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# Equity and disparities in brazilian Higher Education: insights from the Capes University Talent Award

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## ABSTRACT

**Introduction:** the Capes University Talent Award (CUTA) recognizes students with remarkable cognitive development through annual assessments within Brazilian Higher Education (BHE). **Objectives:** this study aims to investigate the geographical distribution, scope, and institutional funding patterns for CUTA awardees. **Method:** we collected data using an Information Access Portal and sourced geographical and funding information from the e-Mec portal. We conducted geospatial analysis by normalizing absolute frequencies. **Results:** the average number of awardees over three years for every 10,000 BHE entrants through the National High School Exam followed this distribution: South Region (17.33), Southeast (17.21), Northeast (13.57), Midwest (8.17), and North (5.75). Sergipe displayed the highest average performance with 119.65 awardees, while Roraima did not record any awardees. The average concentration of awardees in a few municipalities, especially in the capital (62.97%), indicates regional educational inequality. In the scope area, the Health Sciences led averaging 56.6% of awardees, while the humanities (4.27%), Social Sciences (4.27%), Linguistics, Literature, and Arts (0.7%), alongside Agricultural Sciences (0.4%) exhibited the poorest performance. Public institutions exhibited higher participation rates (90.9%). **Conclusion:** these findings underscore the need for educational policies promoting equity and addressing regional and institutional disparities within BHE.

## KEYWORDS

Higher Education. Educational policies. Educational equity. Regional disparities. Academic performance.

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# Equidade e disparidades no Ensino Superior brasileiro: insights a partir do Prêmio Capes Talento Universitário

**RESUMO**

**Introdução:** o Prêmio Capes Talento Universitário (PCTU) reconhece estudantes com notável desenvolvimento cognitivo por meio de avaliações anuais aplicadas a ingressantes no Ensino Superior Brasileiro (ESB). **Objetivo(s):** investigar a distribuição geográfica, a área de conhecimento e o tipo de financiamento institucional dos premiados no PCTU. Além disso, analisar o comportamento geoespacial dos laureados e as disparidades dessas distribuições. **Método:** os dados foram coletados por meio do Portal de Acesso à Informação. A localização geográfica e a natureza do financiamento institucional foram obtidas no Portal e-Mec. Os dados de distribuição geográfica foram analisados com normalização das frequências absolutas, com base nos dados do Instituto Brasileiro de Geografia e Estatística (IBGE). **Resultados:** o número médio dos três anos de premiados a cada 10.000 ingressantes no ESB pelo Exame Nacional do Ensino Médio segue a seguinte distribuição: Região Sul (17,33), Sudeste (17,21), Nordeste (13,57), Centro-Oeste (8,17) e Norte (5,75). O estado de Sergipe apresenta maior desempenho médio com 119,65 laureados, enquanto Roraima não teve premiados registrados. A concentração média de premiados em poucos municípios, especialmente nas capitais (62,97%), indica desigualdades educacionais regionais. Na área de abrangência, Ciências da Saúde lidera com média de 56,6% dos premiados, enquanto Ciências Humanas (4,27%), Ciências Sociais (4,27%), Linguística, Letras e Artes (0,7%) e Ciências Agrárias (0,4%) apresentam os menores desempenhos. Notavelmente, instituições públicas têm significativamente mais laureados (90,9%). **Conclusão:** os dados apontam para desigualdades regionais e institucionais no ESB, destacando a necessidade de políticas educacionais que promovam a equidade e fortaleçam as áreas do conhecimento e as regiões desprivilegiadas.

**PALAVRAS-CHAVE**

Ensino Superior. Políticas educacionais. Equidade educacional. Desigualdades regionais. Desempenho acadêmico.

# Equidad y disparidades en la Educación Superior brasileña: perspectivas a través del Premio Capes Talento Universitario

**RESUMEN**

**Introducción:** el Premio Capes Talento Universitario (PCTU) reconoce a estudiantes con un notable desarrollo cognitivo a través de evaluaciones anuales aplicadas a los ingresantes en la Educación Superior Brasileña (ESB). **Objetivo(s):** investigar la distribución geográfica, el área de cobertura y el tipo de financiamiento institucional de los galardonados con el PCTU. Asimismo, analizar el comportamiento geoespacial de los laureados y las disparidades en esas distribuciones. **Metodología:** los datos se recopilaron a través del Portal de Acceso a la Información. La ubicación geográfica y la naturaleza del financiamiento institucional se obtuvieron en el Portal e-Mec. Los datos de distribución geográfica se analizaron normalizando las frecuencias absolutas. **Resultados:** el promedio de tres años de premiados por cada 10.000 ingresantes en el ESB a través del Examen Nacional de la Educación Secundaria sigue la siguiente distribución: Región Sur (17,33), Sudeste (17,21), Nordeste (13,57), Centro-Oeste (8,17) y Norte (5,75). El estado de Sergipe tiene un mejor rendimiento promedio con 119,65 laureados, mientras que Roraima no tuvo galardonados registrados. La concentración media de galardonados en pocos municipios, especialmente en las capitales (62,97%), indica desigualdades educativas regionales. En el área de cobertura, Ciencias de la Salud lidera con un promedio del 56,6% de los galardonados, mientras que las Ciencias Humanas (4,27%), Ciencias Sociales (4,27%), Lingüística, Letras y Artes (0,7%) y Ciencias Agrarias (0,4%) muestran los peores rendimientos. Es notable que las instituciones públicas tienen significativamente más galardonados (90,9%). **Conclusión:** los datos señalan desigualdades regionales e institucionales en el ESB, destacando la necesidad de políticas educativas que fomenten la equidad y fortalezcan las áreas y regiones desfavorecidas.

