SOCIOECONOMIC DETERMINANTS OF ESSAY WRITING PERFORMANCE: A DESCRIPTIVE STUDY BASED ON MICRODATA FROM THE 2022 ENEM EXAM

DETERMINANTES SOCIOECONÔMICOS DO DESEMPENHO EM REDAÇÃO: UM ESTUDO DESCRITIVO A PARTIR DOS MICRODADOS DO ENEM 2022

DETERMINANTES SOCIOECONÓMICOS DEL DESEMPEÑO EN LA REDACCIÓN DE ENSAYOS: UN ESTUDIO DESCRIPTIVO BASADO EN MICRODATOS DEL EXAMEN ENEM DE 2022

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ABSTRACT

This study conducts a descriptive and interpretative statistical analysis of the 2022 ENEM microdata from a sociological perspective to investigate how structural disparities influence proficiency in the essay exam. Based on a sample of 3,517 participants, the research examines categorical variables such as family income, school type, and household technological resources. The results reveal profound educational stratification, where access to computers and the internet at home correlates with progressive and significant increases in mean and median scores. This highlights what authors such as Rubim, Mantovani, and Alavarse (2025) classify as the expressive impact of combining devices and connectivity on proficiency. The analysis of family income demonstrates that academic performance is strongly determined by socioeconomic background, showing a trend toward higher scores as income increases, which stabilizes only at higher income levels. Furthermore, the study discusses geoFigureical and school inequalities, pointing out the underrepresentation of rural students and the superiority of scores in private and federal public institutions compared to state and municipal networks, as corroborated by Correia and Pintos-Payeras (2025). Under the lens of Jessé Souza (2017), the text reflects on the roots of Brazilian backwardness and the perpetuation of inequalities in access to higher education. It concludes that ENEM has established itself as a fundamental tool for university access, becoming even more effective

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through the implementation of public policies for digital inclusion and the strengthening of basic education. Such actions are essential to increase equity in the examination and ensure that admission to higher education is an accessible reality for all students.

Keywords: Educational Inequalities. ENEM 2022. Essay. Microdata. Digital Inclusion.

RESUMO

Este estudo realiza uma análise estatística descritiva e interpretativa dos microdados do ENEM 2022, sob uma perspectiva sociológica, para investigar como as disparidades estruturais influenciam a proficiência na prova de redação. A partir de uma amostra de 3.517 inscritos, a pesquisa examina variáveis categóricas como renda familiar, tipo de escola e aporte tecnológico domiciliar. Os resultados revelam uma profunda estratificação educacional, onde o acesso a computadores e internet no domicílio correlaciona-se a aumentos progressivos e significativos nas notas médias e medianas, evidenciando o que autores como Rubim, Mantovani e Alavarse (2025) classificam como o impacto expressivo da combinação de dispositivos e conectividade na proficiência. A análise da renda familiar demonstra que o desempenho acadêmico é fortemente determinado pelo background socioeconômico, apresentando uma tendência de notas mais altas conforme a renda aumenta, estabilizando-se apenas em patamares superiores. Além disso, o trabalho discute as desigualdades geográficas e escolares, apontando a sub-representação de estudantes rurais e a superioridade das notas em instituições privadas e públicas federais em comparação às redes estaduais e municipais, conforme corroborado por Correia e Pintos-Payeras (2025). Sob a lente de Jessé Souza (2017), o texto reflete sobre as raízes do atraso brasileiro e a perpetuação de desigualdades no acesso ao ensino superior. Conclui-se que o ENEM se consolida como uma ferramenta fundamental de acesso à universidade, tornando-se ainda mais eficaz mediante a implementação de políticas públicas de inclusão digital e fortalecimento do ensino básico. Tais ações são essenciais para ampliar a equidade no certame e garantir que o ingresso ao ensino superior seja uma realidade acessível a todos os estudantes.

Palavras-chave: Desigualdades Educacionais. ENEM 2022. Redação. Microdados. Inclusão Digital.

RESUMEN

Este estudio realiza un análisis estadístico descriptivo e interpretativo de los microdatos del ENEM 2022, desde una perspectiva sociológica, con el fin de investigar cómo las disparidades estructurales influyen en la competencia en la prueba de redacción. A partir de una muestra de 3.517 inscritos, la investigación examina variables categóricas como ingreso familiar, tipo de escuela y acceso a tecnología en el hogar. Los resultados revelan una profunda estratificación educativa, en la que el acceso a computadoras e internet en el hogar se correlaciona con aumentos progresivos y significativos en las puntuaciones medias y medianas, evidenciando lo que autores como Rubim, Mantovani y Alavarse (2025) califican como el impacto expresivo de la combinación de dispositivos y conectividad en la competencia. El análisis del ingreso familiar demuestra que el desempeño académico está fuertemente determinado por el contexto socioeconómico, presentando una tendencia de mayores puntuaciones a medida que aumenta el ingreso, estabilizándose solo en niveles superiores. Además, el trabajo discute las desigualdades geográficas y escolares, señalando la subrepresentación de estudiantes rurales y el mejor desempeño de instituciones privadas y públicas federales en comparación con las redes estatales y municipales, como lo corroboran Correia y Pintos-Payeras (2025). Desde la perspectiva de Jessé Souza (2017),

