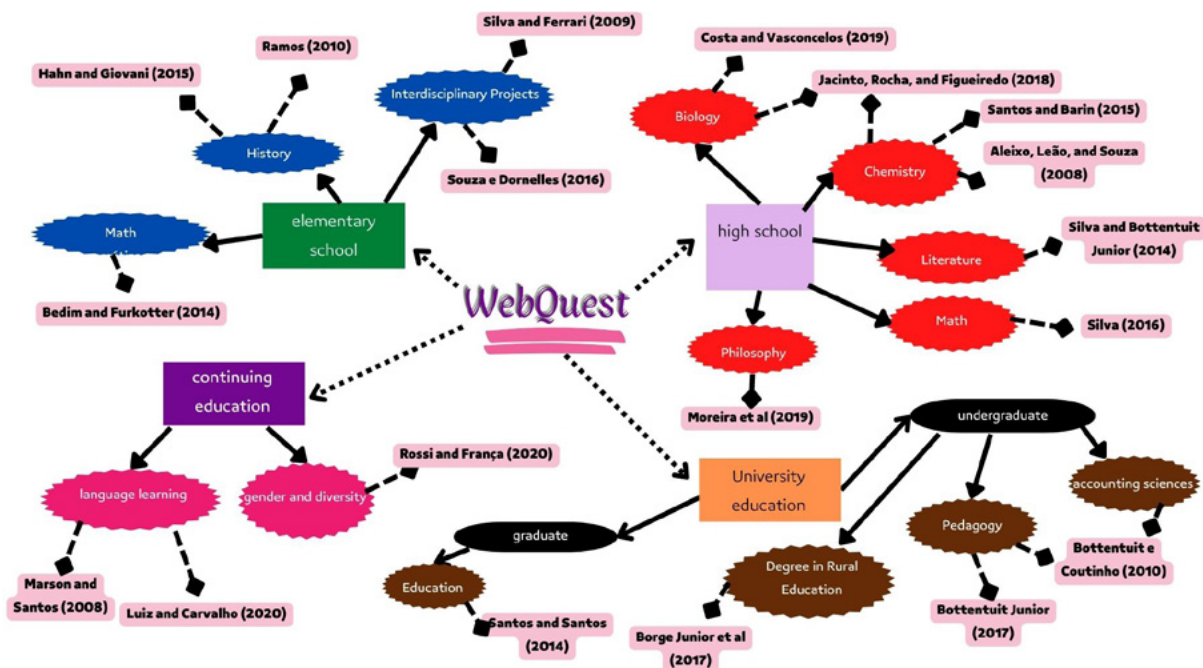


Figure 1. Mental map of the studies found in journals from the education field

Source: developed by the author (2022).

Considering the accounting journals acknowledged by Anpcont, when the terminology “WebQuest” was searched, no published texts were found. This situation shows a need for studies discussing new teaching-learning practices aligned with the new cognitive demands of students in the context of Accountancy.

Those professors in the accounting field with a bachelor’s degree who did not attend courses providing proper pedagogical training need to overcome barriers, learn about teaching-learning methodologies, and innovate their practices. The reason is to prevent discrepancies between the context of classrooms and the social and technological contexts students belong to.

3. Method

This is an experience report describing the use of WebQuest in accounting education. It was conducted in the undergraduate program in Accountancy offered at the Federal University of Sergipe at Itabaiana. The task was applied in the Commercial Accounting course in the first term of 2021 (January to May 2022), a mandatory course administered to 3rd-year students.

Forty-two students were enrolled in the course. The WebQuest task was part of the evaluation activities of the second unit and corresponded to 3 points of the total grade. Thirty-eight students performed the task in groups of 2 to 4 students, totaling 10 groups. Two groups comprised 3 students, and 8 groups comprised 4 students. The professor considered dividing the class into teams because Dodge (1995), the researcher who designed WebQuest, initially thought of this educational experience as an activity conducted in groups.

Next, 10 students voluntarily provided their perceptions regarding WebQuest. The students were invited via the class' WhatsApp, and the students who volunteered received a link with open questions. The completed form should be anonymously returned to the professor to prevent students from feeling constrained. The responses were qualitatively analyzed because, as Silveira and Córdova (2009) noted, such an analysis provides an understanding of a given social group. The students' reports are presented verbatim in the Results section.

The topic addressed by WebQuest was "Taxes: Why and what for?" The purpose was to encourage students to reflect upon taxes in the Brazilian context, concepts, importance, and potential improvements that need to be adopted in the country's tax regime. The WebQuest task proposed that students developed an 8 to 15-minute podcast on the theme "Taxes: Why and what for?", addressing a specific hypothetical target audience, which was high school students who had not previously received fiscal education. The students were encouraged to use their creativity when addressing the topic, considering the target audience, its language, and cultural elements (e.g., memes, movies, shows, games, songs, etc.), bringing practical elements.

When proposing the task, the professor considered the development of other dimensions beyond curricular content, i.e., the students' personal development, such as digital skills that are relevant in the current cyberculture context. Figure 2 presents the competencies the professor sought to promote among the students with the WebQuest task.

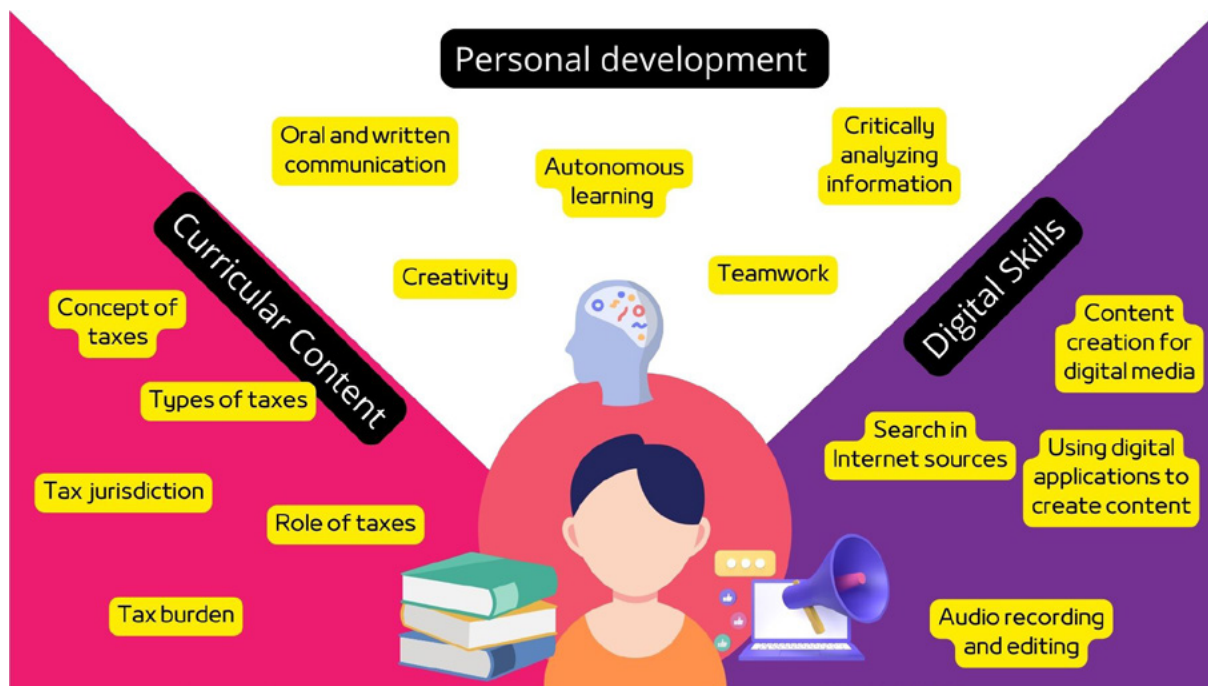


Figure 2. Mental map of the competencies expected to be developed with the WebQuest task.

Source: developed by the author (2022).

The WebQuest task was available via a Google Sites link, enabling website development free of charge. The structure adopted was the same one proposed by Bottentuit Júnior and Santos (2014). The students were supposed to record the podcast, save it in an mp3 file and make it available on SIGAA, an institutional platform for communication between faculty members and students. The professor recommended the Anchor application, available in Google Store and accessible on smartphones, for the students to record and edit the podcast. She recorded a video for the students, explaining how to use the digital tool, but the students were free to choose other resources for recording their podcasts.

4. Results

4.1 WebQuest Presentation

The WebQuest task started with the introduction section with a brief description of the history of taxes, seeking to instigate students to think about the subject and lead students to “reflect upon taxes in the Brazilian context, concepts, importance, potential improvements that need to be adopted.” Table 2 presents the screen and the introduction available in a link in the WebQuest task.

Table 2

WebQuest Introduction

Screenshot

Text transcription


Taxes appeared as humankind started living in community and were given to kings and leaders of civilizations due to their social role, besides honoring gods. Additionally, taxes served to oppress people defeated in war. The Greek Empire proposed taxes, as we know them today to be used in state administration. This model was also adopted by the Roman Empire, which ensured the wealth and prosperity of that civilization.

Currently, however, what are taxes for? Furthermore, what is the legislation governing taxes in the Brazilian context? This WebQuest objective is to reflect upon taxes in the Brazilian context, and the concepts, importance, and potential improvements that need to be adopted.

Source: developed by the author (2022).

Next, the task was presented: developing a podcast on the topic “Taxes: Why and what for?” Students were asked to design a script to reach a specific target audience: high school students who had not previously received fiscal education. Table 3 highlights the task screen proposed in WebQuest.

Table 3
WebQuest Task

Screenshot


Text transcription

What do you need to do?

Let us gather groups of 2 to 4 to develop and record a podcast addressing the topic “**Taxes: why and what for?**” Choose one student to be the interviewer, while the remaining can be the interviewees or debaters. The podcast must last from 8 to 15 minutes. The target audience of your podcast is high school students who have not previously learned anything about taxes, that is, have no previous education.

You should address topics such as:

- What are taxes?
- What are the types of taxes?
- What is tax jurisdiction?
- Examples of taxes, fees, and contributions.
- What are the roles of taxes?
- What is the tax burden, and how is it in Brazil?
- What is the impact of the tax burden on citizens’ lives?

Be creative and consider your target audience, its language, and cultural elements (memes, movies, shows, games, songs, etc.) and provide practical examples.

Source: developed by the author (2022).

In the “Processes” tab, a basic step-by-step was presented for the students to follow and perform the task (Table 4).

Table 4

WebQuest Processes

Screenshot



Text transcription

- 1) Study the material available in the Section “Resources”
- 2) Write the script of your podcast
- 3) Rehearsal of your script
- 4) Record and edit your podcast

Source: developed by the author (2022).

In the “Resources” section, as shown in Table 5, links were provided to give the students some direction during the task. The electronic addresses were separated into 3 categories: 1) resources to learn about taxes, 2) resources to create a script for your podcast, and 3) resources to record your podcast. The students were free to search other sources; they were recommended to choose references carefully though.

Table 5
WebQuest Resources

Screenshot
Text transcription

I present some resources you can use in your podcast on this page.

1) Resources to learn about taxes:

- Brazilian Tax Code: http://www.planalto.gov.br/ccivil_03/leis/l5172compilado.htm
- UFS/ITA Mini-documentary - cidade transparente, cidadão contente [Transparent city, content citizen] (5th in the Brazilian competition: Luz, câmera e educação fiscal da Receita Federal [Light, camera and fiscal education of the Federal Revenue]): https://www.youtube.com/watch?v=w8_C55rOtWE&t=5s
- Paper on taxes' social role: http://www.mpsp.mp.br/portal/page/portal/documentacao_e_divulgacao/doc_biblioteca/bibli_servicos_produtos/bibli_boletim/bibli_bol_2006/RTFPub_n.130.03.PDF
- Paper on the population's perception regarding taxes: <http://www.revistarefas.com.br/index.php/RevFATECZS/article/view/193>

2) Resources to create your podcast's script:

Watch this video and get inspired on how to develop a script for your podcast: www.youtube.com/watch?v=OTs_9R4k5jY

3) Resources to record your podcast:

- Watch this video and see how to record your podcast and make it available using Anchor: youtu.be/Cf-h7VGZJlw
- More tips on how to record your podcast here: www.youtube.com/watch?v=LbqVswjSpdw
- Also, get inspiration by watching the podcast “Se é Ciência” [If it is science], a UFS program: open.spotify.com/show/2x2o2LFTDmPgAGQ6Hlx6cG

Feel free to use other resources, provided they come from reliable sources! Be Well Informed!