**PALABRAS CLAVE**

Enseñanza Superior. Políticas educativas. Equidad educativa. Disparidades regionales. Rendimiento académico.

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# 1 Introduction

The Capes University Talent Award (CUTA) represents an initiative promoted by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and registered three successful editions in 2019, 2022, and 2023. The CUTA's primary purpose is to recognize the performance of students who demonstrate remarkable development in their cognitive competencies while collecting data for the development of studies and research by the Ministry of Education. These students are awarded a prize of R$5,000.00, aimed at subsidizing their studies and contributing to the research conducted by CAPES to formulate public policies in the field of higher education (Capes, 2023).

The CUTA is aimed at students who took the National High School Exam in the year before the award, commenced higher education in the subsequent year, and were duly enrolled in educational institutions, whether public, private, or military. This initiative, facilitated through a general knowledge test, aims to recognize, and reward academic talent, promote educational excellence, and nurture future leaders and researchers in the Brazilian educational landscape (Brazil, 2022).

This study aimed to comprehensively analyze the geographical distribution of CUTA awardees, map areas of knowledge with varying numbers of awardees, and compare the performance of higher education institutions. The ultimate purpose was to investigate whether the collected data supported or contradicted the existence of equity in the Brazilian higher education system.

# 2 Methods

This study adopted a descriptive approach to analyze the frequency of occurrence of a specific phenomenon. Descriptive research aims to reveal the characteristics of a phenomenon and identify correlations between relevant variables. It is important to emphasize that this methodology does not necessarily seek to explain the described phenomena but can serve as a basis for future investigations (Vergara, 2000). Additionally, this work is based on documentary research, which involves access to primary sources of data such as documents from the public, institutional archives, and statistics (Lakatos; Marconi, 2001).

Data regarding CUTA were acquired through the Federal Government's Access to Information portal, using protocol number 23546.063059/2023-41, in strict compliance with Law No. 13.709, dated August 14, 2018 (Brazil, 2018). The data provided included the year of the award, placement, university, campus, municipality where the exam took place, and candidates' areas of knowledge.

The geographical locations of the educational institutions (municipality and state) and the nature of institutional funding (public or private) were collected through searches on Internet pages for each evaluated institution and on the e-MEC digital portal. Higher Education Institutions characterized as "Special" in the administrative category and classified under

Article 242 of the Federal Constitution of 1988 were considered in the study as private institutions, given their monetized associations with users.

All data were tabulated using Microsoft Excel (Version 2307 Build 16.0.16626.20170). Data cleansing was performed by carefully verifying the accuracy and consistency of all generated information and variables. The information was analyzed independently by two evaluators (AUTHOR 1 and AUTHOR 2), the results were compared, and inconsistencies were checked. The entire process was overseen by a third evaluator with considerable expertise in assessing the nature of the data (AUTHOR 3). All information from the database was collected, except for the municipality where the evaluations were conducted, because this variable was not eligible for the study's objective. Information about the municipality, state of the university campus where the students were awarded, and type of funding of the institution (public or private) is available in Supplementary Tables 1, 2, and 3. In addition to the aforementioned program (Microsoft Excel®), the following programs were used: QGIS (version 3.30.2), ScapeToad (version 1.1), and Adobe Photoshop CC (version 14.0).

For the normalization of absolute frequencies to the awardees and subsequent comparisons, the data were adjusted to 10,000 entrants in higher education who used the National High School Exam to enter the respective year of the award, using data from the Higher Education Census and the Brazilian Institute of Geography and Statistics. This criterion was adopted because of the prerequisite of having taken the National Exam to register for the CUTA. For 2022 and 2023, for which there were no available data on the number of entrants, an estimate was made using a linear regression model, utilizing available information from 2014 to 2020 using GraphPad Prism software (Version 8.0.2).

## 3 Results

The number of applicants and participating institutions in the CUTA has varied significantly over the years. In 2019, 21,424 applicants were recorded, 1,185 participating institutions, and an average of 18.08 applicants per participating institution. In 2022, 3,966 applicants and 419 participating institutions existed, averaging 9.46 applicants per participating institution. In 2023, 10,268 applicants and 707 participating institutions were recorded, averaging 14.52 applicants per institution.

This variation highlights a notable discrepancy in educational institutions' participation in awards. In 2019, considering the 2,608 institutions in the country (Brazil, 2020), only 45.43% participated in the CUTA. Furthermore, in the same year, 66.35% of the institutions had 10 or fewer applicants, suggesting a non-uniform distribution in program adoption. However, some institutions such as the Federal University of Rio de Janeiro recorded the highest number of applicants, totaling 492.

Therefore, it is not possible to guarantee that the demand for the program is uniform among institutions and states in the country. The number of applicants may have been influenced by various factors such as awareness of the program, resources available for its

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promotion, and institutional policies encouraging student participation. This variability in demand is evidenced by the numbers presented, which reveal a significant contrast between the number of applicants and institutions with representatives participating in the award.