el texto reflexiona sobre las raíces del atraso brasileño y la perpetuación de las desigualdades en el acceso a la educación superior. Se concluye que el ENEM se consolida como una herramienta fundamental de acceso a la universidad, volviéndose aún más eficaz con la implementación de políticas públicas de inclusión digital y el fortalecimiento de la educación básica. Estas acciones son esenciales para ampliar la equidad en el examen y garantizar que el acceso a la educación superior sea una realidad para todos los estudiantes.

Palabras clave: Desigualdades Educativas. ENEM 2022. Redacción. Microdatos. Inclusión Digital.

1 INTRODUCTION

The National High School Exam (ENEM) is a standardized test applied throughout Brazil since 1998. It was created with the objective of evaluating the performance of basic education graduates and from 2009 onwards it began to be used as a selection for access to universities, including changing its methodology (INEP, 2026).

Every year, the National Institute for Educational Studies and Research Anísio Teixeira (INEP) organizes and applies the exam, which is currently the main mechanism for access to public universities through the Unified Selection System (Sisu), which uses ENEM scores, as well as to access the University for All Program (ProUni) to attend higher education in private institutions. INEP also collects data from citizens who take the tests and makes available the database of data collected since 1998, the last being made available in relation to the year 2024.

Enem microdata are the lowest level of disaggregation of data collected through the exam (INEP, 2026). They meet the demand for specific information by making available the tests, templates, information about the items, the grades and the questionnaire answered by those enrolled in Enem. In addition to the grades of the areas evaluated and information about the test items, the microdata include the answers to the demoFigureic and socioeconomic questionnaire of those enrolled in ENEM.

Several researches and studies are carried out from the microdata made available by INEP with different objectives and perspectives of analysis of different variables. We highlight works carried out through the analysis of socioeconomic variables, mainly income and access to technology, which demonstrate the relevance of such variables for the performance of students in ENEM.

In this work, we started from the assumption of the existence of educational inequalities caused by various demoFigureic factors and socioeconomic differences, proposing as an objective to analyze categorical variables related to school (type and location), access to technology at home (computer and internet) and family income, relating them to the exam writing scores. The focus of the investigation lies in the analysis of categorical variables, type and location of the school, access to technology (computer and internet) and family income, and their direct correlation with the scores of the writing test.

It is worth mentioning that, although the universe of ENEM enrollees reaches the mark of millions of candidates annually, this article is based on a sample of 3,517 enrollees extracted from ENEM 2022 microdata. This delimitation is justified by the fact that this work is the result of an academic exercise proposed within the scope of the Master's Degree in Public Policy Evaluation, specifically in the discipline of Quantitative and Qualitative Methods

and Analysis II. Therefore, the findings presented here derive from this exercise of data treatment and analysis, serving as an empirical investigation that, although delimited, seeks to reflect real patterns of inequality observed in the official examination.

To support the interpretation of the data, the text is articulated with the contemporary literature on inequality and cultural capital. The contributions of Correia and Pintos-Payeras (2025) on the impact of family background, the research of Rubim, Mantovani and Alavarse (2025) on the digital divide and the sociological reflections of Jessé Souza (2017) on the structural roots of Brazilian inequality stand out.

The analysis is structured in four complementary statistical axes, organized into the following sections: Interpretation of frequency tables: outlining the sociodemoFigureic profile and technological gaps of the sample; Visual analysis by Figureic resources: using histograms and Box-Plots to visualize the distribution of the notes; Measures of central tendency: examining means, modes, and medians to identify patterns of proficiency between different groups; Dispersion measures: assessing the variability and consistency of academic performance as a function of school location.

2 DESCRIPTIVE AND INTERPRETATIVE ANALYSIS OF ENEM 2022 MICRODATA: INFLUENCE OF VARIABLES ON THE PERFORMANCE OF THE WRITING TEST

This chapter is dedicated to the empirical and descriptive investigation of the ENEM 2022 microdata, and as previously mentioned, based on a sample of 3,517 enrollees. The central objective of this section is to scrutinize the genesis of Brazilian educational inequalities, examining how categorical variables — specifically the type and location of the school unit, the technological contribution at home (access to computers and the internet) and the stratification of family income — exert influence on the proficiency of students, with a focus on the writing test.

