DESIGN AND UNIVERSITY: A LOOK AT REGIONAL DIFFERENCES IN BRAZIL

DESIGN E UNIVERSIDADE: UM OLHAR PARA AS DIFERENÇAS REGIONAIS

DISEÑO Y UNIVERSIDAD: UNA PERSPECTIVA SOBRE LAS DIFERENCIAS REGIONALES

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ABSTRACT
The field of design as an area of knowledge plays a crucial role in regional development. However, another concept important for local development is sustainability, which encompasses economic, social, and environmental factors. In this context, the article seeks to analyze the presence of design in public educational institutions in the Amazon region compared to other regions of the country. Additionally, it aims to assess the approach to sustainability within design programs in the Legal Brazilian Amazon. To achieve this, a survey of undergraduate and postgraduate (Stricto Sensu) design programs was conducted, along with an investigation to identify research groups, research and extension projects, and intellectual production in 2021. Statistical analysis was applied to the collected data. The results revealed significant disparities in the presence of design in higher education across different regions of the country. The northern region, which encompasses seven out of nine states in the Amazon Region, had the lowest quantity of design education and research in the country. It is evident that design programs are more prevalent in regions with higher urbanization and industrialization rates, whereas the Amazon region demonstrates a lower presence and discussion of design compared to other areas.

KEYWORDS
Education, research and extension, Amazon, university education.

RESUMO
O design como área do conhecimento é um importante fator contribuinte para o desenvolvimento regional. No entanto, outro conceito a ser trabalhado para o desenvolvimento local é a sustentabilidade, que contempla fatores econômicos, sociais e ambientais. A partir disso, o artigo busca analisar a presença do design em instituições públicas de ensino na região amazônica quando comparadas a outras regiões do país, bem como verificar a abordagem sustentável trabalhada nos cursos de design da Amazônia Legal Brasileira. Para isso, foi realizado um mapeamento dos cursos de graduação e pós-graduação (Stricto Sensu) em design e um levantamento para identificar grupos de pesquisa, projetos de pesquisa e extensão e produção intelectual no ano de 2021, sendo aplicado análise estatística nos dados coletados. Como resultado, foram identificadas disparidades significativas quanto a presença do design no ensino superior nas regiões do país, tendo a região norte, a qual abrange sete dos nove estados da região Amazônica, o menor quantitativo referente ao ensino e pesquisa em design no país. Sendo perceptível a presença dos cursos de design em regiões com maiores índices de urbanização e industrialização, enquanto na região amazônica a temática do design apresenta uma baixa presença e discussão quando comparada a outras regiões.

PALAVRAS-CHAVE
Educação, pesquisa e extensão, Amazônia, educação universitária.

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RESUMEN

El diseño como campo de conocimiento es un importante factor contribuyente al desarrollo regional. No obstante, otro concepto que debe abordarse para el desarrollo local es la sostenibilidad, que abarca aspectos económicos, sociales y medioambientales. A partir de esta premisa, el artículo tiene como objetivo analizar la presencia del diseño en las instituciones de educación pública en la región amazónica en comparación con otras regiones del país, así como evaluar el enfoque sostenible aplicado en los programas de diseño de la Amazonía Legal Brasileña. Para ello, se llevó a cabo una cartografía de los programas de pregrado y posgrado (Stricto Sensu) en diseño y se realizó una encuesta para identificar grupos de investigación, proyectos de investigación y extensión, y producción intelectual en el año 2021. Se aplicaron análisis estadísticos a los datos recopilados. Como resultado, se identificaron disparidades significativas en lo que respecta a la presencia del diseño en la educación superior en las distintas regiones del país. La región norte, que engloba siete de los nueve estados de la región amazónica, presentó la menor cantidad de programas de diseño y de investigación en el país. Es evidente la mayor presencia de programas de diseño en regiones con mayores índices de urbanización e industrialización, mientras que, en la región amazónica, la temática del diseño se caracteriza por su baja presencia y escasa discusión en comparación con otras regiones.

PALABRAS CLAVE

Educación, investigación, extensión, Amazonía, educación superior.