### 3.1 Distribution by Regions and States

The Southeast and Southern regions stand out regarding the number of awardees per 10,000 entrants to Brazilian higher education through the National Exam. In 2019, they presented, respectively, 18.96 and 13.32; in 2022, 15.86 and 21.66; and in 2023, 16.83 and 17.01. The average for the three years was 17.21 for the Southeast and 17.33 for the South (Table 1 and Supplementary Tables 4, 5, and 6). In the South, Santa Catarina (22.87) and Rio Grande do Sul (21.33) lead, while in the Southeast, the state of Rio de Janeiro stands out, averaging 36.21.

**Table 1.** Distribution of awardees in CUTA by Region and States per 10,000 entrants

| Region and State | Average | 2019 | 2022 | 2023 |
|---|---|---|---|---|
| **South** | 17.33 | 13.32 | 21.66 | 17.01 |
| Santa Catarina | 22.87 | 21.72 | 27.17 | 19.72 |
| Rio Grande do Sul | 21.33 | 12.25 | 25.91 | 25.83 |
| Paraná | 9.64 | 10.95 | 13.43 | 4.55 |
| **Southeast** | 17.21 | 18.96 | 15.86 | 16.83 |
| Rio de Janeiro | 36.21 | 38.34 | 29.86 | 40.42 |
| Minas Gerais | 16.67 | 15.62 | 18.41 | 15.99 |
| São Paulo | 14.18 | 17.06 | 12.03 | 13.43 |
| Espírito Santo | 10.12 | 10.22 | 12.77 | 7.37 |
| **Northeast** | 13.57 | 14.54 | 13.86 | 12.31 |
| Sergipe | 119.65 | 195.82 | 109.40 | 53.74 |
| Ceará | 22.82 | 25.87 | 21.32 | 21.26 |
| Piauí | 20.39 | 23.64 | 24.65 | 12.90 |
| Pernambuco | 16.71 | 16.35 | 17.47 | 16.31 |
| Alagoas | 13.73 | 13.16 | 15.19 | 12.85 |
| Rio Grande do Norte | 11.39 | 11.35 | 7.49 | 15.34 |
| Paraíba | 10.56 | 8.42 | 13.67 | 9.58 |
| Maranhão | 4.06 | 3.38 | 4.26 | 4.53 |
| Bahia | 4.01 | 3.58 | 3.50 | 4.95 |
| **Midwest** | 8.17 | 5.18 | 7.35 | 11.97 |
| Distrito Federal | 14.38 | 9.36 | 11.70 | 22.07 |
| Goiás | 7.19 | 5.08 | 8.64 | 7.85 |
| Mato Grosso do Sul | 3.98 | 1.54 | 2.28 | 8.11 |
| Mato Grosso | 3.57 | 1.72 | 2.73 | 6.27 |
| **North** | 5.75 | 6.97 | 7.14 | 3.15 |
| Tocantins | 21.92 | 29.10 | 19.53 | 17.14 |
| Amapá | 10.36 | 17.65 | 13.43 | 0.00 |
| Pará | 5.20 | 7.21 | 5.24 | 3.17 |
| Acre | 3.83 | 6.23 | 5.25 | 0.00 |
| Rondônia | 2.01 | 0.00 | 3.12 | 2.93 |
| Amazonas | 2.70 | 0.75 | 6.64 | 0.71 |
| Roraima | 0.00 | 0.00 | 0.00 | 0.00 |
| **Brazil** | 62.03 | 58.96 | 65.87 | 61.25 |

Source: Compiled by the authors (2023) based on CAPES data.

The concentration of awardees in these two regions reflects, in part, state education policies and their ability to attract talented students driven by investments in higher education, scholarships, research, and programs that incentivize academic formation (Lotta, 2019). Notably, the Basic Education Development Index (BEDI) for Regular High School Education in both Private and Public networks in 2021 demonstrates that the Southeast and South regions shared the lead, each with a BEDI of 4.4 (Brazil, 2021). This pattern mirrors the results obtained for CUTA.

The Northeast region, the third region with the highest number of laureates, presented 14.54, 13.83, and 12.53, in 2019, 2022, and 2023, respectively, averaging 13.57. The state of Sergipe stands out, averaging 119.65 awardees, which is 3.3 times higher than that of the second-place state in Rio de Janeiro (36.21). Following are the states of Ceará (22.82) and Piauí (20.39). What draws attention to in the Northeast region is the discrepancy between states, notably Maranhão (4.06) and Bahia (4.01), with the lowest performance.

The Midwest and Northern regions exhibited the lowest laureate indices per 10,000 entrants. In 2019, the values were 5.18 and 6.97, respectively; in 2022, they recorded 7.35 and 7.14; and in 2023, 11.97 and 3.15 were observed. The average of the three years was 8.17 for the Midwest region and 3.15 for the northern region. Within the Midwest region, the Federal District had a notable index of 22.07 laureates. In the Northern region, the Tocantins reach 21.92 laureates. However, a notable aspect of this region is the absence of laureates in some states, such as Amapá in 2023, Acre in 2023, and Rondônia in 2019, and the complete absence of laureates in Roraima in all three years of the CUTA.

These data demonstrate a significant disparity in CUTA awards among different regions of Brazil (Figure 1). Educational policies play a critical role in creating equal opportunities to access higher education. Regions that implement effective policies for financing, scholarships, and programs that encourage academic development can foster the emergence of local academic talent. However, when these policies are unevenly distributed, or these policies are unevenly distributed or insufficient in some areas, the competition for laureates in CUTA can become even fiercer, favoring regions with more robust policies (Brito; Guimarães, 2017; Diniz; Vieira, 2015).