To ensure methodological rigor and analytical clarity, the presentation of the results is structured in four complementary axes, namely: the exegesis of the frequency tables, which outline the sociodemoFigureic profile of the sample; visual analysis through Figureic resources and histograms; the examination of measures of central tendency and the evaluation of measures of dispersion.

This approach allows us to articulate the statistical findings processed in the Jamovi tool with the contemporary literature on family background and cultural capital, providing an in-depth discussion on the determinants of academic performance in the national scenario.

2.1 INTERPRETATION OF THE FREQUENCY TABLES

The interpretation of the attendance tables, generated through the Jamovi program, from the microdata of the 2022 National High School Exam, are important tools for quantitative analysis, since it allows us to identify how different groups are distributed in variables relevant to the exercise proposed here, whether they are the type of school and its location, use of computers, internet, income or type of school. Thus, through these tables, it is possible to understand the social composition of the participants and evidence patterns of inequality, making it possible to visualize asymmetries that often remain hidden in purely descriptive analyses or those centered on averages only.

Thus, the initial descriptive analysis allows us to draw a diagnosis of the structural disparities that permeate the public enrolled in the exam. It can be said that the data reveal a scenario of socioeconomic heterogeneity and significant technological gaps.

2.1.1 *Type of school and location of the school*

The number of people enrolled in ENEM 2022 reached the mark of 3,396,632 (three million, three hundred and ninety-six thousand, six hundred and thirty-two) people (INEP, 2022). In this work, we will use the sample of 3,517 people from the microdata released by INEP.

The behavior of the sample in the distribution by type of school (public and private) shows that most students attend **public schools** (31.8%), while only **7.8% study in private schools**. However, there are some limitations in its precision, as can be seen in Table 1, as there is a high rate of "no response" (60.4%). This high fraction (60.4%) of "did not answer" reduces the accuracy of the inferences, but does not cancel the trend of predominance of the public network. In any case, we choose not to deepen the analysis in relation to this variable in the following sections, and future studies are suggested to understand the high rate of non-respondents to this important information.

It is noteworthy that in an econometric study with microdata from ENEM 2023, Correia and Pintos-Payeras (2025) point out that students from state and municipal public schools perform lower than the general average and other components of the ENEM test when compared to the result of the averages of students from private schools, the exception is federal public schools, in which the average grades of all the components of the test were higher than those of private schools.

In terms of location, 96.9% of students are in urban areas, while only 3.1% are in rural areas. This disproportion reflects the centralization of vacancies in urban areas and indicates that students from rural areas face greater difficulties in commuting with problems related to

distance to school, and infrastructure with fewer educational resources in their area, lack of Internet access and low socioeconomic conditions. The fact that students from rural areas are not considered in the data is indicative that non-urban communities are underrepresented by the microdata made available by ENEM and that the challenges of these students are rarely addressed in educational research.

This asymmetry corroborates the literature that points to the severe challenges of infrastructure and connectivity in remote regions, factors that operate as barriers to entry into higher education.

Table 1

Table of attendances in relation to school type and location.

TP_ESCOLA Frequencies

TP_ESCOLA (Type of High School)	Counters	% of Total	Cumulative %
1 – Didn't answer	2124	60.4%	60.4%
2 – Public	1120	31.8%	92.2%
3 – Private	273	7.8%	100.0%

TP_LOCALIZACAO_ESC Frequencies

TP_LOCALIZACAO_ESC (School Location)	Counters	% of Total	Cumulative %
1 – Urban	985	96.9%	96.9%
2 – Rural	32	3.1%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

2.1.2 Computers

Data on question Q024 (existence of a computer at home) indicate that 41.1% of ENEM 2022 students do not have a computer at home; and 39.8% have only one. Only 19.2% have two or more, as divided in the answers presented in Table 2. However, the discrepancy observed is alarming, as access to the network carried out exclusively via mobile devices (cell phones) limits engagement in complex pedagogical activities and the development of robust digital skills. As Rubim *et al.* (2025), the combination of internet and computer is the factor that effectively enhances proficiency, while the isolated use of cell phones can act only as an entertainment tool, keeping the student at a competitive disadvantage.

Table 2

Table of frequencies in relation to the existence of a computer in the home

Frequencies of Q024

Q024 (Is there a computer at your residence?)	Counters	% of Total	Cumulative %
A – No	1444	41.1%	41.1%
B – Yes, a	1399	39.8%	80.8%
C – Yes, two	422	12.0%	92.8%
D – Yes, three	165	4.7%	97.5%
E – Yes, four or more	87	2.5%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Through these data, it is inferred that there is a high segregation in access to technology. Studies, as well as online work and participation in students' digital engagement, are significantly impacted by this gap, which can still create educational inequality. That's why it's crucial that all students have access to technology, at the very least.