1. INTRODUCTION

Design is defined as a professional activity responsible for creating products and services aimed at meeting the needs of the population (HSUAN-AN, 2017), with its application geared towards promoting quality of life, as well as improving social well-being and urban development (PATROCÍNIO; NUNES, 2015). The establishment of design in Brazil occurred in the 1940s and 1950s, during the period of increasing industrialization and technological expansion under President Juscelino Kubitschek government (MANHANINI, 2019) from the perspective of three major processes: industrialization, urbanization, and globalization (CARDOSO, 2008), which contributed to its establishment in Brazil.

However, the insertion of design in the university as a university degree in Brazil occurred in the period from 1950 to 2000, in the transition stage of the country (GOMES et al., 2021), a moment marked by increasing industrialization and urbanization. In the 1950s are founded the first schools and design courses, such as the Institute of Contemporary Art (IAC) in São Paulo (LONA; BARBOSA, 2020), however, this being a free course and not a graduation. The significant milestone in the establishment of design education in Brazil at the university level occurred in 1962 with the founding of the School of Industrial Design (ESDI) in Rio de Janeiro, serving as a model for the creation of other design programs in Brazil (BURDEK, 2010). Thus, the inclusion of design in Brazilian universities was aimed at promoting the country's industrial development (ANGÉLICO; OLIVEIRA, 2017).

While the first undergraduate design programs were established in Brazil starting from the 1950s, the first Stricto Sensu postgraduate programs in design emerged in the 1990s, marking the maturation of the design field in the country, these postgraduate programs initially began in the southern and southeastern regions of Brazil (DINIZ, 2018). Currently, design is recognized as a distinct area of knowledge, classified within the broad field of applied social sciences, specifically within the subfield of industrial design. Design programs are offered by numerous universities throughout Brazil, with postgraduate programs overseen by the Coordination for the Advancement of Higher Education Personnel (CAPES) (NEVES et al., 2014), and undergraduate programs regulated by the Ministry of Education (MEC).

The university is a space responsible for the production of knowledge, with its three pillars being teaching, research, and extension (AGOPYAN; ARBIX, 2022). However, its role extends beyond knowledge production; the university is also responsible for addressing social, economic, political, and environmental demands (GODDARD, 2018). Thus, it is added to the tripod of teaching, education and extension, social promotion, because the university has a relevant role in regional development and acceleration of economic and social growth in the region (HOFF et al., 2016).

Furthermore, in public universities, public education plays a crucial role in reducing inequalities. According to Schwaab et al. (2017), income inequality levels decrease as educational levels rise, highlighting the need for public policies focused on reducing educational inequalities among states. In this context, public university education generates positive effects on the local economy, as well as, the main effects of university presence in relation to industrial innovation are geographically located near the university (HOFF et al., 2016).

However, the presence of university education in Brazil is still characterized by significant regional disparities. Specifically, the northern region, especially the Amazon region, faces scarcity and limitations in terms of resources and qualified professionals, these resources are insufficient to meet the educational and research demands. In contrast, the southern and southeastern regions, which have historically benefited from social and economic advantages, are equipped with more technological resources and professionals than the Amazon region, as reported by Proença and Nenevé (2004). The Amazon region, rich in biodiversity, exposes great potential for innovation. However, the region continues to face challenges in realizing this potential due to its considerable physical distance from academic centers in the southeast of the country, additionally, the number of researchers in the northern region remains below desirable levels, as noted by Kuwahara et al. (2022).

Thus, the present study aims to analyze the teaching and research in design at Brazilian public universities. For this purpose, specific attention is given to design courses at public universities, their intellectual output, projects, and research groups. The study involves a regional comparison of data across the country, with the goal of understanding the profile of design in higher education at public universities in different regions of Brazil. Special attention is given to the northern and Amazon regions. Furthermore, we intend to examine the sustainable approach adopted in design courses within the Brazilian Legal Amazon. Considering that sustainability studied within design courses in this region can effectively contribute to promoting actions for the valorization and development of the Amazonian territory.