**Figure 1.** Average distribution of awardees per State
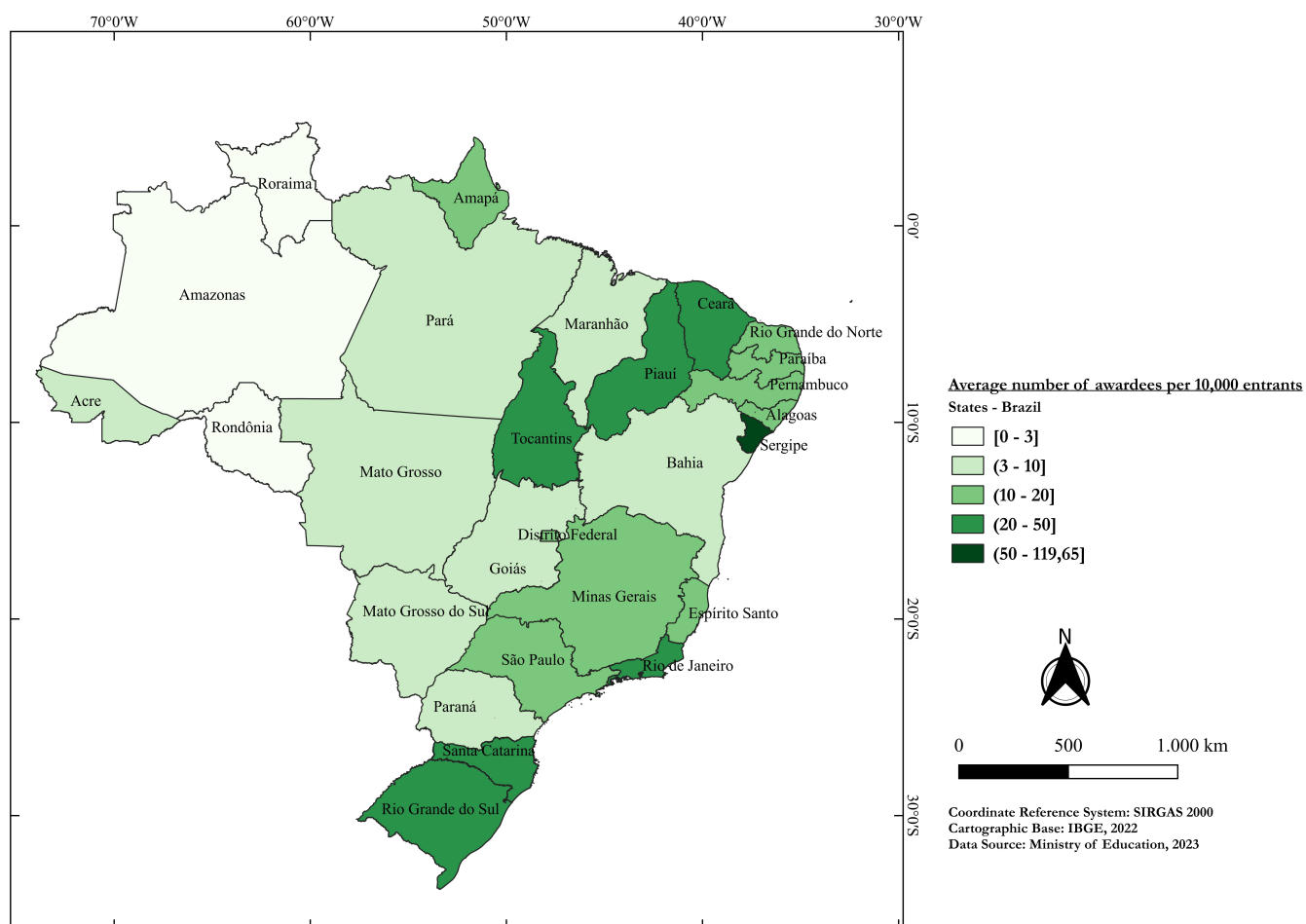


Source: Compiled by the authors (2023) based on CAPES data.

## 3.2 Geographical Distribution by Municipalities

In 2019, 2022, and 2023, we had 104, 121, and 99 municipalities with representatives awarded the CUTA, respectively. When considering the ten municipalities with the highest number of representatives in these years, 577 (57.7%), 490 (49.0%), and 576 (57.6%) awardees, respectively, highlighted a significant concentration of university talent in a few municipalities (Figure 2). Furthermore, when comparing the ratio between the sum of the number of awardees in the capitals of the Southeast, Northeast, South, North, and Midwest regions, they represented, on average, 52.87%, 72.77%, 68.80%, 88.49%, and 83.52% of the awardees concerning the total awardees in the region, respectively. This implies that, on average, 62.97% of awardees in the CUTA are located in the state capital. (Table 2 and Supplementary Tables 7, 8, and 9). At this point, it is worth highlighting the Southeast Region, where the number of laureates is lower, on average, in the capital, indicating a greater internalization of higher education institutions while maintaining the quality of education.