2.1.3 Internet

Table vinculcated to Question Q025 shows that 92.1% of ENEM 2022 students have internet at home, while 7.9% do not; but, although the internet is a well-known technology, at the same time, many students do not have the necessary access at home to use digital resources in the educational environment. The lack of internet at home makes it difficult to study, access online platforms, and develop digital skills.

Therefore, even with most students connected, the data show the need for public policies and school strategies that prioritize connectivity for all. Ensuring minimum access to the internet is essential to reduce inequalities, promote digital inclusion, and provide conditions for all students to take full advantage of the learning opportunities of the twenty-first century.

Table 3

Table of frequencies in relation to internet access in the residence.

Frequencies of Q025

Q025 (Do you have internet access at your residence?)	Counters	% of Total	Cumulative %
A – No	277	7.9%	7.9%
B – Yes	3240	92.1%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Researchers from the University of São Paulo (USP) analyzed a sample of 1.5 million low-income students who participated in ENEM between 2013 and 2023, demonstrating in the results that **having only internet at home has a positive, but modest, effect on students' proficiency in the exam**; on the other hand, **the combination of computer and**

internet proved to be relevant between the years 2015 and 2023, an increase of more than 23.4 points is estimated for students with access to the internet and computer compared to those without access to both technologies (Rubim; Mantovani; Alavarse, 2025).

The technological inequality suggested by the frequencies in relation to access to computers and the internet in the home justifies more detailed analyses of the relationship between computer/internet ownership and performance.

2.1.4 *Income*

Table 4, referring to question Q006, presents the family income distribution of ENEM 2022 students, revealing a great socioeconomic diversity. It is observed that most of the participants are concentrated in the lower and middle income brackets, while only a small portion corresponds to the highest brackets.

The distribution of Q006 (income ranges) shows concentration in ranges **B** (up to 1 minimum wage) and **C** (from 1 to 1.5 minimum wage at the time), which together add up to 42.5% of the sample. The highest ranges (K to Q, which correspond to more than R$ 8,484.01 of per capita income) account for less than 10% of the cases.

Table 4

Table of frequencies in relation to family income with a central tendency in relation to the average ENEM score

Frequencies of Q006 with average trend scores for each income bracket

Q006 What is your family's monthly income? (Add your income to that of your family members.)	Counters	% of Total	Cumulative %	Average Essay Grade	Fashion of Essay Notes
A – No Income	182	5.2%	5.2%	531.65	0.00
B – Up to R$ 1,212.00	916	26.0%	31.2%	559.21	0.00
C – From R$ 1,212.01 to R$ 1,818.00.	581	16.5%	47.7%	598.14	600.00
D – From R$ 1,818.01 to R$ 2,424.00.	380	10.8%	58.5%	624.74	620.00
E – From R$ 2,424.01 to R$ 3,030.00.	308	8.8%	67.3%	619.35	0.00
F – From R$ 3,030.01 to R$ 3,636.00.	172	4.9%	72.2%	653.14	580.00
G – From R$ 3,636.01 to R$ 4,848.00.	Continues			668.07	640.00
H – From R$ 4,848.01 to R$ 6,060.00.				686.12	580.00A
I – From R$ 6,060.01 to R$ 7,272.00.	107	3.0%	87.0%	714.77	580.00
J – From R$ 7,272.01 to R$ 8,484.00.	62	1.8%	88.8%	743.55	920.00
K – From R$ 8,484.01 to	48	1.4%	90.1%	743.33	880.00

R$ 9,696.00.					
L – From R$ 9,696.01 to R$ 10,908.00.	64	1.8%	92.0%	735.94	900.00
M – From R$ 10,908.01 to R$ 12,120.00.	60	1.7%	93.7%	756.00	720.00
N – From R$ 12,120.01 to R$ 14,544.00.	47	1.3%	95.0%	792.34	880.00
O – From R$ 14,544.01 to R$ 18,180.00.	50	1.4%	96.4%	744.00	940.00
P – From R$ 18,180.01 to R$ 24,240.00.	55	1.6%	98.0%	774.18	820.00
Q – Above R$ 24,240.00.	71	2.0%	100.0%	763.94	800.00

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

This distribution highlights economic inequalities that can directly affect access to educational resources, such as books, computers, quality internet, preparatory courses, and extracurricular activities. Students from lower-income families may face additional difficulties in keeping up with learning and preparing for competitive exams, while those from higher-income families have more opportunities for support and resources.

Therefore, the data highlight the need for public policies and school strategies that promote educational equity, ensuring that all students, regardless of family income, have minimum conditions of access to tools, technology, and learning opportunities.