2. METHOD

The present study is characterized as exploratory research in terms of its objectives, bibliographic research, and a survey in relation to the methods employed, with a quantitative nature. This research examines and analyzes data related to teaching, research, and extension activities in Design programs across Brazil. It includes an analysis of undergraduate programs, Stricto Sensu postgraduate programs, research projects, and research groups in the field of design within public educational institutions. Furthermore, the study investigates the area of sustainability in design programs, with a primary focus on the Amazon region, both design and sustainability are essential topics for the development of this region.

The initial step of this work involves mapping courses, research groups, and postgraduate programs in public federal and state universities within the Brazilian Amazon region. According to the Brazilian Institute of Geography and Statistics (IBGE, 2020), the Brazilian Amazon encompasses nine states: Rondônia, Acre, Amazonas, Roraima, Pará, Amapá, Tocantins, Mato Grosso, and Maranhão, covering 64% of the Brazilian territory (COLARES et al., 2018). Of these nine states in the Brazilian Amazon, only seven belong to the northern region, one to the northeastern region, and one to the central-west region of Brazil.

For data collection, primary data were collected from the e-MEC platform of the Ministry of Education, the Sucupira Platform, and the Directory of Research Groups. The mapping of undergraduate courses was carried out on the e-MEC website, with a focus on design courses at public, federal, and state institutions. For this research, undergraduate design courses covering various design areas were specifically selected. The mapping of postgraduate design courses was conducted on the Sucupira Platform, focusing on courses within the industrial design area.

The mapping of design research groups was conducted on the Directory of Research Groups (DGP) platform of National Council for Scientific and Technological Development (CNPQ), specifically researching design groups within the broader field of applied social sciences in the area of industrial design. The DGP is utilized for the mapping of Brazilian research, containing information regarding intellectual production, research lines, and other data related to research groups in Brazil (SCHWARTZMAN, 2022).

Subsequently, the data collection phase was initiated, during which data were gathered from the Sucupira Platform concerning postgraduate programs, their intellectual production, and research projects in the year 2021. This was done to quantify the number of papers and research projects by region in the country, as well as to assess the intellectual production in the Legal Amazon region in comparison to other regions of the country. Additionally, it aimed to examine the quantity of works focusing on sustainability in this region.

Data collection began in July 2022, starting with the survey of the Sucupira Platform and the DGP portal. In addition to data collection and analysis, bibliographic research was also employed based on the results obtained from the comparison of the data collected by region. Bibliographic research, according to Gil (2022), is research developed based on pre-existing materials such as books and scientific articles. The survey is characterized by the collection of data and quantitative analysis. Therefore, this phase of the research aims to assess the environmental and sustainable approach through the analysis of productions and projects in the design postgraduate programs (PPGs) and research groups in the Brazilian Amazon region. It also aims to compare research in this region to other parts of the country.

3. RESULTS AND DISCUSSION

Design as a field of knowledge plays a significant role in territorial development, operating in various sectors of industry and commerce such as fashion, digital products, packaging, food, craftsmanship, furniture, and numerous other segments. It not only influences the visual aspect of products but also contributes to the creation of goods and services, serving as a catalyst in the formulation of development strategies linked to social well-being and urban development (PATROCÍNIO; NUNES, 2015). Therefore, design functions as a key player in the development of products and services related to the territory, as per SEBRAE (2015), acting as an instrument for adding value and product differentiation.

However, the establishment of design courses across the national territory is still closely linked to the productive sector and commerce. Consequently, the presence of undergraduate and postgraduate programs (Stricto Sensu) in Brazil still connected to regions with a higher presence of industry and commerce, as well as higher development indices. This can be observed in the graph (Figure 01), where the northern region has a lower number of available undergraduate and postgraduate programs, while the greater availability of courses is concentrated in the southern, southeastern, and northeastern regions of the country.