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**Figure 2.** Distribution of awardees by Municipalities
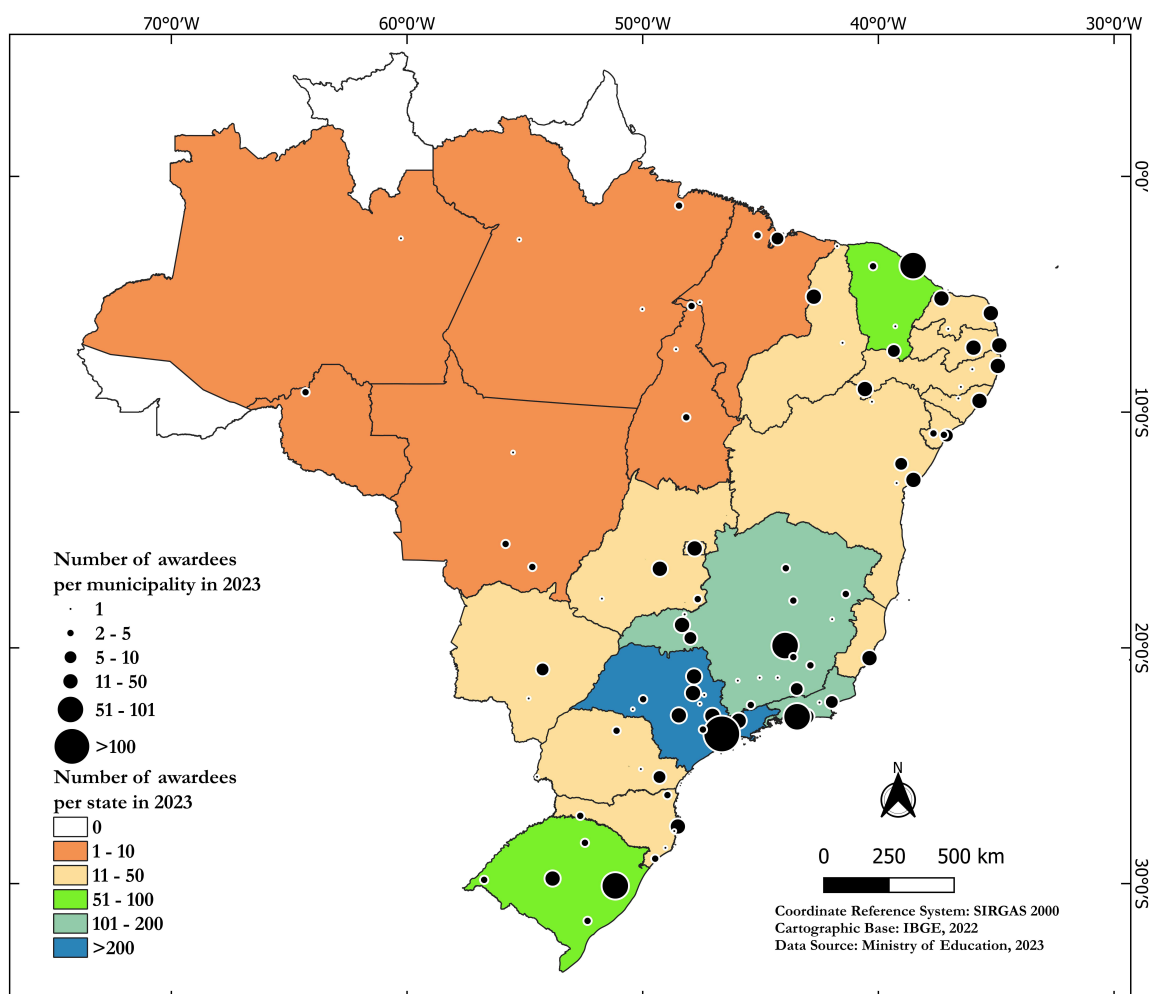


Source: Compiled by the authors (2023) based on CAPES data.

Analysis of CUTA data revealed a notable disparity among municipalities in the distribution of awardees. While some municipalities concentrate on many awardees, many others have much lower representation or even an absence of awardees. This disparity may reflect educational policies that historically favored certain urban areas to the detriment of less-developed regions. Investment policies in education and research often focus on capital and large metropolitan centers, creating educational and opportunity inequalities among municipalities in the country (Medeiros; Oliveira, 2014).