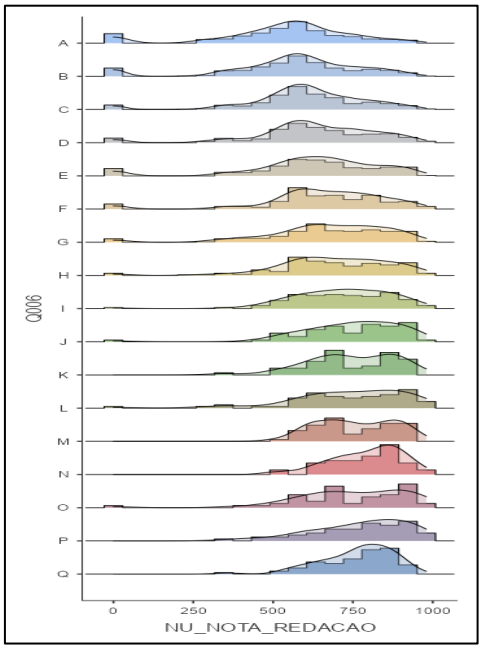
2.2 INTERPRETATION OF THE CHARTS

The attendance tables reflect the economic inequality in the country and point out that most of the candidates belong to low-income families. Recent econometric studies show that **family income, type of school, and parents' education** have significant effects on ENEM performance, especially in writing and mathematics grades (Correia and Pintos-Payeras, 2025).

Figure 1, with a histogram of the relationship between family income (Y axis - vertical) and the essay score (x-axis - horizontal) of the researched sample, contributes to visualize how the data regarding the essay scores are distributed in each category of the income variable (A to Q), which demonstrates a **progressive growth in relation to the peaks and concentration of scores as income increases, tending to stabilize and present a smaller variation from the "J" range (income from R$ 7,272.01 to R$ 8,484.00) to "Q" (above R$ 24,240.00).**

Figure 1

Histogram of the relationship between family income and essay grade.



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

When analyzing Figure 1 and table 4 together, a tendency to repeat higher scores can be perceived, with average scores above and repetition of scores (mode) above 700 from income range "I" and income range "J", respectively.

We can also see that there is a tendency for higher grades as income increases. For example, students in band "A" obtain an average of around **531.65 points**, while those in band "I" achieve an average of **714.77 points**, and group "Q" obtain an average of **763.94 points**. The medians follow this trend, suggesting that the increase in income is associated with better scores.

It is noteworthy, however, that from the "J" range, the essay scores do not maintain the positive variation that had been progressing from one range to the other, presenting random variations when analyzed only under the aspect of the income variable. For example, the highest repetition of the highest grades corresponds to 940 points and occurred in the "O" range, while the highest per capita income bracket "Q" obtained the highest repetition of grades at 800 points. In relation to the average of the essay scores, the range with the highest score was "N", which corresponded to 792.34 and the immediately highest income range, "O" had an average essay score of 744.00 points.

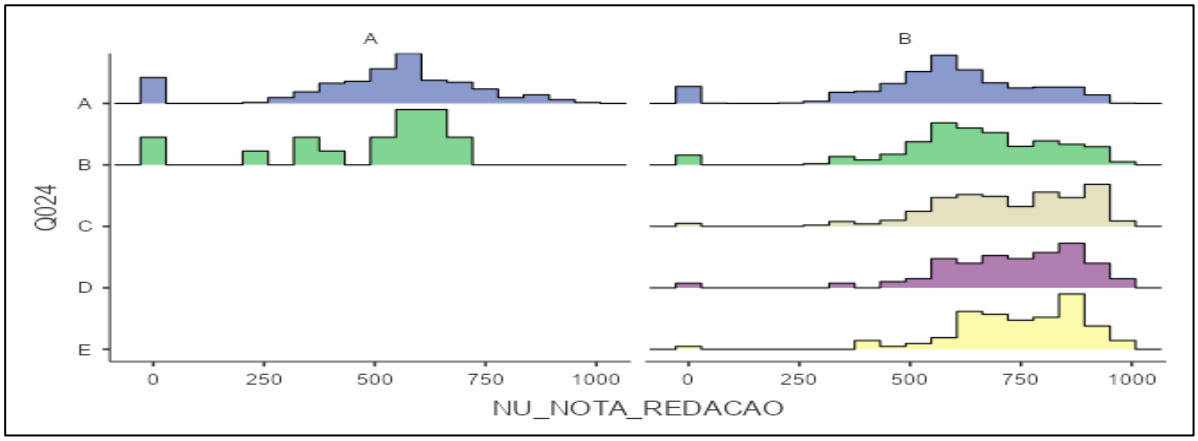
This analysis of the influence of income on ENEM performance and the observation that from a certain income range, does not influence by itself the continuity of the progression of higher grades, suggests that other variables besides income are important to elucidate and understand the results of students in the exam, such as parental education and access to

technology, as he studies by **Rubim; Mantovani; Alavarse (2025). In their research with ENEM microdata from 2015 to 2023, the authors demonstrate that the combination of computer and internet has a significant impact on proficiency, while the internet alone has a modest effect.**

In the histogram of Figure 2 below, which crosses the data of Q024 (existence of computers in the home) on the Y axis (vertical) with the essay score on the X axis (horizontal), separated by group of those who do not have access to the internet (A) and those who have access (B), which appear at the top of the Figure. We can observe an escalation in the scores of the group of those who have access to the internet and as the number of computers at home increases.