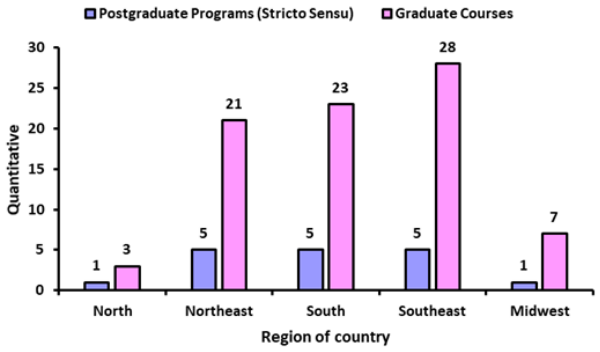

Figure 01: Distribution of Design courses at public universities from Brazil.
Source: Autors.

Regarding postgraduate education (Stricto Sensu) in design in the northern region of the country, there is a noticeable lack of such programs in the context of design research (Figure 2). In addition to the low number of postgraduate programs offered in this region, the only type offered is a professional master's degree (MP), with the number of academic master's (ME) and academic doctoral (DO) programs in design in this region equal to zero. Furthermore, out of all the programs offering doctorate degrees (9), 89% are concentrated in the south-southeast axis of the country. In other words, of the nine programs offering academic doctorate (DO) degrees in design, only one is available in the northeastern region, while eight are in the south-southeast axis of the country.

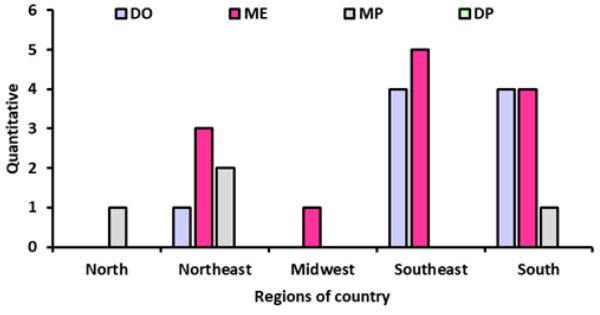

Figure 02: Distribution of PPG's Design at public universities from Brazil.
Source: Autors.

In addition to the presence of design programs by region, other data highlighting the limited availability in the northern region of the country can be found in the information registered in the DGP and Sucupira Platform regarding research conducted in public universities such as research groups, intellectual production, and research projects. In the search for design research groups conducted on the DGP portal, a total of 191 research groups in design were identified in public federal and state educational institutions.

In the search, the initial step involved examining the overall quantity of research groups in design registered in the broad field of applied social sciences, within the area of industrial design. Among the identified groups, the northern region, which encompasses seven out of nine states in the Brazilian Legal Amazon, showed a lower number of registered groups compared to other regions in Brazil. Only three (3) research groups were identified in the entire northern region, and this is a direct consequence of the low number of undergraduate and postgraduate programs in this region.

As for the collection of research projects registered on the Sucupira Platform, only research and extension projects were considered for this study. A total of 548 projects were identified, comprising 483 research projects and 65 extension projects. Similar to the previous categories in terms of low quantity, the northern region of Brazil had a total of 5 registered projects, combining research and extension, which accounts for 0.9% of all projects registered on the platform in the year 2021.

In the category of intellectual production, considering articles published in journals registered in the intellectual production in the year 2021 on the Sucupira Platform, a total of 220 articles published in that year were identified, considering the publication of all postgraduate programs of design in public institutions. In the northern region, only a total of 22 articles were identified, related to the sole postgraduate program in this region. This number of articles is equivalent to 10% of the total articles registered on the platform in the year 2021.

The northern region again has a low quantity when compared to other regions of the country, with the southeastern region having the highest quantity, equivalent to 45% of the intellectual productions for that year. However, in the northern region, despite exhibiting the lowest frequency of intellectual production (10%), this category showed a significantly higher percentage compared to the other variables in the same region, which ranged from 1% to 2%, revealing a remarkably positive performance in terms of scientific dissemination in that region.