Source: developed by the author (2022).

WebQuest also presented an “Assessment” section, in which the criteria for developing the podcast were presented, besides how it would be graded. The grade was an incentive for the students to perform the task, though learning is expected to be a reward by itself, despite scores or grades. This perception requires a paradigm shift though, which will not change by a single activity via active methodologies. Actions are needed to step further and gradually instill a new academic culture, both among students and educators, considering that the effect of isolated initiatives like these is slow. When the entire faculty is engaged in active methodologies, students are more easily convinced that learning is the greatest reward. Table 6 shows the screen that was available to students.

Table 6
WebQuest Assessment

Screenshot

Text transcription

Your podcast will be assessed based on some criteria. So pay attention and develop quality material!
This task will be worth 3.0 points in the 2nd unit's test.

- The group complied with the podcast duration (between 8 and 15 minutes).
- The group complied with Portuguese language rules (profanity is forbidden)
- The group complied with the topic and addressed all the topics proposed.
- The group members' speech was loud and clear.
- The group used language appropriate to the target audience.
- The group adopted a creative approach (mentioned songs, movies, memes, shows, or other elements common in your target audience's culture).
- The group edited the podcast's audio (soundtrack and audio components to draw attention during the speech, etc.)
- The questions were well crafted.
- The answers provided to the questions were well-informed.
- The group developed a script that followed a logical sequence of content.

Source: developed by the author (2022).

The “Conclusion” screen briefly summarized what the students would learn about the subject and led the students to reflect on additional points, as shown in Table 7.

Table 7

WebQuest Conclusions

Screenshot
 <p>WebQuest - tributos</p> <p>Início</p> <h1>Conclusão</h1> <p>Pronto, agora é a sua vez! Creio que depois de todo esse mergulho nos aspectos conceituais dos tributos você deve estar refletindo sobre a relevância desse assunto na nossa sociedade. Pense então: que ações, nós, enquanto contabilistas, devemos realizar visando explicar para a população esse tema, mostrando que eles têm o direito de saber o que o governo faz com o dinheiro público?</p>

Text transcription

Okay, now it is your turn! After diving into the conceptual aspects of taxes, you must consider their relevance in our society. So, consider: What actions we, accountants, should implement to explain this topic to the population and show that citizens are supposed to know what the Government does with public money?

Source: developed by the author (2022).

Finally, the “Teacher’s page” is where the professor introduced herself, left her contact details, and provided the references used in the development of the WebQuest task. This screen is not presented in this study to not compromise its blind assessment.

4.2 Perception of the students who answered the survey

The characteristics of the 10 students who voluntarily participated in the survey are presented in Figure 3 (They are identified by the letter “S” followed by a number). The respondents included young male and female students, aged between 19 and 32, who frequently listen to podcasts.

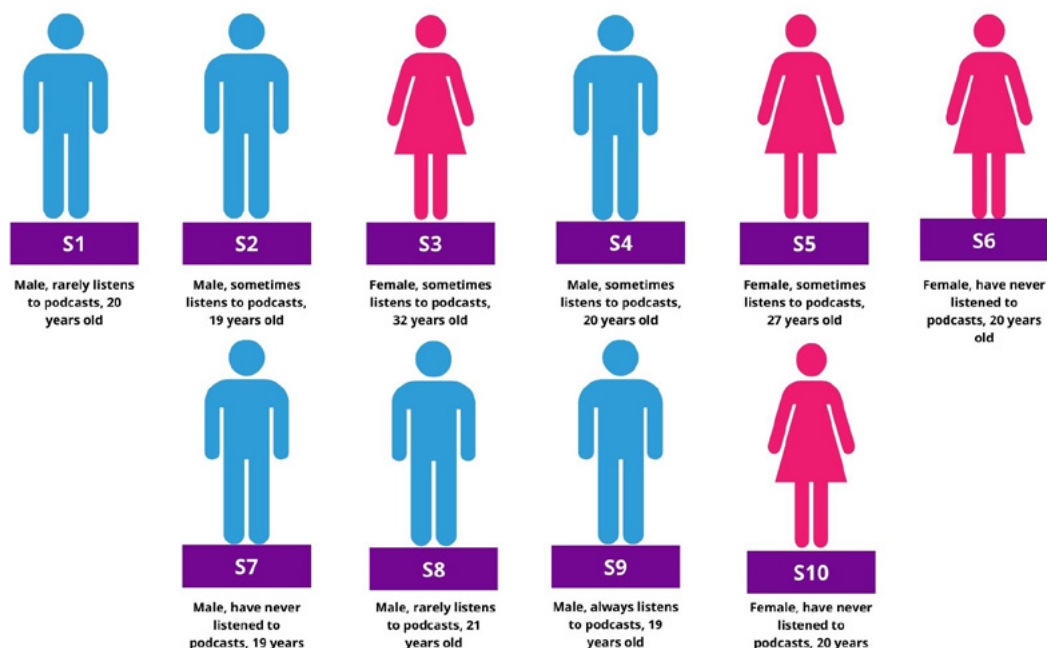


Figure 3. Brief presentation of the respondents.

Source: developed by the author (2022).

Knowing that the students are familiar with podcasts is relevant, considering that Silva and Muller (2010) emphasized that the WebQuest task's final product must make sense in the students' context. Hence, asking students to work on an unattractive task or something distant from their reality would not be compelling. Thus, the creation of a podcast was considered appropriate for the situation that is the object of this study.

Next, the students were asked whether they would recommend the WebQuest methodology to address other topics in the same course, and 9 out of 10 answered they would recommend it. When they were asked whether they would recommend it to other professors to address other curricular components, however, 7 answered yes.

Ramos (2010) noted that the professor plays an essential role in developing the WebQuest task and providing guidance to students. As Silva and Bottentuit (2014) noted, the challenge is for all those involved, professors and students. The fact that fewer respondents would recommend WebQuest to other curricular components may be related to the profile of the faculty members and how the students perceive the professors' didactics and strategies.

Regarding WebQuest's structure (i.e., introduction, task, process, resources, evaluation, conclusion, and teacher's page), the students considered its organization easy to understand, didactic, simple, and, at the same time, attractive and interesting (Table 8). S2's response stands out as this student highlighted the "resources" tab as essential for performing the task.

Prais *et al.* (2017) noted that when students are satisfied with the material provided for performing the WebQuest task, it shows the professor's care in planning the task well, properly exploring the links available on the Internet, and satisfactorily mediating the students' access. Bedim and Furkotter (2014) highlighted that when a professor opts for using WebQuest, s/he must mediate the learning process.

Table 8
Respondents' perception of the WebQuest structure.

Students	Reports
S1	Good!
S2	It is a great learning strategy. It provides all the necessary resources to set up the task.
S3	I think it is very didactic. I like it very much.
S4	Excellent!
S5	Perfect, easy to understand, and quite didactic!
S6	Practical, easy to understand, and somewhat attracts the student given its simple design. It's easy when you're performing the task.
S7	It's well organized and simple to make anyone learn about a given subject.
S8	Great!
S9	Excellent!
S10	Attractive and interesting.

Source: developed by the author (2022).

As shown in Table 9, the students found the task compelling, creative, and challenging. Silva and Mueller (2010), Silva and Bottentuit (2014), and Zoch and Vanz (2018) defended these characteristics. Note that "S6" reported that he found WebQuest engaging because of its content and because he learned to use applications to edit audio. This report shows that WebQuest achieved the professor's purpose of developing digital skills besides technical knowledge. Hence, it is in line with Santos and Zanoni's (2018) recommendation that WebQuest should lead students to think from a digital perspective.

Another highlight concerns "S9", as he stated that WebQuest is "a great idea to replace boring seminars presented in class to professors and classmates." This statement encourages us to reflect upon the need for college professors to rethink the way they assess students and the teaching-learning strategies they adopt.

Aguiar (2020) states that higher education professors often adopt practices in which they feel safe and already work for them but ignore whether such a model resonates with students, makes sense in their context, or is in line with their values. The author above argues that this situation leads students to only "[...] memorize content instead of obtaining in-depth and meaningful learning that is necessary for their professional future" (AGUIAR, 2020, p.62).

Table 9

The respondents' perceptions regarding the task

Student	Reports
S1	Good.
S2	It was a good approach, the way it happened, like a conversation. It was easy and practical to learn about the subject.
S3	It was a new experience.
S4	Interesting.
S5	I found it very creative!
S6	I found it very interesting, not only because it promoted studying the subject, but also developing the techniques when editing using the applications.
S7	It was challenging for someone who had never heard about it, but it helped overcome barriers.
S8	It's the best way to learn.
S9	It's a great idea to replace the boring seminars we have to present to professors and classmates in the classroom. Besides encouraging the students' creativity, it is possible to create a dynamic and laid-back activity.
S10	It enables the development of new skills.

Source: developed by the author (2022).

The students were also asked about the main difficulties (Table 10); most difficulties concerned audio editing and recording. The reason is that the usual Internet user is more accustomed to consuming rather than sharing content in cyberspace, and whenever they do share any content, it is usually photos.

Table 10

Difficulties reported.

Student	Reports
S1	Not laughing.
S2	There was none.
S3	I had no difficulties.
S4	Audio editing.
S5	Only meeting the group members!
S6	The part concerning audio editing.
S7	The resources concerning audio editing.
S8	Finding a quiet place.
S9	Formatting the podcast.
S10	Translating a subject of complex language into a subject with a more usual language.

Source: developed by the author (2022).

Despite difficulties, all the groups completed the task, though one group returned it late, and their grade was reduced by 50%. Nevertheless, a general analysis of the students' responses indicates that the experience was satisfactory, innovative, and productive, enabling them to learn not only the course's content but also how to develop content using digital technology.

4.3 The perspective of the professor who proposed the task

Considering that the professor proposed the activity to develop knowledge that concerned the course (curricular content), personal development (creativity, communicative skills, learning autonomy, and teamwork), and digital skills (using technologies to learn and develop resources), she considered having achieved the educational objectives.

When assessing each group, the professor noticed that, in general, all the criteria were duly fulfilled, but there was difficulty regarding the creative approach. For example, the groups were asked to associate the content with elements of the target audience's culture. The reason is that some teams focused only on the technical aspect, explaining the concepts without making such connections.

The students also found editing to be challenging. The groups were asked to include a soundtrack and emphasis elements, which are common on podcasts. Almost none of the groups included these elements and their podcasts only presented the participants' voices though. Note that the professor recorded a video for the students to know how to add these elements using the Anchor Application.

Additionally, this criterion, the one the students met less frequently, is also what the students reported as challenging, precisely audio editing.

Accounting professionals are not trained to edit audio, images, and videos; however, the COVID-19 pandemic increasingly demanded that professionals work on the digital network to remain active and attract the public. Hence, many accountants started to create lives on YouTube channels and Instagram to communicate with their clients and add value to their work.

This trend is likely to continue. Therefore, students are recommended to start obtaining knowledge regarding this aspect to deal with the new circumstances and new ways of entering the job market, which require creativity and digital communication skills. For this reason, teaching institutions and teachers need to take responsibility for encouraging their students to acquire such skills.

Finally, Table 11 presents a summary of the groups' evaluation. The professor sent a detailed report to each group via the institution's integrated system, justifying why she considered they met the criteria met or not.

Table 11

Summary of the groups' assessment

Criterion	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10
The group complied with the podcast duration (between 8 and 15 minutes).	S	S	S	S	S	S	S	S	S	S
The group complied with Portuguese language rules (profanity is forbidden).	S	S	S	S	S	S	S	S	S	S
The group complied with the topic and addressed all the topics proposed.	S	S	S	S	S	S	S	S	S	S
The group members' speech was loud and clear.	S	S	S	S	S	S	S	S	S	N
The group used language appropriate to the target audience.	S	S	S	S	S	S	S	S	S	S
The group adopted a creative approach (mentioned songs, movies, memes, shows, or other elements common in your target audience's culture).	S	N	S	S	N	S	S	S	N	N
The group edited the podcast's audio (soundtrack and audio components to draw attention during the speech, etc.)	N	N	N	S	S	S	S	N	N	N
The questions were well crafted.	S	S	S	S	S	S	S	S	S	S
The answers provided to the questions were well-informed.	S	S	S	S	S	S	S	S	S	S
The group developed a script that followed a logical sequence of content.	S	S	S	S	S	S	S	S	S	S

Source: developed by the author (2022).