**Table 2.** Distribution by State Capitals of Awardees in the CUTA.

| Region and Capital | 2023 | 2022 | 2019 | Average |
|---|---|---|---|---|
| **Southeast Capitals** | 295 (56.41%) | 212 (43.98%) | 330 (57.09%) | 279.00 |
| São Paulo-SP | 108 (45.57%) | 68 (32.69%) | 150 (49.18%) | 108.67 |
| Rio de Janeiro-RJ | 92 (66.19%) | 81 (76.42%) | 106 (75.71%) | 93.00 |
| Belo Horizonte-MG | 84 (61.76%) | 48 (32.00%) | 62 (51.67%) | 64.67 |
| Vitória-ES | 11 (100.00%) | 15 (83.33%) | 12 (92.31%) | 12.67 |
| **Northeast Capitals** | 177 (70.24%) | 205 (75.09%) | 190 (72.8%) | 190.67 |
| Fortaleza-CE | 51 (78.46%) | 50 (80.65%) | 53 (81.54%) | 51.33 |
| Recife-PE | 29 (64.44%) | 37 (78.72%) | 30 (73.17%) | 32.00 |
| Teresina-PI | 19 (90.48%) | 34 (87.18%) | 29 (87.88%) | 27.33 |
| Salvador-BA | 16 (66.67%) | 13 (81.25%) | 10 (71.43%) | 13.00 |
| João Pessoa-PB | 16 (59.26%) | 24 (63.16%) | 8 (36.36%) | 16.00 |
| Natal-RN | 16 (55.17%) | 10 (71.43%) | 21 (91.3%) | 15.67 |
| Maceió-AL | 14 (93.33%) | 14 (82.35%) | 13 (100.00%) | 13.67 |
| Aracaju-SE | 10 (58.82%) | 16 (50.00%) | 23 (52.27%) | 16.33 |
| São Luís-MA | 6 (66.67%) | 7 (87.50%) | 3 (50.00%) | 5.33 |
| **South Capitals** | 89 (71.20%) | 103 (65.61%) | 66 (70.97%) | 86.00 |
| Porto Alegre-RS | 66 (77.65%) | 49 (57.65%) | 25 (64.10%) | 46.67 |
| Florianópolis-SC | 15 (53.57%) | 26 (70.27%) | 21 (84.00%) | 20.67 |
| Curitiba-PR | 8 (66.67%) | 28 (80.00%) | 20 (68.97%) | 18.67 |
| **Midwest Capitals** | 71 (86.59%) | 43 (87.75%) | 32 (94.11%) | 48.67 |
| Brasília-DF | 45 (97.83%) | 24 (100.0%) | 20 (100.0%) | 29.67 |
| Goiânia-GO | 14 (77.78%) | 17 (89.47%) | 8 (80.00%) | 4.67 |
| Campo Grande-MS | 10 (90.91%) | - | 2 (100.0%) | 4.00 |
| Cuiabá-MT | 2 (28.57%) | 2 (66.67%) | 2 (100.0%) | 2.00 |
| **North Capitals** | 13 (72.22%) | 34 (87.18%) | 29 (85.29%) | 25.33 |
| Palmas-TO | 5 (62.50%) | 4 (44.44%) | 7 (58.33%) | 5.33 |
| Belém-PA | 5 (71.43%) | 11 (100.0%) | 14 (100.0%) | 10.00 |
| Porto Velho-RO | 2 (100.0%) | 2 (100.0%) | - | 1.33 |
| Manaus-AM | 1 (100.0%) | 9 (100.0%) | 1 (100.0%) | 3.67 |
| Rio Branco-AC | - | 2 (100.0%) | 2 (100.0%) | 1.33 |
| Macapá-AP | - | 6 (100.0%) | 5 (100.0%) | 3.67 |
| Boa Vista-RR | - | - | - | - |
| Total | 645 (64.50%) | 597 (59.70%) | 647 (64.70%) | 629.67 |

Source: Compiled by the authors (2023) based on CAPES data.
The table is arranged in descending order, based on the number of awardees per Region/capital in 2023. The total number of awardees per year is 1000. The average was calculated arithmetically over three years of execution. The percentage represents the sum of the awardees in the capitals by Region and capital by state relative to the total number of awardees in the Region and the State.

Moreover, the data highlight the impact of the distribution of awarded university talent on regional R&D. The concentration of this talent in a limited number of municipalities, especially the state capital, is notable. This may have significant implications for less-privileged regions regarding access to quality education and research resources. The high concentration of awardees in the capital may perpetuate regional inequalities, leaving remote areas with limited access to the talent and knowledge generated by the awarded students

(Rolim; Serra, 2015). Furthermore, these data may reflect the migration of the best students to the capital of the country's states in search of the best institutions for professional formation. These data may characterize a "brain drain" within the country itself, referring to the term coined in 1963 by the Royal Society, a British academic institution, which referred to the migration of English researchers to other countries.

### 3.3 Areas of Knowledge

Over the three years, the average number of awardees in the CUTA by field of knowledge was as follows: 566 in Health Sciences, 185.67 in Engineering, 86.00 in Exact and Earth Sciences, 49.00 in Biological Sciences, 42.67 in Humanities, 42.67 in Applied Social Sciences, 17.00 in Multidisciplinary Others, 7.00 in Linguistics, Letters, and Arts, and 4.00 in Agrarian Sciences (Table 3).

**Table 3.** Distribution by Areas of Knowledge of Awardees in the CUTA.

| Areas of Knowledge | 2023 | 2022 | 2019 | Average |
|---|---|---|---|---|
| Health Sciences | 691 (69.1%) | 538 (53.8%) | 469 (46.9%) | 566.00 |
| Engineering | 129 (12.9%) | 184 (18.4%) | 244 (24.4%) | 185.67 |
| Exact and Earth Sciences | 56 (5.6%) | 97 (9.7%) | 105 (10.5%) | 86.00 |
| Biological Sciences | 45 (4.5%) | 47 (4.7%) | 55 (5.5%) | 49.00 |
| Humanities | 27 (2.7%) | 55 (5.5%) | 46 (4.6%) | 42.67 |
| Applied Social Sciences | 28 (2.8%) | 45 (4.5%) | 55 (5.5%) | 42.67 |
| Multidisciplinary - Others | 17 (1.7%) | 20 (2.0%) | 14 (1.4%) | 17.00 |
| Linguistics. Letters. and Arts | 6 (0.6%) | 7 (0.7%) | 8 (0.8%) | 7.00 |
| Agrarian Sciences | 1 (0.1%) | 7 (0.7%) | 4 (0.4%) | 4.00 |

Source: Compiled by the authors (2023) based on CAPES data.
The table is arranged in descending order based on the number of awardees per field of knowledge in 2023. The average was calculated arithmetically over three years. The percentages represent the number of awardees in a specific field relative to the total number of awardees. The total number of awardees per year is 1000.