From the quantitative data collection of the research groups, intellectual production and research and extension projects, the non-parametric chi-square statistical test of adherence was applied, for expected proportions equal, with a significance level of 5%. It was used to assess the distribution and frequency of a specific parameter. In this study, the application aimed to compare the regions of the country in terms of the quantity of research groups,

Variables	Country Region	Nº	F%	p
Research Groups	North Northeast Southeast South Midwest	3 55 58 67 8	1,57 28,8 30,37 35,07 4,19	< 0.0001
Intellectual Production (Articles in journals)	North Northeast Southeast South Midwest	22 29 100 46 23	10 13,2 45,45 20,9 10,45	< 0.0001
Research Projects	North Northeast Southeast South Midwest	4 131 175 123 50	0,83 27,12 36,24 25,46 10,35	< 0.0001
Extension Projects	North Northeast Southeast South Midwest	1 7 28 7 22	1,54 10,77 43,07 10,77 33,85	< 0.0001

Table 01: Profile of research and extension of design at the public university.
Source: Autors.

intellectual production, research projects, and extension projects, thus generating a profile of research in design in public university (Table 1).

In the application of the chi-square test, all variables showed a P-value lower than the significance level, indicating a significant difference in design research among the regions of the country. The northern region of the country has a low percentage for all the studied variables. Hence, it is possible to observe the low index of teaching, research, and extension in the field of design in this region of the country, and consequently in the amazon region, given that the northern region encompasses nine (9) out of the seven (7) states of the amazon region. There are only four (4) undergraduate programs and just two (2) postgraduate programs dedicated to the field of design in the Amazon region. Table 1 summarizes these data.

The low offer of design courses in public universities in the Amazon region is the result of the process of implementing design courses in Brazil. The creation of these courses across the national territory was due to industrialization and technological expansion in the 1940s and 1950s promoted by the government of Juscelino Kubitschek (MANHANINI, 2019). However, this expansion of productive industry in Brazil is distributed unevenly and selectively throughout the country (SILVA et al., 2020). With the technological and industrial expansion in Brazil, the first design courses were founded in the south-southeast axis of the country, such as the Escola Superior de Desenho Industrial (ESDI), the first design course in Brazil, created in the state of Rio de Janeiro.

Design is a product of three major historical processes, according to Cardoso (2008): industrialization, urbanization with the concentration of population in major cities, and globalization. Therefore, the implementation of design in a particular region is a result of industrial and technological presence in that territory. Consequently, there is a limited availability of design courses in the northern region of the country, where, according to Colares et al. (2018), the states in this region stand out economically due to plant and mineral extraction, agriculture, and fishing.

The low frequency of design courses at universities in the Amazon region, both at the undergraduate and postgraduate (Stricto Sensu) levels, specifically master's and doctorate programs, is mainly due to the limited industrial presence in this region, as the predominant economic activities are extraction and agriculture. For the South and Southeast regions, according to the geographical distribution of industry provided by the industry portal, the states in the South-Southeast axis of Brazil had a higher share of the industrial GDP in 2019, regions with a greater presence of design courses and, consequently, more research and extension in this field of knowledge.

Another point to consider is the analysis of the sustainable approach in research in the design courses in the Amazon region. Sustainability is a growing and recurrent theme in the field of design due to its relationship with the industry and product development. Sustainability is also a significant theme for the Amazon region and its future prospects, as it aims to balance economic development with environmental and social factors. To analyze the sustainable approach in design research in these undergraduate and postgraduate programs, the recurrence of this theme in research groups, intellectual production, and research and extension projects was examined.

From the search of research groups on the DGP portal, where 191 research groups of design in public universities were identified, as previously mentioned, 38 research groups address sustainability as a research line. The search used the following terms: design and sustainability, eco-design, sustainable products, and design and sustainable development. In the northern region, out of a total of three (3) research groups in the field of design, two (2) groups have sustainability as a research line. In the entire Amazon region, out of a total of seven (7) research groups, (4) four have sustainability as a research line. In other words, more than half of the research groups in the northern region and the Amazon region have sustainability as a research line.

Regarding intellectual production in Stricto Sensu Postgraduate Programs of design (PPGs), in the year 2021, out of the 220 articles registered on the Sucupira Platform, 50 articles are from postgraduate programs located in the Amazon region, of which only eight (8) articles mention sustainability, corresponding to just 4% of the total articles produced in these PPGs in the Amazon region. In research and extension projects, out of 483 research projects, only 24 projects are from PPGs in the Amazon region, and of these, five (5) mention sustainability. In extension projects, out of 65 projects registered on the Sucupira platform in 2021, the Amazon region had only one (1) registered project, and this single extension project mentions sustainability.