Considering that this study's objective, which was to present an experience report on adopting the WebQuest methodology in the Commercial Accounting course in an Accountancy program, was achieved, we proceed to the last section.

5. Conclusions

This study's objective was to present an experience report on adopting the WebQuest method in the Commercial Accounting course in the undergraduate Accountancy program at the Federal University of Sergipe at Itabaiana.

The WebQuest task addressed the topic "Taxes: why and what for? The students were asked to develop a podcast addressing this topic directed to high school students without previous contact with fiscal education. The class was divided into groups of 2 to 4 students, totaling 10 teams.

The students were satisfied with interacting with WebQuest because of its friendly-user structure. Additionally, the students considered the task challenging and engaging and promoted creativity. Their main difficulty concerned audio editing; a situation confirmed when assessing the groups. The professor who proposed the WebQuest task verified that most groups did not adequately address this aspect in the podcast.

Note that WebQuest was already applied in this same course, addressing another content and task. In the previous case, the topic concerned starting a business. The students were asked to take on the role of an intern at an accounting office and write a post for this fictitious office's social network, addressing the main corporate types and aspects concerning the opening of a business in Sergipe, Brazil. The results of this first WebQuest task were presented at a scientific event and are awaiting final publication. Thus, we consider that the reason why students accept it well is not because of its novelty or exceptionality from a teaching-learning perspective but perhaps because meaningful tasks are proposed.

It is worth noting that WebQuest does not exclude the possibility (and even the need) for professors to present lectures or adopt more traditional teaching-learning methodologies and tasks. Professors need to have the sensibility to dose their approaches between conservative and innovative methodologies though, to encourage students to have a more active role in their learning process rather than depend on someone to present systematized knowledge. The reason is that upon graduation, students will find a dynamic context in constant change that demands autonomy and self-taught abilities.

This study is expected to contribute to professors in the Accounting field and present the process of developing a WebQuest task, besides suggesting one type of application, encouraging professors to adopt it in their pedagogical practice and implement teaching-learning strategies aligned with modern cognitive demands.

Some fellow professors may ask themselves how to apply these strategies to address more practical topics, such as accounting entries, cost accounting, etc. One should adapt the section "Task" to address content better in these cases. For instance, in the case of cost calculation, students may be asked to record a video simulating a consultancy for a client unsure which costing method to adopt.

In situations such as accounting entries, students may perform accounting calculations and closing statements in specific software. It is always essential that the task chosen makes sense for the students' context, both the one they already experience and the one they will experience in their professional practice.

Furthermore, WebQuest is just one of the many active methodologies available, and professors should be familiar with them to select the most appropriate for a given context and educational objectives. If one realizes that WebQuest is not the most useful for a given situation, considering the content addressed and class' profile, one may select another tool from a vast range of existing possibilities.

This study's limitation concerns the fact that only 10 students answered the survey. This does not invalidate this study's results nor diminish its contributions though, as the results show that it is possible to teach using a creative and enticing task while encouraging students to be independent learners.

Thus, professors must remind students that upon graduation, they will find a job market that is constantly changing. For this reason, they must update their knowledge without having a professor to provide such knowledge. Hence, since college, students must be encouraged to learn how to learn so that they can overcome obstacles by themselves.

Future studies should apply the same WebQuest task in other institutions and courses to work with the same content to compare results. Other tasks, such as creating videos, infographics, and other resources, are also relevant to convey content in the current cybercultural context.

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Women's participation in graduate programs in Applied Social Sciences in Brazil

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Abstract

Objective: Even though women's presence in the academic milieu is currently more frequent, their delayed entry into this sphere may restrict their presence in Brazilian graduate programs. Hence, this study's objective is to analyze the participation of women in graduate programs in Applied Social Sciences from 2010 to 2019.

Method: Data were collected from the Catalog of Dissertations and Theses of the Coordination for the Improvement of Higher Education Personnel (Capes) concerning the production of dissertations and theses between 2010 and 2019 in the field of Applied Social Sciences. A total of 98,116 publications were found: 81,454 theses and 16,662 dissertations, which were cataloged according to gender. The letter M was assigned for men's productions, and W was assigned for women's productions. The results show that 48.66% concerned women's publications, while men authored 51.34%.

Results: The results indicate that women's participation in graduate programs increased over the years, especially in Master's programs; 83.39% of productions concerned Master's theses and 16.61% dissertations. The programs in which female presence was stronger in the period were public and business administration, accounting sciences, and tourism, which together account for 28.75% of the publications, followed by Law with 23.71%.

Contributions: Women's presence in graduate programs in Applied Social Sciences has increased in recent years. However, the presence of women in doctoral programs is inferior to that of men. Therefore, this study is relevant to encourage discussions about the presence of women in the Brazilian academy and the factors that restrict their presence in the academic milieu.

Keywords: Female gender; Graduate Program; Science policy.

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1. Introduction

Education is considered a right intended to promote personal development, preparing individuals to be citizens and professionally qualified. Hence, equal educational conditions should be provided to all (Constituição, 1988). Accordingly, the Universal Declaration of Human Rights (1948) states that education and teaching should disseminate awareness of human rights and freedom.

Studying gender roles is essential to understand how society is organized and the roles each gender plays. However, certain characteristics and patterns, such as the notion that men are supposed to be the financial providers while women are responsible for domestic chores, delayed the presence of women outside the home, such as in the academic milieu and job market (Lopes, 2015). Hence, gender inequality and preconceptions in the educational and professional spheres are consequences of socially constructed and established conceptions of the female gender (Melo, 2017).

In this sense, stereotypes impacted women's academic and professional lives and are perpetuated to this day. Hence, certain feminine characteristics such as empathy and sensitivity are used to justify barriers preventing them from entering or advancing in the job market. Additionally, the need to reconcile household chores, child care and professional responsibilities aggravate the process (Rodrigues *et al.*, 2015; Lara *et al.*, 2017; Carmo *et al.*, 2016).

Despite such difficulties, even though the participation of women in the academic milieu has been delayed, its increase in undergraduate and graduate programs in recent decades is promising. However, even though women are more educated than men, their presence in the job market, such as positions with a formal job contract and in the research field, is less frequent than their male counterparts (Cruz, 2019).

Although women's presence in universities is more significant than men's, women are less visible and less appreciated as professionals (Guedes, 2008). For example, Mendonça and La Rocque (2016) argue that when women are portrayed as scientists in cinematographic art, they usually play supporting roles rather than prominent roles. A similar situation is observed by Cardoso (2016), in which characteristics associated with the female gender, such as kindness and graciousness, are used to convey the idea that women are less capable than men in a working context.

Based on the previous discussion, this study focuses on the following research question: **What is women's participation in graduate programs (Master's and doctoral programs) in Applied Social Sciences in Brazil?** Hence, the objective is to analyze women's participation in graduate programs in the field of Applied Social Sciences in Brazil between 2010 and 2019.

Therefore, we expand the discussion about gender and inequality in graduate programs and the job market. In addition, the importance of verifying the participation of women in master's and doctoral programs is highlighted because this is the path for women to become researchers and professors. Thus, we emphasize the relevance of discussing and encouraging debates within universities regarding gender issues.

This study is divided into four sections in addition to the introduction to better present information. The first section presents the theoretical framework, addressing gender inequality and women's participation in science and graduate programs. The second section discusses the methodological procedures, and the third section presents an analysis of the results. Finally, the fourth section presents the final considerations.

2. Theoretical Framework

2.1 Gender Inequality

Lara *et al.* (2017) argue that gender roles are constructed and transmitted from a very early age. Thus, family members teach girls to perform domestic chores, while boys are taught to be independent by working outside the home. Leite & Pátaro (2013) also identified these differences in social roles that are attributed and taught to genders. Her research shows that girls are encouraged to perform tasks around the home, and boys are encouraged to study and train themselves through courses.

Differences between genders regarding opportunities are found in the school environment and permeate the path to college and job relationships (Teixeira & Freitas, 2015; Souza, 2016; Menezes, 2019; Leite & Pátaro, 2013). From this perspective, the lack of incentives and stereotypes concerning the female gender strongly interfere with social organization and opportunities provided to women as professionals (Rodrigues *et al.*, 2015; Andrade & Monteiro, 2018).

The historical barriers women encounter in society have led to many struggles for the change process to occur. Among these obstacles, the author highlights the prohibition of women from studying and getting involved with science because they were not supposed to have the necessary skills, such as insight and courage, which men would be endowed with (Melo, 2017; Lopes, 2015). In this sense, female and male behaviors started to be differentiated by society, in which some characteristics attributed to men, such as courage and intelligence, were considered to be superior to those attributed to women, such as fragility and patience (Leite & Pátaro, 2013; Lopes, 2015).

Fernandez (2019) reports that the conception of female inferiority is based on gender discrimination within society, especially in the job market. The author argues that certain professions are culturally perceived as more suitable for women while others are not. Thus, being a nanny, nurse, or teacher is aligned with being a woman because it involves activities previously performed at home, such as housekeeping and childcare.

Despite the effects arising from these limitations, the feminist movement contributed to making certain advances and improvements regarding gender relations possible in social settings, directly benefiting women (Melo, 2017). Among the advancements resulting from this struggle to obtain better conditions, women have greater participation in universities and the job market to support their families. Thus, they must reconcile their responsibilities at home and outside the home (Lara *et al.*, 2017).

Considering this context, women who manage to access the job market encounter obstacles in reconciling their professional and personal lives and, to a large extent, abdicate more outstanding professional achievements more frequently than men (Tavares & Parente, 2015; Amaral *et al.*, 2017; Lopes, 2015; Menezes, 2019). Amaral *et al.* (2017) sought to identify the mishaps imposed on students in a computer field course, mainly composed of men. The authors found that the abilities of female students are undervalued, especially their knowledge and, in professional terms, even in the university.

Furthermore, as discussed before, women's professional performance was influenced by the household chores traditionally attributed to them. For this reason, women are more frequently present in health and education courses, such as nursing, teaching, and social work. On the other hand, men are more frequently present in fields that distance themselves from these responsibilities, such as engineering and mathematics. Finally, note that the differences between genders are only related to biological factors rather than their abilities or competencies (Lopes, 2015).

According to Lima (2013), women find difficulties in professions such as military careers, executive positions, technology sectors, and science. As a result, they find few jobs and professional growth opportunities, while their technical-scientific knowledge is underestimated (Teixeira & Freitas, 2015; Carvalho & Rabay, 2015; Andrade & Monteiro, 2018). Therefore, women's path includes more mishaps than men's, especially in research (Tavares & Parente, 2015).

2.2 Women's Scientific Production

The participation of women in academia has increased since the 1980s and 1990s due to the institutionalization of higher education. Thus, in recent decades, women have been more frequently present in Brazilian universities, and there is a growing trend of women occupying research positions (Leta, 2003). Hence, the expectation for the coming years is that the proportion of female participation in science will match that of their peers. However, despite this advance, cultural barriers remain regarding the professional growth of women in the research field (Ohayon *et al.*, 2006). According to Tavares and Parente (2015), several studies use the term "glass ceiling" to refer to an invisible and impenetrable barrier between women and leadership positions.

Therefore, despite the expectation of female growth in the academic environment, women still face obstacles to getting a stable position in the academic milieu, especially in fields where women are not traditionally represented, such as exact sciences (Andrade & Monteiro, 2018; Ohayon *et al.*, 2006; Lima, 2013). Regarding this aspect, Silva and Prestes (2018) discuss the segmentation of fields of knowledge according to gender, considering that women are less represented in exact sciences due to a lack of openness and collective encouragement; hence, their scientific production in this field is less frequent as well.

