

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

INSTITUTO DE LETRAS

PROGRAMA DE PÓS-GRADUAÇÃO EM LETRAS

CAMILO J. SÁNCHEZ PRANAO

**INTERNATIONALISATION OF HIGHER EDUCATION:  
THE LANGUAGE PROFILE OF INTERNATIONAL RESEARCHERS IN BRAZILIAN  
ACADEMIC PRODUCTION**

Porto Alegre

2024

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Orientadora: Profa Dra Simone Sarmento

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## Resumo

A internacionalização da educação superior é um processo dinâmico que integra dimensões internacionais, interculturais e globais no objetivo, nas funções ou na oferta do ensino superior (Knight, 2003), fomentando o intercâmbio de conhecimentos e a diversificação das atividades nas instituições acadêmicas. Historicamente, observa-se no Brasil uma maior mobilidade para o exterior, com mais alunos e pesquisadores deixando o país em busca de experiências do que o número de estudantes e pesquisadores internacionais que vêm para o Brasil. Na Linguística Aplicada, iniciativas de internacionalização em instituições de ensino superior têm motivado pesquisas sobre o papel das línguas na internacionalização do ensino superior (Baumvol, 2018; Baumvol et al., 2021; Ferreira, 2022; Finardi, 2019; Finardi & França, 2016; Finardi et al., 2019; Garcez, 2019). Com base nos princípios da linguística ecossistêmica (Couto, 2015), pesquisadores internacionais têm o potencial de fortalecer o ecossistema linguístico da academia brasileira. Nesse contexto, esta pesquisa investiga o papel e as contribuições de acadêmicos internacionais na academia brasileira, com foco em sua produção acadêmica e proficiência linguística em diferentes áreas do conhecimento. Por meio de um estudo comparativo de currículos, utilizando dados coletados na plataforma Lattes, o estudo compara a produção e a proficiência linguística de acadêmicos internacionais com seus pares brasileiros. Parte da análise concentra-se nas publicações de artigos, livros, capítulos de livros e trabalhos completos em anais de congressos por idioma: português, inglês, espanhol e "outros" idiomas. Os resultados indicam que os acadêmicos internacionais tendem a publicar nas línguas dominantes das suas respectivas áreas, embora também publiquem de maneira menos extensiva noutras línguas, diversificando o ecossistema de publicação na academia brasileira. Os resultados revelam também que o inglês predomina nas ciências "mais duras", enquanto o português é preferido nas ciências "mais brandas", muitas

vezes acompanhado pelo espanhol como língua secundária de preferência dos pesquisadores internacionais. O estudo mostra também que os acadêmicos internacionais das ciências "mais duras" são ligeiramente mais produtivos do que os seus pares brasileiros, ao passo que os das ciências "mais brandas" apresentam uma produtividade consideravelmente menor. O estudo explora também a correlação entre a proficiência linguística e os padrões de publicação, sugerindo que, embora os investigadores internacionais disponham de um repertório linguístico diversificado, a proficiência linguística por si só pode não influenciar diretamente as escolhas da língua de publicação. Estes resultados contribuem para a nossa compreensão da internacionalização do ensino superior e das práticas de publicação acadêmica no meio acadêmico brasileiro e sublinham a importância da diversidade linguística e do intercâmbio intercultural na promoção de ambientes de investigação colaborativos e no avanço da disseminação do conhecimento, no Brasil e em escala global.

*Palavras-chave:* línguas para fins de investigação e publicação, diferenças disciplinares, produção e disseminação de conhecimento, práticas linguísticas acadêmicas, ensino superior brasileiro

## Abstract

The internationalisation of higher education is a dynamic process that integrates international, intercultural, and global dimensions into the purpose, functions, or delivery of postsecondary education (Knight, 2003), fostering knowledge exchange and diversification of scholarship in academic institutions. Historically, there has been greater external mobility in Brazil, with more students and researchers leaving the country in search of experiences abroad than the number of international students and researchers coming to Brazil. In Applied Linguistics, institutional internationalisation initiatives within higher education institutions have prompted research on the role languages play in the internationalisation of higher education (Baumvol, 2018; Baumvol et al., 2021; Ferreira, 2022; Finardi, 2019; Finardi & França, 2016; Finardi et al., 2019; Garcez, 2019). Based on ecosystemic linguistics principles (Couto, 2015), international researchers have the potential to strengthen the linguistic ecosystem of Brazilian academia. In this context, this research investigates the role and contributions of international scholars in Brazilian academia, focusing on their academic output and language proficiency across fields of knowledge. Through a comparative CV study using data collected from the Lattes platform, the study compares international scholars' outputs and language proficiency with matched Brazilian peers. Part of the analysis focuses on publications of articles, books, book chapters, and complete papers in conference proceedings per language, namely Portuguese, English, Spanish, and "Other" languages. Findings indicate that international scholars tend to publish in the dominant languages of their respective fields, while also publishing, although less extensively, in other languages, diversifying the ecosystem of publication in Brazilian academia. Findings reveal that English predominates in the "harder" sciences, while Portuguese is favoured in the "softer" sciences, often followed by Spanish as a secondary language choice for international researchers. The study also shows that