Therefore, the low frequency of design courses in university in the northern and Amazonian regions, both at the undergraduate and postgraduate levels, has an impact on the training, improvement, and qualification of design professionals in this region. This, in turn, leads to a lack of research in design, which is an important instrument for the expansion of education according to the National Curriculum Guidelines (DCN) for Undergraduate Design Courses or Resolution No. 5, dated March 2004.

Consequently, the study highlights the greater presence of design courses and, consequently, a higher number of research activities in the southern and southeastern regions (Figure 3), which, as indicated by Proença and Nenevé (2004), have historically and socially benefited, to the detriment of other regions of Brazil such as the northern region, which experiences a low frequency of design courses and postgraduate programs, impacting research and extension activities in design in this region.

The presence of public universities in the Amazonian region is crucial since the university acts as a mechanism for fostering the development of the region where it is located (HOFF et al., 2017). In addition to the presence of public universities, having design courses in universities in the Amazonian region is necessary for promoting

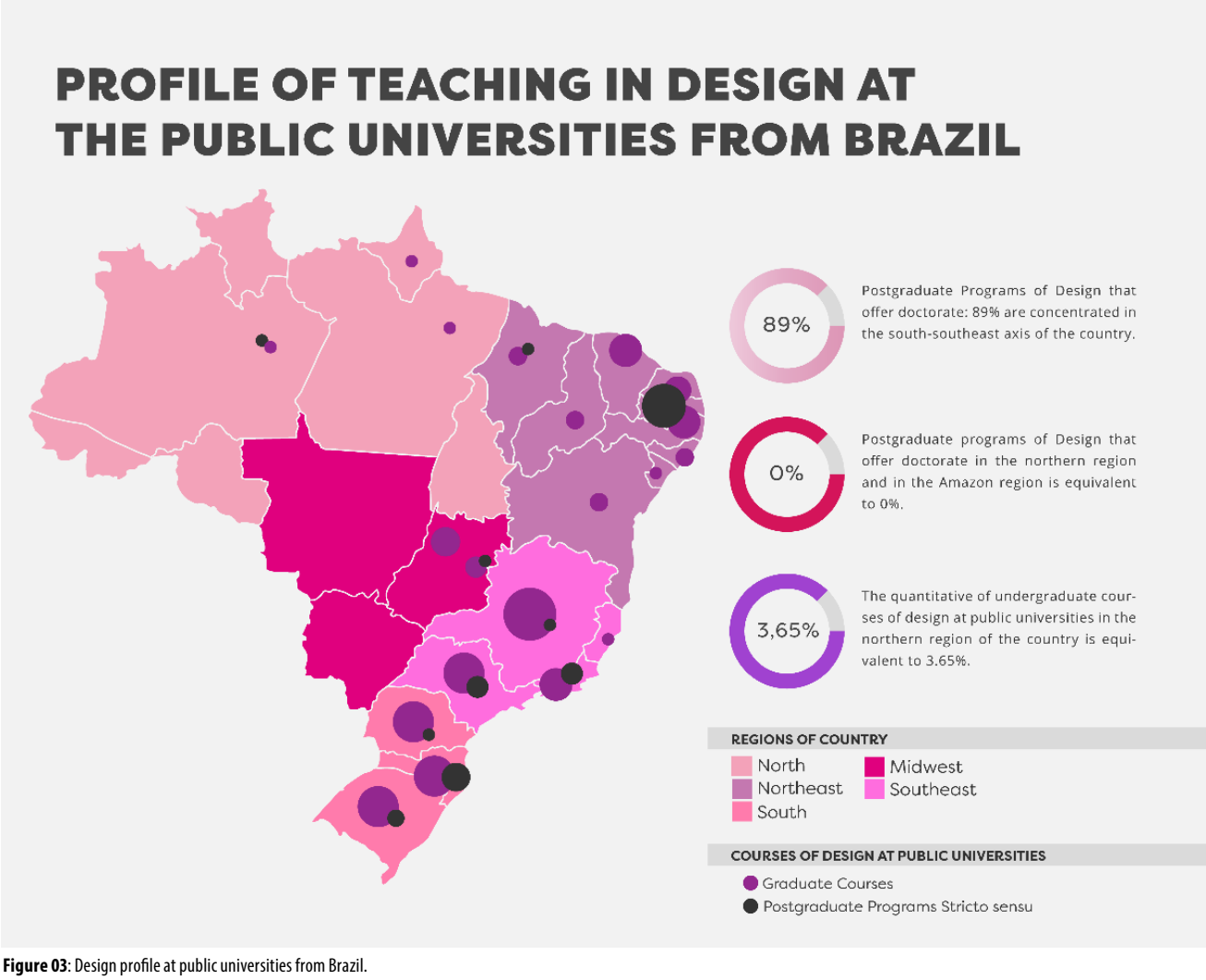

Figure 03: Design profile at public universities from Brazil.
Source: Autors.

regional development. This is because the field of design serves as an enabler for creating and innovating products and services related to the territory (KRUCKEN, 2009). Therefore, design plays a significant role in the development of the region through innovation and the promotion of local product and service creation. Strategic design, when employed in a specific territory, benefits producers and consumers, adds value to territorial and social capital, and establishes a sustainable perspective for regional development (ARRUDA; SILVA, 2017).

In addition to the presence of universities, another crucial aspect for the development of the Amazonian region is the teaching and practice of sustainability in university. The concept of sustainable development is defined as development that does not compromise the capacity of natural resources for future generations while considering environmental, social, and economic dimensions (CAVALCANTE et al., 2012). The concept of sustainable development is fundamental for the Amazon region, which boasts significant biodiversity and wealth of traditional knowledge derived from the people of the Amazon region (BARBOSA et al., 2021). It is crucial to consider sustainable use of its resources and the preservation of species and natural habitats in the development of the region.

4. CONCLUSION