On the other hand, women's presence is perceived in fields traditionally described as feminine, such as pedagogy and nursing, considering these professions are linked to teaching and care, aspects considered to be feminine (Andrade & Monteiro, 2018; Teixeira & Freitas, 2015; Ohayon *et al.*, 2006; Lima, 2013). From this perspective, Grossi *et al.* (2016) note that due to the majority of women in these programs, the level of scientific production is also higher in these fields than in exact sciences; the most significant number of dissertations is defended in the biological, health, and human sciences fields.

Gindre and Budó (2018) show the disparate participation of women in events in the field of criminal sciences compared to men. According to the authors, men present most papers at events such as annals, congresses, and seminars on criminal matters. When considering the coordination of events, the authors also point out that only 20 of the 79 individuals who became coordinators in the five years of research were women, showing that women are less represented in leading positions.

In addition to the production of knowledge, women remain a minority in positions of command and those of greater recognition. This fact is reflected in the academic milieu, where women disperse throughout their scientific careers (Tavares & Parente, 2015). Furthermore, Ohayon *et al.* (2006) argue that women find it difficult to ascend professionally in academic and scientific institutions because men traditionally dominate these environments, reinforcing the stereotype that men are more apt to assume leading positions.

According to Leta (2003), the different modalities of scholarships distributed by the National Council for Scientific and Technological Development (CNPq) are divided into scientific initiation programs, Master's and Ph.D. programs, recent Ph.D. graduates, and research productivity following this hierarchical order. In this sense, the proportion of female scholarship holders has expanded in the different types of scholarships awarded. However, as the hierarchical level of scholarships increases, the proportion of women decreases. This fact is explained by the low representativeness of women in prominent and recognized academic positions, which delays their participation in this milieu. Furthermore, the author shows that a portion of women goes through the initial modalities but do not continue in scientific activities as the recognition given based on grants is mainly restricted to men.

In this sense, Teixeira and Freitas (2015) argue that little attention is given to gender issues in academic environments, culminating in a few propositions to change this context. The authors mentioned above considered that these issues in the educational field affect the division of labor and assignments within educational institutions, disseminating a distinct organizational culture according to gender. Such factors favor men over women. In this sense, women's access to scientific productions is hindered and discouraged by implicit and structural practices that permeate society.

Nganga et al. (2021) argue that the tension in the trajectory of female researchers between academic and personal identities leads to the development of skills, such as time management, organization, and task prioritization, in an attempt to balance the numerous responsibilities they have. Furthermore, the authors believe that as career levels progress, the pressure of university tasks increases and the adjustments needed to adapt to new positions harm women, considering that the pace of graduate programs was not designed for women.

2.3 Graduate Programs

According to the Brazilian Institute of Geography and Statistics (IBGE, 2018), the participation of women in undergraduate programs is slightly higher than that of men. The literature confirms this statement, showing the greater participation of women in undergraduate programs (Ferri *et al.*, 2018; Silva & Prestes, 2018). However, even though women are more numerous than men at this level of training, their participation in graduate programs, such as Master's and doctoral programs, is less frequent than their male counterparts. In this sense, women leave academic studies after graduating; hence, they are less represented than men in graduate programs (Teixeira & Freitas, 2015; Ribeiro *et al.*, 2017; Tavares & Parente, 2015; Leta, 2003).

Thus, the participation of women in research is restricted since the beginning of academic life, either due to a lack of incentive to research, due to discrimination and devaluation of them as researchers or because of the low expectations of following a career as a scientist (Teixeira & Freitas, 2015; Silva & Prestes, 2018; Ribeiro *et al.*, 2017; Tavares & Parente, 2015; Menezes, 2019). Furthermore, according to Silva and Prestes (2018), the participation of women becomes restricted as the degree levels increase. In this sense, the presence of women in academia is less frequent, while their presence is more significant in Master's programs than in Ph.D. programs. Accordingly, Leta (2003) highlighted the female disadvantage in research and degree levels.

In this sense, Araújo (2016) discusses gender disparities in 2015 in Brazilian graduate programs in the field of philosophy. According to the author, approximately 28.4% of 3,652 students were women, while 71.6% were men. The same situation is found in the teaching career; only 20.76% of 785 professors were women. Furthermore, the author notes that women are 2.5% less likely to reach the top of the academic career in graduate schools, as full professors than men.

Ferreira and Casagrande (2016) analyzed women's female participation in research groups in the graduate programs in science and technology (S&T) at the Universidade Tecnológica Federal do Paraná (UTFPR). Their findings show that the faculty mainly comprised men, 72.33%. Additionally, in 2015, one of the programs, the one in energy systems (PPGSE), had no woman among its faculty members.

Furthermore, Ohayon et al. (2006) compared the participation of women in scientific research. Even though the statistics indicate an increase of women in research positions, women are clearly in a smaller number among awarded researchers with CNPq productivity grants, researchers leading research groups, and researchers nominated for development agency committees or appointed to leadership positions. The same occurs in France, where women are also a minority among full professors, on scientific committees, and in technology. Therefore, it is difficult for women to ascend professionally in Brazil and France, especially in the research field.

3. Methodological Procedures

This is a descriptive study, as it is intended to present an analysis of the characteristics found regarding gender in Brazilian graduate studies. As for the procedures, it is classified as a documentary study because it uses data that have yet not received treatment. Finally, its approach is characterized as a quantitative study (Raupp & Beuren, 2006).

3.1 Population and Sample

Information from Applied Social Sciences concerning the period between 2010 and 2019 was collected from the Capes Catalog of Dissertations and Theses. In addition, a spreadsheet was extracted from Capes' website that contained data concerning several productions conducted in graduate programs. However, according to this study's objective, only academic and professional dissertations and theses from the field of Applied Social Sciences and its respective programs, as determined by Capes, were considered.

In this segment, 98,116 productions were found: 81,454 (83.02%) concerned theses and 16,662 (16.98%) dissertations. Table 1 shows the total distribution of dissertations and theses according to regions. Note that the Southeast presents the largest share, with 53.79% of dissertations and theses, while the North presents the lowest, with 2.35% of dissertations and theses.

Table 1
Total production of dissertations and theses according to region.

Region	Total	%
Southeast	52,785	53.79%
South	21,688	22.10%
Northeast	14,826	15.11%
Midwest	6,520	6.65%
North	2,297	2.35%
Total	98,116	100.0%

Source: study's data (2022)

As for publications over time, Table 2 presents the total number of publications in the period. Note that 2010 presents the smallest proportion of publications, with 6.89%. The highest participation concerns 2019, with 13.27% of the data analyzed. Hence, the data presented in Table 2 shows that total production increased from 6.89% to 13.27% in the period.

Table 2
Total production of dissertations and theses over the years

Year	Total	%
2010	6,762	6.89%
2011	7,313	7.45%
2012	8,140	8.30%
2013	8,570	8.74%
2014	9,394	9.57%
2015	9,887	10.08%
2016	10,936	11.15%
2017	11,575	11.80%
2018	12,515	12.75%
2019	13,024	13.27%
Total	98,116	100.0%

Source: study's data (2022)

As for the distribution of productions according to the fields, ten fields of knowledge were identified. Table 3 shows the field of Applied Social Sciences and the number of dissertations and theses.

Table 3

Number of dissertations and theses according to the field of knowledge

Field of Knowledge	Total	%
Public and Business Administration, Accountancy, and Tourism	22,810	23.25%
Public Administration, Accountancy, and Tourism	7,338	7.48%
Architecture and Urbanism	8,541	8.70%
Applied Social Sciences I	2,906	2.96%
Communication and Information	8,867	9.04%
Law	26,724	27.24%
Economics	10,643	10.85%
Demography and city/regional planning	5,120	5.22%
Social Work	5,167	5.26%
Total	98,116	100%

Source: study's data (2022)

Table 3 shows that Law presents the highest production, with 27.24% of the total, followed by public and business administration, accounting sciences, and tourism, which together present 23.25% of publications. Regarding the lowest participation, applied social sciences I appears with 2.96%, while Demography and city/regional planning and social work present 5.22% and 5.26%, respectively.

3.2 Treatment of Data

All the dissertations and theses published in the graduate programs in Applied Social Sciences were identified and selected based on the data obtained. Furthermore, a ten-year time frame was considered to achieve this study's objective, based on the need to analyze the participation of women in graduate programs in the last decade. The productions were initially cataloged by genre, identifying the researchers with a letter M if a man or W if a woman.

This identification was performed manually; in some cases, gender was confirmed by searching the authors. Therefore, after this classification, the dissertations and theses were categorized to determine the total participation in graduate programs according to the modality of production. This process enabled analyzing how the production progressed over the years according to regions and fields of knowledge.

Thus, data were mapped using the following indicators: female audience, dissertations and theses, women's participation according to fields of knowledge, dissertations and theses according to region, dissertations and theses produced by women, and production per year. Hence, data were analyzed to meet this study's objective.

4. Analysis and Discussion of Results

4.1 Women's Participation in Graduate Programs

To analyze the difference between women's and men's publications, the authors were divided according to gender to identify which audience produces the highest number of dissertations and theses in the field of Applied Social Sciences in Brazilian universities. As a result, women's publications totaled 48.66% of the total, representing 47,744 productions, and men were responsible for 50,372 productions, or 51.34%.

Regarding this aspect, women were the minority, by a difference of 2.68%, which confirms what Seefeld et al. (2017) state about the tendency of women to increase their presence in graduate schools. Hence, the results show this trend of women's greater participation in graduate programs. Table 4 shows the total participation of women in the development of dissertations and theses and their respective percentages.

Table 4

Percentage of women's production

Women's production in graduate programs	Total	%
Dissertations	7,932	16.61%
Theses	39,812	83.39%
Total	47,744	100%

Source: study's data (2022)

Regarding the total number of women's productions in the period, Table 4 shows that women's participation was more significant in the number of theses, with 83.39% than in the number of dissertations, with 16.61%. Hence, the percentages in each program show that women are more likely to become masters than doctors. Such a fact is also reported in the literature, as some authors note that women leave the programs as the level of academic degrees increases (Teixeira & Freitas, 2015; Silva & Prestes, 2018). Thus, despite the more significant number of women participating in Master's degrees, their presence at the doctoral level is still rare.

4.2 Women's Participation According to Field of Knowledge

Here the participation of women is analyzed according to the field of knowledge. According to CAPES (2022), evaluation areas facilitate analysis and development activities. Thus, the criterion adopted is affinity. Two levels are considered; the first level is that of colleges and is divided into three, involving life sciences, humanities, and exact, technological, and multidisciplinary sciences. The second level concerns major fields and is divided into nine: Agricultural Sciences; Biological Sciences; Health Sciences; Human Sciences; Applied Social Sciences; Linguistics, Letters, and Arts; Exact and Earth Sciences; Engineering; Multidisciplinary Sciences.

In this study, we considered the College of Humanities and the large field of Applied Social Sciences, determined by Capes. In this sense, Table 5 shows that the fields of Public and Business Administration, Accounting Sciences, and Tourism together present the highest production, with 28.75%, followed by Law, with 23.71%. Even though the Law program presents a lower percentage, its participation is the largest, considering the field with the highest percentage is segmented into three different programs.

Table 5

Women's Participation in the fields of knowledge

Field of Knowledge	Total	%
Public and Business Administration, Accountancy, and Tourism	13,729	28.75%
Architecture, Urbanism, and Design	5,290	11.08%
Communication and Information	7,013	14.69%
Law	11,322	23.71%
Economics	3,445	7.21%
Demography and city and regional planning	2,845	5.97%
Social Work	4,100	8.59%
Total	47,744	100.0%

Source: study's data (2022)

Until 2015, CAPES used the nomenclature Social Sciences I to refer to programs that integrate communication and information. However, only the nomenclature Communication and Information was used to refer to these programs after this period. Hence, the division determined by CAPES and currently used to refer to the seven fields is adopted in this study. At the same time, the two groups mentioned before were added together, totaling 14.69% of the data. In this sense, the fields with the lowest participation of women were Demography and city/regional planning, with 5.97%, and Economics, with 7.21%.

4.3 Women's Production According to Region

Here, we analyze the percentage of women's participation in dissertations and theses according to region. Hence, below we present an analysis of the percentage of women's participation in dissertations and theses according to the region.