Figure 2

Histogram of the relationship between the groups of access and non-access to the internet and the existence of computers in the residence and the writing grade

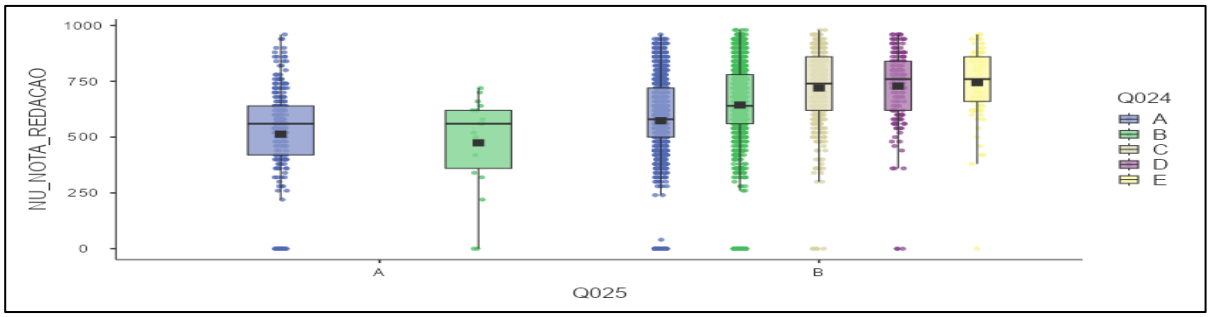


Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

It is noteworthy in relation to the group that does not have access to the internet, that the sample of this group only has two variables in relation to the existence of computers in the residence, either they do not have a computer ("A" x "A") or they have only one ("A" x "B"), with the average scores of those who have a computer, but do not have internet, being smaller than those who do not have a computer and do not have internet, being more evident in Figure 3 of the Box-Plot type, which is below:

Figure 3

Histogram of the relationship between the groups of access and non-access to the internet and the existence of computers in the residence and the essay grade.



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Figure 3 shows the highest medians and means (black line and square that appear within the colored rectangles, respectively) for those who have access to the internet and have a computer, making the best results of those who have internet and one more computer even more evident, compared to the results of the group that does not have internet.

2.3 INTERPRETATION OF MEASURES OF CENTRAL TENDENCY

The world is increasingly integrated into the technological environment, and education suffers, like any other dimension of human life, the influence of the increasing presence of technologies, whether in the classroom environment or outside it. Currently, the possibilities of using technological resources are wide and diversified and in the case of the National High School Exam, it can be stated, according to Ramos (2012, p. 5) that

Society is becoming more and more technological, including in education, which requires specialization of its sciences. In this context, a new format of education appears, in which chalk, blackboard and books are no longer the only instruments to teach that teachers have, thus needing to develop a set of didactic-pedagogical activities based on the technologies available in the classroom and those that students bring with them.

Given this requirement, access to technological resources must be part of the reality of our schools. In this regard, the microdata available by INEP allow us to understand, among other things, how access to the computer and internet by the public that takes the test interferes with its results. Thus, we chose to verify how or not owning the computer affects the exam's writing grade, as well as seeking to establish a relationship between having access to the internet at home and writing performance.

Before presenting the results, it should be clarified that the variables chosen to give substance to this analysis use the following denomination: code Q024, used for the following question: "Do you have a computer in your home?"; code Q025 for the following question:

"Do you have Internet access in your home?" and NU_NOTA_REDACAO for the Writing test score.

With this, the tables with the respective discussions and analysis follow, namely:

Table 5

Residence with computer and Grade of the writing test

Descriptive Statistics

	Q024	NU_NOTA_REDACAO
N	A	1444
	B	1399
	C	422
	D	165
	E	87
Average	A	563
	B	642
	C	720
	D	729
	E	744
95% CI mean lower limit	A	552
	B	631
	C	704
	D	703
	E	711
95% CI upper limit mean	A	574
	B	652
	C	736
	D	755
	E	777
Median	A	580
	B	640
	C	740
	D	760
	E	760
Fashion	A	0.00
	B	580
	C	920
	D	880
	E	880

Note. The CI of the mean assumes that the sample distribution of the mean follows a distribution t with N-1 degrees of freedom

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

The results obtained from the crossings between the variables "Q024" (computer use) and NU_NOTA_REDACAO allow a series of considerations. As for the essay score, the average undergoes a progressive growth as it advances from categories A (which has an average of 563) to E (with a score of 744), a fact that also occurs in the median. In fashion, there is an abrupt growth from category B (grade 580) to C (grade 920) and a slight drop to maintain the grade of 880 in categories D and E. There is also an advance in the medians, which go from 580 to 760 points.