Through this study, it is possible to visualize the profile of research and education in design in Brazil's public universities based on the number of undergraduate and postgraduate courses, research and extension projects, intellectual production (articles published in journals), and research groups registered in the e-MEC platform, Sucupira, and the Directory of research groups, respectively. Considering the collected information, regional disparities in research and education in design in the country are evident, with the numbers of research and education in the northern region of the country still being low when compared to other regions, such as the south and southeast.

Consequently, research and education in design in the Amazon region also show low numbers. This is because, out of the nine states in the Brazilian Legal Amazon, seven are part of the northern region. Moreover, among these nine states, only three offer undergraduate design courses, with just two of them having postgraduate programs, one being a master's program and the other a professional master's program, with no doctorate programs available. Furthermore, the entire Amazon region has only seven research groups in design registered in the field of industrial design. Thus, despite comprising 64% of the Brazilian national territory, the region exhibits low figures concerning research and education in design within public universities.

Thus, there is a noticeable low frequency of design-related topics in the Amazon region as a whole, as well as the sustainability theme within the field of design in the Amazon region. This is due to the limited availability of design education, the low number of articles published in journals, and the lack of research and extension projects dedicated to these themes in the postgraduate design programs of this region. Nevertheless, regarding research groups, over half of the design research groups in the Amazon region have sustainability as their research focus.

Design in the university, concerning the university's tripod of extension, research, and teaching, exhibits significant disparities among Brazil's regions, especially when comparing the central-southern regions with the northern region, which encompasses most of the Amazon region. Considering that the implementation of design in Brazil is influenced by factors such as industrialization and urbanization, regions with a stronger presence of industry and services, historically and socially advantaged, tend to have a higher number of design courses at the university and, consequently, more research and extension projects, research groups, published articles, and others.

Regions that rely heavily on extractive industries, agriculture, and fishing, such as the northern region, have fewer design courses and, consequently, a lower number of research and teaching projects related to design. This includes areas like sustainable design and strategic design, which could contribute to the region's development. Therefore, there is a need to expand design programs in public universities in the Amazon region since the field of design can significantly contribute to the development and valorization of the Amazon territory.

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