Table 6

Number of dissertations per region

Region	Women's production	Total production	% Women's production	% Production per region
Midwest	425	964	44.5%	5.7%
Northeast	948	1,845	51.9%	11.1%
North	33	73	41.8%	0.4%
Southeast	4,905	10,485	46.7%	63.0%
South	1,621	3,295	49.2%	19.8%
Total	7,932	16,662	47.60%	100.0%

Source: study's data (2022)

Regarding the number of dissertations per region, Table 6 shows that the productions are not homogeneously distributed. The Southeast presents the highest number of productions, with 63%, more than half of the total, and markedly ahead of the remaining regions. The South follows with 19.8%, the Northeast with 11.1%, the Midwest with 5.7%, and the North with only 0.4% of the total.

Therefore, according to Table 6, only in the Northeast did women produce more dissertations than men, with 51.9%. The South follows with 49.2%, and the Southeast presents the highest number of dissertations authored by women, with 46.7%. The participation of women in the Midwest and North was 44.5% and 41.8%, respectively.

As for women's participation in theses, Table 7 shows that the region with the highest number of productions in the period is the Southeast, with 51.93%. Conversely, the North presents the lowest participation, with 2.73%, followed by the Midwest, with 6.82%. Note that the literature shows that the North invests less in graduate programs, which is in line with this study's findings, showing that the number of productions in this region is lower than in the remaining regions (Tavares & Parente, 2015).

Still, some authors argue that there is a greater concentration of graduate publications in certain regions (Nascimento & Nunes, 2014; Tavares & Parente, 2015; Souza et al., 2017). This study's results corroborate the literature, considering that both dissertations and theses are more concentrated in the Southeast than in the North.

Table 7

Number of theses per region

Region	Women's production	Total production	% Women's production	% Production per region
Midwest	2,621	5,556	47.17%	6.82%
Northeast	6,835	12,981	52.65%	15.94%
North	1,245	2,224	55.98%	2.73%
Southeast	19,516	42,300	46.14%	51.93%
South	9,595	18,393	52.17%	22.58%
Total	39,812	81,454	48.88%	100.0%

Source: study's data (2022).

Regarding women's participation in the production of theses according to region, Table 7 shows that women authored more theses than men in the Northeast, North, and South, with 52.65%, 55.98%, and 52.17%, respectively. On the other hand, the Midwest had 47.17%, and the Southeast had 46.14% of women's participation. Even though the North presents the lowest number of publications, with 2.73%, women produced 55.98% of the theses in the region. On the other hand, the Southeast, which presents the highest production among all regions, with 51.93%, has the lowest percentage of theses published by women, with 46.14%.

These results corroborate previous studies, such as Silva and Prestes (2018), regarding the greater participation of women in Master's programs than in Ph.D. programs. In addition, note that women led the publication of theses in three Brazilian regions, accounting for more than half of what was produced. However, regarding the number of dissertations, only the Northeast presents 51.9% of publications authored by women. Thus, even though women are more frequently present in Master's programs, their presence in doctoral programs is less frequent.

4.4 Progression of Women's Participation According to Year

In this section, we present how academic productions progressed over the years, along with women's participation in the publication of dissertations and theses.

Table 8

Women's participation in the publication of dissertations over the years

Year	Women's production	Total production	% Women's production
2010	430	944	45.55%
2011	438	980	44.69%
2012	577	1,274	45.29%
2013	622	1,334	46.63%
2014	719	1,541	46.66%
2015	780	1,625	48.00%
2016	929	2,002	46.40%
2017	1,077	2,189	49.20%
2018	1,146	2,311	49.59%
2019	1,214	2,462	49.31%
Total	7,932	16,662	47.61%

Source: study's data (2022).

The percentages in Table 8 were calculated considering the differences between genders concerning the total number of productions. Thus, Table 8 shows that the percentage of women's participation varies slightly in the period. This analysis shows a gradual increase in the period. However, a drop is observed between 2010 and 2011 and 2015 and 2016 in the percentage of women in the programs. The year in which women presented the highest participation was 2018 and the year with the lowest participation was 2011, with 44.69%.

As for the number of theses authored by women, a larger variation is found regarding theses than dissertations (Table 9). 2019 was the only year in which the number of women who attended a Master's program was higher than men, with 50.75%. A variation between 46.87% and 49.21% is found in the remaining years. Overall, publications increased by 3.88% from 2010 to 2019.

Table 9

Women's Participation in theses over the years

Year	Women's production	Total production	% women's production
2010	2,727	5,818	46.87%
2011	3,021	6,333	47.70%
2012	3,334	6,866	48.56%
2013	3,537	7,236	48.88%
2014	3,834	7,853	48.82%
2015	4,065	8,262	49.20%
2016	4,362	8,934	48.82%
2017	4,551	9,386	48.49%
2018	5,021	10,204	49.21%
2019	5,360	10,562	50.75%
Total	39,812	81,454	88%

Source: study's data (2022)

Even though the number of female Masters is higher than that of female doctors, the percentage of participation in both master's and Ph.D. programs is close to 50%. The same finding is shown by Ohayon *et al.* (2006), i.e., men's and women's publications tend to equalize. However, this study's results show an increase of approximately 4% in the period for both dissertations and theses. In this sense, it is clear that the mishaps need to be overcome to ensure gender equity within the academy and job market.

5. Conclusion

Understanding women's context in society and the obstacles they face to reach leadership positions is essential to encourage debates on gender inequality. Many factors influence the barriers impeding advancements in the university environment, such as the difficulty of women reconciling the second shift and having their knowledge underestimated.

This study's objective was to analyze women's participation between 2010 and 2019 in graduate programs in Applied Social Sciences. According to this study, women's participation increased in graduate programs. Women authored 47,744 publications in the period analyzed, i.e., 48.66% of the total dissertations and theses. Thus, regarding the total number of women's publications, there were more theses, with 83.39%, than dissertations, with 16.61%.

Regarding the fields of Applied Social Sciences with the highest production authored by women, Public and Business Administration, Accounting Sciences, and Tourism stand out. Together, these represent 28.75% of the total, followed by Law, with 23.71%. As for the fields with the lowest participation of women in graduate programs, Demography and City/Regional Planning amount to 5.97% and Economics to 7.21%.

As for the number of dissertations according to region, only in the Northeast did women surpass men, with 51.9%, while the remaining regions had less than 50% participation. About Master's degrees, women's participation in the period was higher than men's in the Northeast, North, and South. Note that the region with the highest number of dissertations and theses is the Southeast, with 63% and 51.4%, respectively, although the analysis shows that women are less represented than men in this region.

The progression of productions over the period varied over the years analyzed, especially regarding Master's degrees. Only in 2019 did women surpass men in the number of theses, with 50.75%. Overall, the production increased by 3.88% from 2010 to 2019. Regarding the dissertations, a gradual increase was found over the years, with the highest participation of women in 2018, with 49.59%.

The results lead to the conclusion that there is a tendency for women to be more represented in graduate programs in Applied Social Sciences in Brazil. Their presence is not the same nationwide though, which impacts job opportunities, especially for faculty positions at universities.

As a research limitation, we note that, due to the significant ethnic variability in Brazil, there was difficulty in identifying the gender of foreign and even Brazilian names. Thus, gender was confirmed through an online consultation. Nevertheless, such a limitation does not invalidate this study's findings, which contribute to the discussion regarding the presence of women in Brazilian academia and the factors that influence their presence in graduate programs.

Thus, future studies could investigate the factors that explain the differences found here. Hence, aspects such as encouragement and openness to genders in the various fields, faculty composition, and potential influences on careers in research, including the culture of university environments, can be addressed in the future.

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Brazilian Market Reaction to Auditor's Opinions

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Abstract

Objective: This study's objective was to analyze the Brazilian market's reaction to independent auditors' opinions disclosed in explanatory notes.

Method: This empirical and quantitative study addressed the relationship between independent auditors' opinions and stock returns, considering contexts in which there is a Big Four firm, and before and after periods of economic crisis. The effects of other control variables, such as GDP, dollar and SELIC, volatility, size, equity, net income, and share liquidity, were also considered in the multiple regression analysis. The estimation of the Multiple regression was performed with Stata 17. Quarterly data were collected from the explanatory notes and Economatica from 2010 to 2019.

Results and contributions: The results indicate that the Brazilian market reacts negatively when a non-Big Four independent auditor issues a qualified opinion in times with no economic crisis. These results benefit companies because they show empirical evidence that when an external audit firm identifies that a company's financial statements do not comply with accounting standards and manifests such a finding by issuing a qualified opinion, the market may have an adverse reaction, depending on the quality of the audit firm and the Brazilian economic context. Additionally, this study contributes to the Brazilian and international literature as it analyzes the market reaction to external auditors' qualified opinions, depending on the audit firm's quality and economic scenario.

Keywords: auditor's qualified opinions; accounting information relevance; Brazilian stock market.

1. Introduction

Monitoring the activities of companies through internal and external audits is a topic widely discussed in the Brazilian and international literature (Brandão et al., 2021; Parreira et al., 2021; Sena et al., 2020; Hartmann & Martinez, 2020; Alzeban, 2021; Almarayeh et al., 2020; Carvalho et al., 2019; Pakdaman, 2018; Muslih & Ami, 2018; Hoti et al., 2012; Al-Attar, 2017; Kipkosgei, 2010; Takinakis et al., 2010; Batista, 2009; Almeida & Almeida, 2009; Necula, 2014; Hendriksen & Van Breda, 1999; Chen et al., 1999). In this study, the focus is on the external audit.

In Brazil, Brandão et al. (2021) address the issuance of “red flags” and the disclosure of deficient internal controls in IBrX100 companies, which may contribute to the role of internal audit in reducing risks and information asymmetry between stakeholders. When studying earnings management and external auditing, Parreira et al. (2021) identified that audit firm rotation does not affect total accruals, positively impacting stakeholders. Sena et al. (2020) concluded that Big Four external audits do not impact the level of earnings management due to operational (non-accounting) decisions. Almeida and Almeida (2009) show that external audits carried out by a Big Four firm reflect greater information quality given reduced earnings management. However, Hartmann and Martinez (2020) have already identified that companies audited by Big Four firms are more aggressive at the tax level than those audited by non-Big Four firms.

At an international level, Alzeban (2021) found that when the remuneration of executive directors of internal audit firms is based on results, it affects the quality of financial statements, reducing audit objectivity. In addition, Almarayeh et al. (2020) identified that audit impacts earnings management differently in emerging countries compared to Anglo-Saxon and Western European countries.

Hendriksen and Van Breda (1999) state that companies whose statements receive an unqualified opinion from an external audit firm may signal confidence in the stock market. Likewise, a company with its financial reports qualified by an external auditor is expected to give a signal different from the signal given by a company with an unqualified opinion (Spense, 1973; Santana et al., 2014).

Regarding the signal sent to the stock market by companies with unqualified and qualified opinions, studies addressing the same subject were conducted in several countries, such as the United States (Necula, 2014), China (Chen et al., 1999), Iran (Pakdaman, 2018), Indonesia (Muslih & Ami, 2018), Croatia and Slovenia (Hoti et al., 2012), Jordan (Al-Attar, 2017), Kenya (Kipkosgei, 2010) and Greece (Takinakis et al., 2010); though, no consensus was found regarding their findings.

Chen et al. (1999), Hoti et al. (2012), Al-Attar (2017), and Pakdaman (2018) show that the opinions of external auditors are significantly related to the return on assets. Kipkosgei (2010) identified a negative and weak relationship, while Takinakis et al. (2010), Necula (2014), and Muslih and Ami (2018) did not identify a significant relationship between the two due to the low informative power of external auditors' qualified opinions.

In Brazil, Batista (2009) conducted a study relating the stock market's reaction to external auditors' opinions. However, Batista (2009) estimated it without using other explanatory or control variables to assess the effect on asset returns. Carvalho et al. (2019) did not identify a relationship between changing external auditors' opinions (in general terms) and the companies' variation in market value. However, a sample of only 231 companies was addressed without specifically testing the auditors' qualified opinions.

International studies have already tested the effect of several variables on the return on assets and measured the quality of accounting information in external audits, testing the efficiency of qualified opinions in the market. However, the Brazilian stock market still lacks studies of this nature, comparing companies audited with qualified and unqualified opinions in contexts with Big Four and non-Big Four firms and considering contexts with and without an economic crisis.