During these three years, a steady increase has been observed in the number of awardees in the field of Health Sciences, including Nursing, Pharmacy, Medicine I, II, and III, Nutrition, Dentistry, and Public Health (Capes, 2014), with 469, 538, and 691 awardees in 2019, 2022, and 2023, respectively. This increase can be explained by competition for admission to these courses and is a direct reflection of the COVID-19 pandemic. Studies have shown an increase in the preference for careers in the healthcare field owing to the constant valorization of these professionals during the pandemic response (Abmes, 2021). Indeed, over the past 10 years, there has been a significant increase in demand for health courses: In 2015, the admission rate was 21.0 per 10,000 inhabitants, increasing to 38.5 per 10,000 inhabitants in 2021, placing the health field in second place, behind only Business, Administration, and Law

(Brazil, 2022). Another relevant factor is the competitiveness of these courses on entrance exams, as they usually have the highest cutoff scores, alongside engineering.

Conversely, the field with the lowest performance in the CUTA is Agricultural Sciences, which includes the evaluation areas of Food Science, Agricultural Sciences I, Veterinary Medicine, and Zootechnics / Fishery Resources (Capes, 2014), averaging only 4.00 awardees. The worst performance was recorded in 2023, with only one award in this area. This is surprising considering Brazil's global prominence in the agricultural sector, with projections indicating that this sector will represent approximately 25% of Brazil's gross domestic product in 2023 (Cepea, 2023).

Additionally, the relevance of the humanities is highlighted, encompassing a variety of evaluation areas, such as Anthropology/Archaeology, Political Science and International Relations, Religious Sciences and Theology, Education, Philosophy, Geography, History, Psychology, and Sociology (CAPES, 2014). Despite the breadth and importance of these fields, the average number of awardees annually was 42.67, a considerably smaller proportion than the area with the highest number of awards (Health Sciences). It is noteworthy that in 2022, the pedagogy course belonging to the education field achieved the highest number of enrollments (821,864 students), surpassing courses with the highest number of enrollments in the Health Sciences area, such as nursing (fourth place with 457,968 enrollments) and medicine (ninth place with 245,501 enrollments) (Brazil, 2022).

However, it is observed that, even with the high number of students enrolled in Pedagogy, the main representative of the Humanities, the number of awardees in the CUTA is lower, indicating nuances in the distribution of awards among different areas of knowledge. Likewise, the field of Linguistics, Literature, and Arts, which includes the evaluation areas of Arts and Linguistics and Literature, shows very low performance, averaging only 7.00 awardees on the CUTA.

### 3.4 Institutional Structure

Regarding funding, in 2019, 2022, and 2023, public institutions received 921, 877, and 929 awardees, respectively, averaging 909 awardees (90.9%) annually. Conversely, private institutions received 79, 123, and 71 awardees per year, averaging 91 (9.1%) awardees. These data highlight the significant superiority of university talent awarded by the CAPES in public higher education institutions. However, recent data indicate that out of a total of 2,574 higher education institutions in the country, 2,261 (87.83%) are private, and 313 (12.16%) are public (Brazil, 2022). Thus, a significant disparity exists between the number of public and private institutions; however, public institutions produce approximately nine times more awardees than their private counterparts, as observed in the CUTA award rates (Supplementary Tables 10, 11, and 12).

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In 2019, a total of 133 institutions participated, comprising 83 public and 50 private; in 2022, the number increased to 166 institutions (92 public and 74 private); in 2023, we recorded

130 awarded institutions (85 public and 45 private). These data indicate a notable concentration of university talent in some higher education institutions, whereas others demonstrate lower representation or lack of awardees. For example, the University of São Paulo consistently had several awardees in three years: 197 (19.7%) in 2019, 54 (5.4%) in 2022, and 97 (9.7%) in 2023, averaging 116 (11.6 %). Conversely, in 2019, 2022, and 2023, 58 (43.60%) out of 133, 77 (46.38%) out of 166, and 54 (41.53%) out of 130 institutions, respectively, had only one awardee in CUTA.

This finding is attributed to students' preference for educational institutions recognized for their excellence in teaching, research, extension, entrepreneurship, and innovation, resulting in a higher concentration of university talent in these institutions. Moreover, public institutions excel in providing high-quality education, inherent to their university model that integrates teaching, research, and extension synergistically (Cavalheiro *et al*., 2018).

This phenomenon can be explained by the predominance of faculty comprising Ph.D. holders in public higher education institutions (69.1% of faculty, compared to 32.8% in private institutions), which significantly contributes to academic excellence by fostering a culture of research and innovation. Another related factor is employment status, which is pivotal in the quality of education offered by these institutions, with 86.7% of faculty working full-time, whereas in private institutions, this number is only 27.2%. Finally, we cannot underestimate the fundamental role that public institutions play in postgraduate education and scientific knowledge production, as they are responsible for a significant part of the country's knowledge construction (Brazil, 2022).

## 4 Final Remarks

This study aims to investigate the geographical distribution of awardees in the CUTA, map areas of knowledge with varying numbers of awardees, and assess the performance of higher education institutions. Our study addresses a significant gap in the literature on the distribution of university talent. To achieve these objectives, we adopted a descriptive and documentary methodological approach, including access to public databases, descriptive analyses, the creation of geographical distribution maps of awardees, and tabulation and comparison of awardees by area of knowledge and type of higher education institution, considering the funding criterion. This methodological path enabled a comprehensive exploration of these issues, yielding highly relevant insights.