With regard to fashion, there is a piece of data to be better analyzed, as the table indicates that candidates belonging to category A had a result of zero (0). At first glance, it can be said that the high number of zeros represents a large number of people who did not write the essay or made serious mistakes, such as escaping the topic or serious writing difficulties. With this, the table shows that in the most vulnerable groups there are extreme results, such as the zero presented in fashion. As for the most favored groups, there is a concentration of high grades, with a lower number of failed results and more consistent performance.

Now, this picture represents very clearly that educational inequality, demonstrated in the microdata in ENEM, is not only present in the differences in the averages obtained, but demonstrates the coexistence in the education of our country of those who experience bitter results of their performance because they belong to vulnerable groups of society and those who stand out for the excellence of the results, because they belong to the privileged layers of society.

The data presented so far demonstrate that the performance of ENEM participants is influenced by several factors, especially demoFigureic and socioeconomic factors (Correia; Payeras, 2025). Thus, different authors reinforce how close the relationship between ENEM performance and access to different technological resources is. Rubim, Mantovani and Alavarse (2025) add directly to this when they state that "addressing digital inclusion as a priority implies ensuring that all students have essential resources, such as devices connected to the internet, allowing learning to extend beyond school and reach the home environment".

Table 6

Residence with Internet access and Grade of the writing test.

Descriptive Statistics

	Q025	NU_NOTA_REDACAO
N	**A**	277
	B	3240
Omission	**A**	0
	B	0
Average	**A**	511
	B	635
95% CI mean lower limit	**A**	485
	B	628
95% CI upper limit mean	**A**	537
	B	642
Median	**A**	560
	B	640
Fashion	**A**	560
	B	580
Standard deviation	**A**	222

Descriptive Statistics

	Q025	NU_NOTA_REDACAO
Variance	**B**	204
	A	49378
	B	41430
Breadth	**A**	960
	B	980
Minimum	**A**	0
	B	0
Maximum	**A**	960
	B	980

Note. The CI of the mean assumes that the sample distribution of the mean follows a distribution t with N-1 degrees of freedom

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

At first, it can be highlighted that internet access in homes exceeds by more than eleven times the number of homes without internet. In percentage terms, we have 7.9% of households without internet against 92.1%. As for the average, there was a significant difference of 124 points between the categories, with 511 points in category A, against 635 in category B. A situation that can be confirmed when we observe the median, where the participants without internet had 560 points while the others had 640 points, reinforcing the difference in the average. As for fashion, even with a difference of less than 20 points between the categories, the group with internet access continues to perform better.

Thus, there is no doubt that access to the internet works as a strong indicator of access to information, to different resources for study and to digital literacy practices. A picture that corroborates the view of authors, such as Moran (2015), when he states that digital culture, present in the use of computers and access to the internet, modifies the ways of learning and teaching, requiring new knowledge to deal with information and communication in the digital environment and through this knowledge, it is possible to envision a more egalitarian society.

Now, access to the internet is associated with better educational results and greater stability in the performance of writing tests, since the various indicators presented in tables 5 and 6 demonstrate that better performance among ENEM participants who have access to technological resources such as computers and internet access. On the other hand, according to Henares, Menezes-Filho, and Komatsu (2021), disadvantaged groups tend to have greater difficulty in preparing for ENEM, reflecting that socioeconomic disparities are visible not only in society, but also in education.

In this regard, Farias, Negreiros and Rocha (2024) state that to reduce inequalities, it is necessary to strengthen both support for families and the quality of the public education system, either by providing the necessary infrastructure for internet access in schools, as well as the creation of policies that favor the necessary means for internet access also in the homes of the neediest social groups.