Considering this controversy in the literature and a lack of studies addressing this topic in Brazil with the controls included in this study, the objective is to analyze the reaction of the Brazilian stock market toward independent auditors' qualified and unqualified opinions disclosed in explanatory notes. Therefore, this study's relevance lies in measuring the effects on stock returns under the influence of independent auditors' unqualified and qualified opinions and other explanatory variables and important controls identified in the literature to gauge the reaction of the Brazilian stock market.

Article 177, § 3rd, of Law No. 6,404, of December 15th, 1976 (Brazil, 1976), determines that publicly-held companies are obliged to carry out annual and quarterly independent audits. Hence, all companies listed on B3 from 2010 to 2019 were identified and classified according to independent auditors' reports: qualified opinion and others (unqualified, adverse, and disclaimer of opinion), under NBC TA 700 (CFC, 2016a) and NBC TA 705 (CFC, 2016b).

A one-year period is too long to verify the impact of qualified opinions on stock returns, as several factors may arise and influence stock returns (Ball & Brown, 1968). Hence, quarterly secondary data were collected in the Economatica database using a historical series. A multiple regression model estimated by the Ordinary Least Squares (OLS) method with errors robust to heteroscedasticity, including time- and sector-fixed effects control, was performed to test this study's hypotheses. The dependent variable was the abnormal return on the day companies' statements were disclosed.

The results suggest that when a company discloses its statements with a qualified opinion issued by a non-Big Four external audit firm in times of no economic crisis, its abnormal returns are lower than those of companies with unqualified opinions. However, the abnormal return of companies with qualified opinions issued by a Big Four (whether in a period of crisis or not) or which had a qualified opinion issued in a period of economic crisis (regardless of whether a Big Four issued it or not) are not statistically different from those with unqualified opinions.

The results contribute to the companies' managers, showing the relevance of financial statements complying with accounting rules. The stock market may react negatively when a company does not comply with rules and is identified by an external audit firm. This study also contributes to the Brazilian and international literature by providing empirical evidence that the Brazilian market responds to qualified opinions issued by external audit companies. Additionally, the stock market's reaction differs depending on the audit quality and the Brazilian economic context.

2. Theoretical Framework

2.1 Accounting Information and Return on Shares

Ball and Brown (1968), Beaver (1968), and Ohlson (1995) stand out among the studies addressing the relevance of accounting information in the stock market.

Ball and Brown (1968) studied the effect of disclosing accounting information on stock returns. They also state that the market is efficient and impartial; that is, data disclosed through financial statements are helpful for price formation in securities markets, as previous earnings reflect future earnings trends, and the market reacts rapidly by minimizing additional abnormal gains for long periods. Faced with the controversial reactions of investors in the stock market, Beaver (1968) sought to assess their perceptions of earnings disclosure (results) and the consequent movement in price and volume of operations in common shares carried out in the weeks immediately following the disclosure of accounting information. Although Ball and Brown (1968) indicate that accounting information is just one of several variables taken into account when making a decision, interim reports, rather than only annual disclosures, show that this is important information. Ball and Brown (1968) and Beaver (1968) state that accounting information has predictive power.

In the same line of reasoning, Ohlson (1995) analyzed American data, while Rezende (2005) analyzed Brazilian data. The conclusion is that accounting information is essential in forecasting and evaluating companies. Rezende (2005) verified that information on profit and net worth was statistically relevant as predictive power, specifically for the telecommunications sector.

The accounting information in Net Income, Comprehensive Income, and Operating Cash Flow are statistically relevant in the Brazilian capital market, at the 1% level, to explain share value (Batista et al., 2017). As for accounting legislation, the CFC (2011) points out that accounting information is only considered relevant if it can influence decision-making; hence, it must have the predictive capacity and confirmatory value, including as a means of feedback, according to Technical Pronouncement CPC 00 R1 (CPC, 2011). Additionally, according to Technical Pronouncement CPC 00 R1 (CPC, 2011), besides relevance, the quality of accounting information presents the following characteristics: materiality, faithful representation, comparability, verifiability, timeliness, and comprehensibility. Hence, there is a need to test the validity and coherence of such reports, verified and applied by a specific area of accounting, which is auditing (CFC, 1983).

Ohlson (1995) concluded that accounting is a means to evaluate companies. However, company valuations should be adjusted through "other" relevant facts that influence market value (Ohlson, 1995). For example, Ball and Brown (1968) and Ohlson (1995) highlighted that the distribution of dividends is based on the book value, reducing the value of the company in the future; however, without impacting the earnings of the current year (Ball & Brown, 1968; Ohlson, 1995). Considering the previous discussion, external audit opinions may be another relevant fact to inform the stakeholders as information is disclosed. Even the critical analysis of an external audit can change investors' perceptions of disclosed information.

Other aspects, such as control variables, can be considered in an empirical analysis. In addition to the factors already discussed by Ohlson (1995), several studies show the impact of macroeconomic variables (GDP, Selic, and dollar) to explain accounting variations in debt indicators, in companies' valuation, and consequently, return on assets, in the propensity to undertake risk, and in predicting profits and issuing shares on the stock exchange (Guerra & Ornelas, 2014; Oliveira & Frascaroli, 2014; Moura & Coelho, 2016; Paredes & Oliveira, 2017; Mota et al., 2017). The companies' size was also relevant for pricing risky assets in the international (Fama & French, 2015) and Brazilian markets (Moreira et al., 2021). Yokoyama et al. (2015) and Miralles-Quiros et al. (2017) show that the information generated by large companies has less information power; however, it has greater relevance among smaller companies, including better returns when presented in an investment portfolio.

2.2 Audit, Qualifications, Crisis, and Return on Shares

Camargo et al. (2014), Ribeiro (2015), Costa (2017), and Porte et al. (2018) stand out in the literature, as they identified an increase in the volume of publications both by internal and external audits. The topics most frequently found include audit reports, change of auditors (audit firm rotation), councils/committees, quality, and audit procedures. In this sense, Ribeiro (2015) highlights some of the main topics related to auditing: corporate governance, international accounting standards, internal control, fraud, risk assessment, capital markets, earnings management, social responsibility, company valuation, value creation, and performance, besides strategy, audit committee, external audit, internal audit, internal control, media coverage in accounting, research, and companies' socioeconomic data (Porte et al., 2018).

In Brazil, auditors manifest their opinions regarding accounting reports through an independent audit report. According to NBC TA 700 (CFC, 2016a), such a report can be classified into two types: unmodified opinion (unqualified opinion), when the external auditor identifies all provisions outlined in the general and specific accounting legislation, as applicable. External auditors issue a modified opinion when they identify distortions in accounting information or insufficient audit evidence to make conclusions (CFC, 2016a).

A report with a modified opinion is classified as a qualified opinion when relevant distortion is evidenced or audit evidence in a non-generalized manner was not identified; adverse opinion when accounting information is not fairly and accurately presented; and disclaimer of opinion when the auditor is unable to find audit evidence, and consequently, fails to give an opinion, as recommended by NBC TA 705 (CFC, 2016b).

To better visualize and interpret the information above in the Brazilian context, Figure 1 clarifies and summarizes the circumstances in which modified opinion reports must be issued under the terms of NBC TA 705 (CFC, 2016b).

Nature of the matter leading to a modified opinion	Auditor's judgment on the widespread dissemination of potential effects on the financial statements	
	Relevant but not generalized	Relevant and generalized
Accounting statements present relevant misstatements	Qualified opinion	Adverse opinion
Inability to obtain appropriate and sufficient audit evidence	Qualified opinion	Disclaimer of opinion

Figure 1. Independent auditor's opinion

Source: NBC TA 705 (CFC, 2016b).

Issuing an unqualified report can send a positive signal to the stock market; however, a modified opinion report may send a negative signal (Spence, 1973; Santana et al., 2014; Hendriksen & Van Breda, 1999). In other words, when an auditor issues a qualified opinion, s/he emphasizes that the information disclosed is not the most recommended. Thus, the qualified opinion may represent a negative sign to stakeholders. Thus, the signaling theory applied to the quality and relevance of the information generated by independent audit accounting reports was tested in this study (Spence, 1973; Santana et al., 2014; Hendriksen & Van Breda, 1999).

Hendriksen and Van Breda (1999) agree that disclosing unqualified information may send a confidence signal to the stock market. Regarding the signal sent to the stock market by companies with and without an external auditor's qualified opinion, studies of the same nature were conducted in several countries: the United States (Necula, 2014), China (Chen et al., 1999), Iran (Pakdaman, 2018), Indonesia (Muslih & Ami, 2018), Croatia and Slovenia (Hoti et al., 2012), Jordan (Al-Attar, 2017), Kenya (Kipkosgei, 2010) and Greece (Takinakis et al., 2010), however, no consensus was found regarding the results.

Chen et al. (1999), Hoti et al. (2012), Al-Attar (2017), and Pakdaman (2018) show that the opinions of external auditors are significantly related to the return on assets. Kipkosgei (2010) identified a negative and weak relationship, while Takinakis et al. (2010), Necula (2014), and Muslih and Ami (2018) did not identify a significant relationship between audit opinions and return due to the low informative power of external auditors' opinions. Despite such inconclusive results, we expect that when a company receives a qualified opinion from an external auditor regarding its financial statements, the signal sent to the market is negative (Spence, 1973; Santana et al., 2014).

From this perspective, note that the disclosure of audit reports can mitigate the information asymmetry between internal users (managers) and external users (shareholders and stakeholders), considering that an external user would hardly access privileged information about the validity of the reports generated by accounting, except through audits (Arkelof, 1970).

In this case, an audit serves as a tool to reduce conflicts of interest and information asymmetry. In addition, by disclosing independent audit reports, even if mandatory, companies reveal the level of their care, zeal, commitment, and adherence to legal and accounting standards to the market (Spence, 1973; Hendriksen & Van Breda, 1999; Santana et al., 2014; CFC, 2016a), such as the normative scenario provided for in NBC TA 700 in Brazil.

Research is needed to assess the degree of relevance and impact of accounting information (qualified opinion) on the stock market. This study contributes by testing the signal emitted by independent auditors' reports on decision-making and, consequently, on the companies' shares and returns, considering the theoretical framework proposed by Ohlson (1995). Hence, the first hypothesis is proposed considering the studies showing that audit is a factor that reduces earnings management and information asymmetry by providing better information quality and influencing decision-making. Additionally, an auditor's qualified opinion reveals that a given company is not fully complying with standards and accounting principles; thus, it is signaling to the users of information that it is unreliable.

Hypothesis 1: a qualified opinion negatively impacts the return on shares.

Note that the literature shows that audits performed by Big Four firms (i.e., Deloitte, EY, KPMG, and PWC) show greater information quality by decreasing earnings management (Almeida & Almeida, 2009). Thus, a Big Four audit may reflect the greater quality of accounting information, and, therefore, an increase in its degree of relevance reflected in users' decisions is expected. Thus, we present the second research hypothesis:

Hypothesis 2: The qualified opinion of an external audit has a more negative impact on the return on shares when performed by a Big Four than by other audit firms.

Costa et al. (2012) identified that economic crises affect how analysts evaluate equity and net income. In other words, economic crises affect accounting information and should therefore be considered in decision-making (Costa et al., 2012). Furthermore, net income, equity, and crisis are relevant when estimating and predicting future returns (Rezende, 2005; Costa et al., 2012; Batista et al., 2017). Thus, considering the negative (pessimistic) reaction of the stock market in periods of economic crisis, it is believed that the effects of a qualified opinion combined with such periods would intensify the effect on stock returns, which leads to the third hypothesis:

Hypothesis 3: A qualified opinion has a more negative impact on stock returns in years of economic crisis than in other economic contexts.

Additionally, following the same line of reasoning, it is worth testing more hypotheses associating Big Four audits with times of economic crisis, which is translated in the fourth research hypothesis.

Hypothesis 4: a qualified opinion has a more negative impact on stock returns when performed by a Big Four in years of economic crisis.

Moreira et al. (2021) tested it in several macroeconomic periods. They identified that size and crisis are related and affect the pricing of assets, showing that investors are more sensitive to risk during such times. We observed that risk is also a relevant factor in investors' decision-making (Silva Junior & Machado, 2020) and, therefore, should be considered in the empirical estimation model. Silva Junior and Machado (2020) note that liquidity and volatility are risk indicators and assume Sharpe's CAPM Beta (1964) with the same characteristic.