We demonstrate the concentration of university talent in certain municipalities, notably the state capital, which underscores regional inequalities in access to quality education and research resources. This concentration may perpetuate such disparities. Additionally, a significant number of awardees, averaging over half in Health Sciences, highlight the significant concentration of CUTA awardees in this area. Finally, we emphasize the superiority of public higher education institutions in institutional funding, highlighting their essence in selecting awardees and offering quality education.

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Collectively, the findings highlight the need for educational and research policies promoting geographical and institutional equity. By enabling the emergence and contribution of academic talent across all regions and areas of knowledge, such initiatives can mitigate educational inequalities and bolster the Brazilian higher education system's robustness.

## References

ASSOCIAÇÃO BRASILEIRA DE MANTENEDORAS DE ENSINO SUPERIOR (Abmes). **Coronavírus e Ensino Superior: o que pensam os alunos.** Brasília, Distrito Federal. 2021. Available on: https://bit.ly/49qP5aI. Accessed on: 08 jun. 2023.

BRAZIL. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Inep). **Censo da Educação Superior 2022.** Brasília: Inep, 2022. Available on: https://bit.ly/47kJnFh. Accessed on: 14 jun. 2023.

BRAZIL. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Inep). **Índice de Desenvolvimento da Educação Básica (Ideb) 2021**. Brasília: Inep, 2021. Available on: https://bit.ly/40pHMvy.  Accessed on: 14 jun. 2023.

BRAZIL. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Inep). **Sinopse Estatística da Educação Superior 2020**. Brasília: Inep, 2020. Available on: https://bit.ly/3MvJvtN.  Accessed on: 14 jun. 2023.

BRAZIL. Lei nº 13.709, de 14 de agosto de 2018. **Lei Geral de Proteção de Dados Pessoais (LGPD)**. Brasília, DF: Diário Oficial da União, 2018. Available on: https://bit.ly/3T9LasK. Accessed on: 08 jun. 2023.

BRAZIL. Ministério da Educação (MEC). **Prêmio Talento Universitário.** Available on: https://bit.ly/45Wt2Wg. Accessed on: 14 jun. 2023.

BRITO, Cristiane Sousa; GUIMARÃES, André Rodrigues. A expansão da educação superior e a desigualdade regional brasileira: uma análise nos marcos dos planos nacionais de educação. **EccoS – Revista Científica**, n. 44, p. 43–66, 17 nov. 2017. Available on: https://bit.ly/3QMEeQY. Accessed on: 08 jun. 2023.

CAVALHEIRO, Maria Gabriela; MENDES, Caroline Antonelli *et al*. O Que os Estudantes Consideram na Escolha do Curso de Graduação? **Revista de Graduação USP**, v. 3, n. 2, p. 63–69, 4 jul. 2018. Available on: https://bit.ly/3SuZ9cp.  Accessed on: 07 jun. 2023.

CENTRO DE ESTUDOS AVANÇADOS EM ECONOMIA APLICADA (Cepea). **PIB do agronegócio brasileiro**. Available on: https://bit.ly/3MxUVgn.  Accessed on: 17 jun. 2023.

DINIZ, Clélio Campolina; VIEIRA, Danilo Jorge. Ensino Superior e Desigualdades Regionais: notas sobre a experiência recente do Brasil. **Revista Paraense De Desenvolvimento**, v. 36, n. 129, p. 99–115, dez. 2015. Available on: https://bit.ly/3QqqF8j.  Accessed on: 17 jun. 2023.

FUNDAÇÃO COORDENAÇÃO DE APERFEIÇOAMENTO DE PESSOAL DE NÍVEL SUPERIOR (Capes). **Áreas de Avaliação Capes**. Available on: https://bit.ly/3sozQOF. Accessed on: 09 jun. 2023.

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FUNDAÇÃO COORDENAÇÃO DE APERFEIÇOAMENTO DE PESSOAL DE NÍVEL SUPERIOR (Capes). **Prêmio Capes Talento Universitário**. Available on: https://bit.ly/40vkdSm. Accessed on: 17 mai. 2023.

LAKATOS, Eva Maria; MARCONI, Maria Antônia. **Fundamentos de Metodologia Científica**. 4.ed. São Paulo: Atlas, 2001. 320 p. ISBN 85-224-3397-6.

LOTTA, Gabriela. **Teorias e Análises sobre Implementação de Políticas Públicas no Brasil**. Brasília: Fundação Escola Nacional de Administração Pública, 2019. Available on: https://bit.ly/3MxNjuB. Accessed on: 14 jun. 2023.

MEDEIROS, Marcelo; OLIVEIRA, Luís Felipe Batista de. Desigualdades regionais em educação: potencial de convergência. **Sociedade e Estado**, v. 29, n. 2, p. 561–585, ago. 2014. Available on: https://bit.ly/40pMM3g. Accessed on: 14 jun. 2023.

ROLIM, Cássio; SERRA, Maurício. Ensino Superior e desenvolvimento regional: Avaliação do Impacto Econômico de longo-prazo. **Revista Brasileira de Estudos Regionais e Urbanos**, v. 3, 2015. Available on: https://bit.ly/3FQnEtf. Accessed on: 13 jun. 2023.

VERGARA, Sylvia. **Projetos e relatórios de pesquisa em administração**. 3.ed. Rio de Janeiro: Atlas, 2000.