2.4 INTERPRETATION OF DISPERSION MEASURES

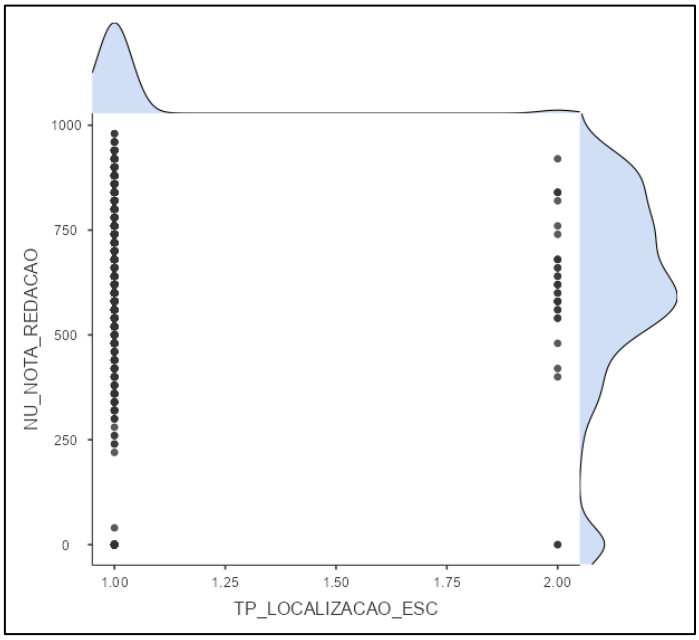
Applied since 1998, the National High School Exam (ENEM) was implemented to assess the learning of students in the last year of high school (3rd grade). In 2009, ENEM underwent a reform, reaching its current format with 45 questions from each area of knowledge (BRASIL, 2018) and an essay. This is the largest large-scale evaluation in Brazil, being used as a competition parameter for access to higher education vacancies in the main Brazilian universities.

Thus, from this last information we will briefly discuss how ENEM can be a tool for exclusion and perpetuation of inequalities in access to higher education within the Brazilian socio-historical context. This text aims to analyze the measures of dispersion in ENEM essay scores in the 2022 edition, comparing the average essay scores of students from schools located in the urban area with the average essay scores of students from schools located in the rural area.

The analysis of the essay score was selected for this study because it is the only essay test of the exam, thus excluding the scores of the objective tests. The essay test requires students to have interdisciplinary knowledge, sociocultural repertoire, argumentation skills and written production. Let's look at the following Figure.

Figure 4

Measures of dispersion of essay scores by Type of School Location



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

When analyzing Figure 4, where 1.00 represents schools in the urban area and 2.00 represents schools in the rural area, we see that the average writing scores closest to 1000

(thousand) were from students from schools in the urban area. The Figure is divided into quartiles, as proposed by Barbetta (2012), also showing that schools in the urban area had greater variance in essay scores, while schools in the rural area had a higher concentration of essay scores between 500 and 750 points.

Now, is it not known to the government that rural students, including peasants, caiçaras, indigenous people, and quilombolas, face absurdly greater challenges than students in urban areas? Why, then, put them on the same "ruler" and offer the same conditions of access to university if they did not have the same educational conditions?

Studying the history of the formation of the Brazilian State, we see that historically the working class (especially the rural one) inherited the ills left by the traces of inequality in Brazil. Quoting Souza (2017), "the true root of Brazilian backwardness lies in the legacy of slavery" and in the way the ruling class was formed. (Souza, 2017).

From the classic perspective of Holanda (1978), the relationship of approximation between the State and society is the way to confront and repair inequalities (Holanda, 1978), so it is urgent that the government, through Public Policies, the Ministry of Education, Councils and Secretariats: 1. offer dignified conditions of education to rural populations; 2. respect the specificities of rural education regarding the forms of learning assessment; 3. Guarantee rural students the right to access university through the principles of equity, citizenship and social justice.

3 FINAL CONSIDERATIONS

The analyses carried out in this work infer that **socioeconomic inequalities and access to technology strongly influence the performance of students in ENEM.** The attendance tables showed that the majority of the sample is low-income and does not have a computer. The Figures and measures of central tendency showed that essay scores increase significantly with the possession of computers and, to a lesser extent, with access to the internet. Family income is determinant and has significance for the averages and medians of essay scores, rising as one advances in the income brackets until a stabilization from the per capita income above R$ 7,272.01 at the time. The dispersion of essay scores is lower among students from schools located in urban areas, suggesting a state view of the specificities of schools located in rural areas.

These inferences converged with the recent literature, in which the studies pointed out demonstrate that the combination of computer and internet has a significant effect on proficiency, that the type of school and family income are crucial determinants of performance and that the digital divide deepens educational inequalities.

As a limitation of the work, we point out that social phenomena are complex and involve both structural aspects and subjective dimensions of reality. In this sense, Pougan (2015) suggests the articulation between qualitative and quantitative methods to expand the possibilities of analysis and interpretation of the investigated phenomena. Regarding the choice of research method, Creswell (2010) points out that when developing a research proposal that uses a quantitative, qualitative or mixed methods approach, it is essential to review the academic literature on the topic of interest, in order to verify its relevance to the investigation. In addition, this survey provides subsidies to the researcher to delimit the scope of the study, enabling a more precise reflection on the feasibility and relevance of the area chosen to carry out the research.

In this way, the relevance of future research in which statistical data are articulated, field research and theoretical references on social, cultural and digital capital is pointed out, discussing public policies for technological inclusion and support for public schools (especially state/municipal and rural) as ways to reduce the gap of opportunities.

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