Thus, the return on shares is empirically tested, taking into account the effect of auditors' qualified opinions: Big Four qualified opinions, times of crisis, external auditors' qualified opinions in a time of crisis, and a Big Four qualified opinion in a time of period. Additionally, controls representing economic aspects and the companies' risk and financial indicators were also considered in the estimation.

3. Methodology

3.1 Study's Sample and Data

The initial sample included all the companies listed on B3 from 2010 to 2019, totaling 15,000 company/year/quarterly observations. In addition, information concerning the external audit company and external auditors' qualified opinions were obtained from the CVM database, and accounting information was collected from the Economatica database.

Table 1 presents the exclusion criteria and the number of observations removed at each step. First, we removed observations containing negative equity, which caused the loss of 1,169 observations. After removing the observations with missing information regarding auditors' opinions and abnormal returns, 1,927 observations remained. Finally, we removed observations with missing information about the control variables. Thus, the final sample comprised 1,368 company/year/quarterly observations from 2011 to 2019. Of the 1,368 resulting observations, 3.07% presented qualified opinions; 83.04% had their statements audited by a Big Four firm, and 33.63% of the observations referred to periods of crisis. All continuous variables were Winsorized at 1% level in both tails.

Table 1
Sampling

	No. of observations removed	No. of resulting observations
Brazilian companies listed on B3 from 2010 to 2019 on a quarterly basis		15,000
Observations with negative PL removed	1,169	13,831
Observations missing information about qualified opinions and Abnormal returns removed	11,904	1,927
Observations missing information on the control variables removed	559	1,368
TOTAL		1,368

Source: Developed by the authors.

3.2 Econometric Model

A multiple linear regression model, similar to the one applied by Beyer et al. (2010), presented in equation (1), was used to test this study's hypotheses. The model was estimated using Ordinary Least Squares (OLS) with errors robust to heteroscedasticity, controlling for time and sector-fixed effects.

$$RA_{it} = \beta_0 + \beta_1 Ressalva_{it} + \beta_2 Ressalva_{it} * Big4_{it} + \beta_3 Ressalva_{it} * Crise_t + \beta_4 Ressalva_{it} * Big4_{it} * Crise_t + \sum \beta_k Controles_k + \varepsilon_{it} \quad (1)$$

RA_{it} represents the abnormal return of company i on the day its financial statements were disclosed in quarter t . $Ressalva_{it}$ is a dummy variable that assumes 1 if company i had a qualified opinion issued by an external auditor in quarter t , and 0 otherwise. $Big4_{it}$ is a dummy variable that assumes 1 if company i was audited by a Big Four in quarter t , and 0 otherwise. $Crise_t$ is a dummy variable that assumes 1 if quarter t occurred in 2014, 2015, or 2016, and 0 otherwise.

Hypothesis H1 is tested in coefficient β_1 . This coefficient is expected to be negative, indicating that companies that received a qualified opinion from an external auditor regarding their financial statements present a lower abnormal return than companies that did not receive a qualified opinion.

Hypothesis H2 states that the negative association between a qualified opinion and the abnormal return of a company on the day of disclosure is even higher than when the external audit firm is a Big Four. This hypothesis is tested through the β_2 coefficient. According to H2, β_2 is expected to be negative. Hypothesis H3 states that the negative association between a qualified opinion and the company's abnormal return on the day of disclosure is even greater in times of economic crisis. This hypothesis is tested through coefficient β_3 . According to H3, β_3 is expected to be negative.

Finally, hypothesis H4 is tested using the β_4 coefficient, which is expected to be negative, indicating that the negative association between a qualified opinion issued by a Big Four firm and the abnormal return of companies on the day their accounting statements are disclosed is even greater in times of economic crisis.

3.3 Variable

A one-year period is too long to verify the reaction of the Brazilian market toward an auditor's qualified opinion, as several factors may arise and influence stock returns (Ball & Brown, 1968). Therefore, we used the event study method to measure the return on shares when the phenomenon under study occurs (Mackinley, 1997). Furthermore, Campbell et al. (1997) determine that the event study is used to assess the impact on the value of a firm as a result of changes in regulation, mergers and acquisitions, and earnings announcements, as well as to assess the effect of macroeconomic variables. Additionally, it must be performed following pre-determined steps: 1) Definition of the event; 2) Selection criteria; 3) Abnormal and normal returns; 4) Estimation procedure; 5) Test procedures; and 6) Empirical results (Campbell et al., 1997).

Beyer (2010) studied the reaction of the stock market considering abnormal returns based on the disclosure of voluntary financial reports, disclosure of financial reports required by regulations, and disclosure of analysts' reports, and identified that voluntary disclosures explain most of the abnormal returns. However, the remaining disclosures, including mandatory ones (i.e., audit reports), are also relevant and statistically significant (Beyer, 2010).

According to article 177, § 3rd of Law No. 6,404/1976, audit reports must be published annually together with consolidated financial statements, further stating the need to comply with standards issued by CVM (Brasil, 1976). However, under article 29th of CVM Instruction No. 480/2009, there is a requirement for the quarterly publication of this same information, within a maximum of 45 days after the end of the period, except for the last quarter of the year, considering that the consolidated information is presented within the expected period of annual publication (CVM, 2009).

The description of the periodicity of disclosure of financial statements and the deadlines are presented in Figure 2. The publication concerning the first quarter of a given fiscal year, which encompasses the months of January, February, and March, must be published by May 15th (CVM, 2009). As for the fourth quarter, which ends in December, the maximum period for annual publication is 90 days from the end of the year, that is, March 31st of the following year. Considering the long period between annual publications and several variables explaining abnormal returns, we opted for analyzing quarterly information instead of annual information.

QUARTER	PERIOD	PUBLICATION DEADLINE
1 st quarter	January 1 st to March 31 st	Up to May 15 th
2 nd quarter	January 1 st to June 30 th	Up to August 14 th
3 rd quarter	January 1 st to September 30 th	Up to November 14 th
4 th quarter	January 1 st to December 31 st	Up to March 31 st of the following year

Figure 2. Legal deadline to publish audit reports

Source: developed by the authors.

Thus, the dates of the events were the dates when the companies' financial statements were effectively disclosed quarterly. Therefore, the difference between the return of company i on the date of event t and the market return (defined here as Ibovespa) was considered to calculate the abnormal return (Campbell et al., 1997), as shown in Equation (2):

$$AR_{it} = R_{it} - Ret_{Ibov_{it}} \quad (2)$$

Where AR_{it} represents the abnormal return of company i on the date the accounting statements of company i were disclosed, containing information for quarter t . R_{it} is the daily return of company i on the date when the financial statements of company i were disclosed containing information for quarter t . $Ret_{Ibov_{it}}$ refers to the Ibovespa return on the date when the financial statements of company i were disclosed containing information for quarter t .

To obtain a robust result, control variables with financial accounting indicators were included, besides macroeconomic variables that may also influence the companies' abnormal return. Figure 3 presents the description of the regression model variables exposed in Equation (1) and the respective theoretical foundation that explains its relationship with the topic addressed here.

VARIABLE	VARIABLE DESCRIPTION	SOURCE
Explained variable		
RA_{it}	Abnormal return $RA_{it} = R_{it} - Ret_Ibov_{it}$	Ball and Brown (1968); Beaver (1968); Ohlson (1995)
Explanatory variables		
$Ressalva_{it}$	Dummy variable indicating when the financial statements of company i in quarter t present an external auditor's qualified opinion.	NBC TA 705 (CFC, 2016b)
$Big4_{it}$	Dummy variable indicating when a Big Four firm audited the financial statements of company i in quarter t .	Almeida and Almeida (2009); Chen et al. (1999), Hoti et al. (2012), Al-Attar (2017) and Pakdaman (2018).
$Crise_t$	Dummy variable indicating when the quarter t is part of a crises period. The years of crisis considered for estimation were 2014, 2015, and 2016.	Costa et al. (2012); Rezende (2005); Batista et al. (2017) and Moreira et al. (2021).
Explanatory control variables		
$\Delta Dolar$	US Dollar quarterly exchange variation	Guerra and Ornelas (2014); Oliveira and Frascaroli (2014); Moura and Coelho, (2016); Paredes and Oliveira (2017); Mota et al. (2017)
$\Delta Selic$	Selic rate quarterly variation	Guerra and Ornelas (2014); Oliveira and Frascaroli (2014); Moura and Coelho, (2016); Paredes and Oliveira (2017); Mota et al. (2017)
ΔPIB	Quarterly GDP variation.	Guerra and Ornelas (2014); Oliveira and Frascaroli (2014); Moura and Coelho, (2016); Paredes and Oliveira (2017); Mota et al. (2017)
PL	Equity Value per share $PL = \frac{PL}{n^{\circ} \text{ de ações em circulação}}$	Ball and Brown (1968); Beaver (1968); Ohlson (1995); Gonçalves et al. (2014)
LL	Value of Net Income per share $LL = \frac{LL}{n^{\circ} \text{ de ações em circulação}}$	Ball and Brown (1968); Beaver (1968); Ohlson (1995); Gonçalves et al. (2014)
$Liquidez_{i,t}$	Market liquidity (risk measure)	Fama and French (2015); Moreira et al. (2021); Yokoyama et al. (2015) and Miralles-Quiros et al. (2017)
$Vol_{i,t}$	Security volatility (risk measure)	Fama and French (2015); Moreira et al. (2021); Yokoyama et al. (2015) and Miralles-Quiros et al. (2017)
$Tam_{i,t}$	Company size represented by the natural logarithm of Asset	Brasil (2007); Leone and Leone (2012); Yokoyama et al. (2015) Miralles-Quiros et al. (2017)

Figure 3. Description of empirical model's variables

Source: developed by the authors.

4. Analysis of Results

4.1 Descriptive Statistics

Table 2 presents the descriptive statistics of the variables in the regression model presented in Equation (1), used to test this study's hypotheses. In addition, the number of observations, minimum, first quartile, mean, median, standard deviation, third quartile, and maximum for the continuous variables were presented, besides the number of observations, minimum, mean, and maximum concerning the dummy variables.

According to the mean of the dummy variables *Ressalva*, *Big4*, and *Crisis*, of the 1,368 observations, 3.07% presented an external audit's qualified opinion, a Big Four audited 83.04%, and 33.63% of the quarters included a period of economic crisis.

The mean abnormal return was negative, -0.02%, indicating that, on average, companies have a return below the market return on the day their financial statements are disclosed. Furthermore, this value is well below the median abnormal return of 0.0037%, indicating that even after winsorization, extreme values are still distorting the mean abnormal return downwards. The mean of the remaining variables, except for *PL*, is not very far from the median, suggesting no extreme values are biasing the mean.

Table 2

Descriptive Statistics

Variable	N	Min	Q1	Mean	Median	SD	Q3	Max
RA	1,368	-0.0265	-0.0048	-0.0002	0.000037	0.0086	0.0043	0.0263
Ressalva	1,368	0	-	0.0307	-	-	-	1
Big4	1,368	0	-	0.8304	-	-	-	1
Crise	1,368	0	-	0.3363	-	-	-	1
ΔDolar	1,368	-0.0668	-0.0452	0.0035	-0.0121	0.0748	-0.0061	0.1876
ΔSelic	1,368	-0.2272	-0.0414	-0.0182	-0.0195	0.0632	0.0000	0.1132
ΔPIB	1,368	-0.0514	0.0029	0.0099	0.0164	0.0278	0.0272	0.0520
PL	1,368	0.0777	4.7111	15.8248	8.9865	23.3780	17.6409	182.80
LL	1,368	-8.0357	0.0020	0.2794	0.2017	1.3002	0.5148	5.6595
Liquidez	1,368	0.1726	0.6693	1.2612	0.9720	1.0417	1.4559	6.3643
Vol	1,368	0.0867	0.1773	0.2493	0.2550	0.0878	0.3129	0.4860
Tam	1,368	11.2826	14.0825	15.1754	15.1794	1.6360	16.1801	19.5702

Source: developed by the authors.

As for the economic environment, dollar and GDP variations were, on average, positive and close to zero, while the average Selic variation was negative and close to zero. Therefore, on average, these economic indicators varied slightly in the period.

Pearson's correlations between the model's continuous variables were analyzed. The correlations between the model's continuous independent variables were statistically significant at 10%, ranging between -0.3605 and 0.4418, showing no evidence of perfect collinearity in the model since none of the correlations was below -0.7 or higher than 0.7.

4.2 Analysis of the Regression Model Results

The model presented in Equation (1) was estimated using the Ordinary Least Squares (OLS) method with errors robust to heteroscedasticity, including the control for fixed effects of time and sector to test the hypotheses. The VIF of the estimated model without fixed effect controls was 2.45, ranging from 1.02 to 5.85, which does not present a multicollinearity problem to the model.

The model estimation results are presented in Table 3, Panel 3. Note that the coefficient of the *Ressalva* (β_1) variable was negative and statistically significant at 1%, indicating that companies with a qualified opinion in their financial statements have an abnormal return below that of companies with no qualified opinion. This finding suggests that the market penalizes companies when their financial statements present a qualified opinion. Hence, this finding confirms hypothesis H1.

The coefficient of the interaction variable *Ressalva*Big4* (β_2) was positive and statistically significant at 5%, which, according to hypothesis H2, was not expected. The expectation was that the company presenting a qualified opinion issued by a Big Four firm would face an even more negative market reaction, i.e., among the companies with qualified opinions, those whose qualified opinion had been issued by a Big Four, would have an abnormal return lower than the companies with qualified opinions issued by other external auditing companies, implying a negative β_2 coefficient.

Table 3

Results of the estimation of the Econometric Model presented in Equation (1)

PANEL A: Model Estimation by OLS with Robust errors		
	RA	
	Coefficient	Statistics t
Ressalva	-0.0055	(-2.91)***
Ressalva*Big4	0.0065	(2.38)**
Ressalva*Crise	0.0051	(1.76)*
Ressalva*Big4*Crise	0.0002	(0.04)
Δ Dolar	0.1297	(2.22)**
Δ Selic	0.0059	(0.40)
Δ PIB	0.1168	(1.68)*
PL	2.64E-05	(2.18)**
LL	6.49E-04	(2.78)***
Liquidez	3.30E-05	(0.14)
Vol	-0.0070	(-1.99)**
Tam	-2.30E-04	(-1.14)
Constante	0.0007839	(0.18)
Efeito Fixo de Tempo	Yes	
Efeito Fixo de Setor	Yes	
N	1.368	
R2	7.43%	
PANEL B: Test for the Sum of Coefficients		
	Sum	F Statistics
$\beta_1+\beta_2$	0.0010	(0.6264)
$\beta_1+\beta_3$	-0.0004	(0.8667)

Note: *, **, *** statistical significance at 10%, 5%, and 1%, respectively.

Source: developed by the authors.

Table 3, Panel B presents the test for the sum of coefficients β_1 and β_2 , which was not statistically significant. Therefore, there is no statistically significant difference between the abnormal return of companies with qualified opinions issued by a Big Four firm and companies without qualified opinions concerning their financial statements.

The coefficient of the interaction variable *Ressalva*Crise* (β_3) was positive and statistically significant at 10%, which, according to hypothesis H3, was not expected. According to H3, the difference between the abnormal return of companies whose statements received a qualified opinion and the abnormal return of companies without a qualified opinion was expected to be even more significant in times of crisis than in other periods, which would imply a negative β_3 coefficient.

Table 3, Panel B presents the test for the sum of coefficients β_1 and β_3 which was not statistically significant, suggesting that companies with qualified opinions issued in times of crisis do not have abnormal returns significantly different from those without qualified opinions.

The coefficient of the interaction variable *Ressalva*Big4*Crise* (β_4) was not statistically significant. This finding was not expected by hypothesis H4. According to H4, in times of crises, an accounting statement with a qualified opinion issued by a Big Four external audit was expected to have an even more negative association with the abnormal return of companies, leading to a negative β_4 . Hence, companies with a qualified opinion issued by a Big Four firm do not have abnormal returns significantly different from those that do not; it does not change during periods of economic crisis.

Regarding the control variables, the coefficients of variables $\Delta Dolar$, ΔPIB , PL , LL , and Vol were statistically significant. According to the sign of the estimated coefficients, all these variables positively affect the abnormal return of companies on the day their financial statements are disclosed.

Therefore, when an external audit firm other than a Big Four issues a qualified opinion in periods with no economic crisis, a company's returns are lower than those of companies without a qualified opinion. Additionally, the abnormal return of companies with qualified opinions issued by a Big Four (whether in a crisis or not) or had a qualified opinion issued in a period of economic crisis (regardless of whether a Big Four issued it or not) are not statistically different from those without qualified opinions.

Therefore, this study's findings indicate that the market reacts to auditors' qualified opinions in certain contexts; hence, we consider that an auditor's opinion is relevant in decision-making (Chen et al., 1999; Batista, 2009; Hoti et al., 2012; Al-attar, 2017; Pakdaman, 2018).

5. Conclusion

This study's objective was to analyze the reactions of the Brazilian stock market to the independent auditors' qualified opinions published in the explanatory notes. The relationship between independent auditors' qualified opinions and stock returns was verified considering the contexts in which a Big Four issues an opinion, compared to a non-Big Four's opinion, and before and after an economic crisis. Additionally, the effects of control variables were considered in the regression analysis, such as GDP, dollar and Selic, volatility, size, equity, net income, and share liquidity.

The results obtained in the hypotheses test were estimated using the Ordinary Least Squares (OLS) method with errors robust to heteroscedasticity, controlling for fixed effects of time and sector.

The estimation results were that the coefficient of the variable *Ressalva* was negative and statistically significant at 1%. This finding indicates that companies with qualified opinions in their financial statements have an abnormal return below that of companies without qualified opinions. Thus, the results suggest that the market penalizes companies whose financial statements receive qualified opinions, confirming hypothesis H1, which is aligned with Spense (1973) and Santana et al. (2014).

However, the coefficient of the interaction variable *Ressalva*Big4* was positive and statistically significant at 5%, which was not expected by hypothesis H2, i.e., the results are not aligned with Almeida & Almeida (2009). A company presenting a qualified opinion issued by a Big Four was expected to face an even more negative reaction. In other words, among the companies with qualified opinions, those with an opinion issued by a Big Four were expected to have an abnormal return lower than those with a qualified opinion issued by a non-Big Four external audit firm, implying a negative coefficient.

The test for the sum of the and coefficients showed no statistical significance. Therefore, there is no statistically significant difference between the abnormal return of companies with qualified opinions issued by a Big Four and those without qualified opinions. The coefficient of the interaction variable *Ressalva*Crise* was positive, i.e., opposed the arguments based on the results reported by Costa et al. (2012) and Moreira et al. (2021). This finding was not expected by hypothesis H3. Additionally, the fact that the sum of the coefficients and was not statistically significant suggests that companies with qualified opinions issued in times of crisis do not have abnormal returns significantly different from companies without qualified opinions. Finally, the interaction variable *Ressalva*Big4*Crise* was not statistically significant. In other words, this result goes against hypothesis H4. According to H4, in periods of crisis, an accounting statement with a qualified opinion issued by a Big Four external audit firm was expected to present an even more negative relationship with the abnormal return, leading to a negative. Hence, companies with qualified opinions issued by a Big Four firm do not have abnormal returns significantly different from companies without qualified opinions, regardless of periods of economic crisis.

This study was restricted to assessing the effect of auditors' qualified opinions and the remaining variables listed before on the return on shares. Therefore, a limitation of this study concerns the number of observations of companies with qualified opinions. However, this is an aspect of the Brazilian context.

Dollar, Equity, Net Income, and Volatility were the significant control variables, which aligns with what is proposed in the literature.

In line with Almarayeh et al. (2020), recommendations are for future studies to verify whether the remuneration of executive directors of internal audit firms in the Brazilian market affects the quality of financial statements, and in a second stage, investigate the market reaction to such information. Additionally, future studies should verify the effect of other types of audit reports (unqualified opinion, disclaimer of opinion, and adverse opinion) on the volatility and cost of capital.

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Articles may be written in Portuguese, English, with at least 5,000 and maximum 9,000 words, including tables, figures, notes and references. A maximum of 5 (five) authors are allowed per article. All papers accepted will be translated and published in two languages: Portuguese and English.

Articles containing tables or figures, they [the tables and figures] should be in a format that allows them to be edited. In case some of these Figures or Tables have been imported from other programs such as Excel, Power Point etc., the source file must also be sent as Supplementary File.

Do not use expressions like *id.*, *ibid.*, *op. cit.*, *loc. cit.* and the like, or reference notes and footnotes. Notes at the end of the text are acceptable, but should be avoided.

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- An **abstract** written in the language of origin of the article (Portuguese or English) with at least 150 and at most 200 words, single space between lines, in four paragraphs containing the following elements, highlighted: **Objective, Method, Results and Contributions**. At the end of the abstract should be placed **three to five** keywords;

Objective: this study was aimed at investigating the relevance of accounting education and research for the growth of the Brazilian economy during the first decade of the 21st century.

Method: to collect the data, a structured questionnaire was used, elaborated based on the relevant literature. The questionnaire was tested and applied to a sample of Brazilian accountants and businessmen during 2017. In the analysis of these data, content analysis was applied and statistical tests were used to establish relations between the answers obtained.

Results: the main findings of this study indicate that the expansion of accounting education and research in Brazil was essential for the growth of the economy, according to the respondents' perception, despite the impression that accountants and businessmen need to make better use of the accounting information.

Contributions: from the academic viewpoint, the evidences from this research contribute to fill of an important existing gap in the Brazilian literature. What the market is concerned, they contribute by providing evidence that, despite its perceived relevance, its users need to make better use of the accounting information.

Key words: Education; Research; Accounting.

- The article itself, written in Portuguese or English, with at least 5,000 and at most 9,000 words, including tables, figures, notes and references.
- The pages of the articles should be properly numbered in the upper right corner, typed with Word for Windows, under the following conditions:
 - A4 paper (210 x 297 mm);
 - Times New Roman, size 12;
 - Spacing: single;
 - Paragraph input: 1.25;
 - Margins: 3cm top, 2cm bottom, 3cm left, 2cm right;
 - Tables and figures in Times New Roman, size 10;
 - Citations and references must comply with current standards of the APA (American Psychological Association).

3. Tables and Figures¹

Tables and figures should be used in articles whenever their information make text comprehension more efficient, without repeating information already described in the text.

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The table should usually show numeric or textual information organized in an orderly exposition of columns and rows. Any other statement should be characterized as textual figure.

The table should be displayed with its information visible and sufficient for their understanding and should be formatted as follows:

¹ Most of these guidelines were adapted from the Manual for Submissions of the *Revista de Administração Contemporânea – RAC*, available at www.anpad.org.br.

Table editor	Word for Windows 97 or superior. In case authors have drawn their tables in Microsoft Excel or in a similar program, please remake the tables using the feature in Word
Font	Times New Roman, size 10
Line spacing	Simple
Spacing before and after paragraphs	3 pt
Table colors	Use only black and white (grayscale)
Title	The table title must be brief, clear and explanatory. It should be placed above the table, in the top left corner, and on the next line, just below the word Table (with a capital initial), followed by the number that designates it. The tables are presented with Arabic numerals in sequence and within the text as a whole. Eg: Table 1, Table 2, Table 3, and so on
Citation of tables	When citing tables in the text, type only the number referring to the table, for example Table 1, Table 2, Table 3 and so on. (the word 'Table' should be presented with the first letter capitalized). Never write 'table below', 'table above' or 'table on page XX' because the page numbers of the article may change while formatting
Table notes	The font used in the notes of the table should be Times New Roman, size 10, single spaced. The notes should be described in the footnote of the table, and they serve to indicate the Source of the information of the table, and other information important to understanding the table

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The figure should show a flow chart, a chart, a photograph, a drawing or any other illustration or textual representation.

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Figure colors	Use only black and white (grayscale)
Format	Figures should be submitted in an editable format
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Captions	The caption is the explanation of the symbols used in the figure and must be placed within the limits of the figure
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