international scholars in the "harder" sciences are slightly more productive, whereas those in "softer" sciences exhibit a salient lower productivity. Moreover, the research explores the correlation between language proficiency and publication patterns, suggesting that while international researchers have a diverse linguistic repertoire, language proficiency alone may not directly influence publication language choices. These findings contribute to our understanding of the internationalisation of higher education and scholarly publication practices in Brazilian academia and underscore the importance of linguistic diversity and cross-cultural exchange in fostering collaborative research environments and advancing knowledge dissemination both in Brazil and on a global scale.

*Keywords:* languages for research and publication purposes, disciplinary differences, knowledge production and dissemination, scholarly language practices, Brazilian higher education



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## Chapter 1: Introduction

In today's world, borders are fluid. Globalisation and technological advances have allowed the population to interact with other groups, have access to information, and migrate with more ease than previous generations. Even during a pandemic that prevented people from travelling, this diaspora prevailed, adopting different channels to meet their needs, be they social interaction, learning, or entertainment. These exchanges add to individuals' identities and experiences, diversifying their cultural capital, expanding their linguistic repertoires, presenting opportunities and connecting communities from which they may desire to be part.

In academia, these cross-cultural exchanges are highly valued and in increasing demand, since they result in positive outcomes in domains such as academic, professional and personal development, and also benefit the host population (Mutchnick et al., 2004). For the institutions that partake in exchange programmes, some expected benefits are the *“participation in international research and debate forums, which strengthens the participation of the higher education system in the social and technological development agenda in each country and contributes to the improvement of national levels of specialized workforce qualification”* (Neves & Barbosa, 2020, p. 150). Consequently, it is rational to invest in internationalisation programmes and make the necessary adaptations to ensure the integration and engagement of international university professors with local learning communities.

In this academic context, the internationalisation of higher education acts as a transformative phenomenon, allowing universities to engage with global knowledge networks. Within this dynamic environment, language proficiency plays an important role, enabling effective communication, collaboration, and knowledge dissemination among

scholars and researchers. As Brazilian universities embrace internationalisation, questions arise about the role of language proficiency in fostering academic exchange and its implications for researchers and academic production in the different fields of knowledge. This dissertation explores this intricate interplay between language, academic production, and internationalisation within the context of Brazilian higher education.

The internationalisation of higher education, as defined by Knight, is a process characterised by the integration of international, intercultural, and global dimensions into the purpose, functions, or delivery of postsecondary education (Knight, 2003). These three concepts are relevant since they encompass an understanding of internationalisation at multiple levels: nations, cultures, and countries. The author adds that internationalisation should not be narrowly defined by specific activities or outcomes but should encompass the broader dimensions of education. This multifaceted process involves integrating global perspectives, fostering academic exchange, and promoting intercultural understanding. Universities worldwide have increasingly recognized the significance of internationalisation in preparing students for a globally interconnected world.

This pursuit for internationalisation is a growing global phenomenon, and in each context, it presents different opportunities and challenges. In Brazil, one of the salient opportunities is the notable stride in fostering international cooperation through structured programmes, exchange initiatives, and joint degree programmes. Funding agencies such as CAPES (Foundation for Advancement of Higher Education Personnel) have played a crucial role in incentivising and funding international activities, contributing to the expansion of academic collaborations (Neves & Barbosa, 2020). On the other hand, internationalisation at home<sup>1</sup>, one of the internationalisation strategies implemented in the country, is reported to

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<sup>1</sup> Defined as “the purposeful integration of international and intercultural dimensions into the formal and informal curriculum for all students within domestic learning environments” (Beleen & Jones, 2015, p. 69). This idea focuses on the effect of these international elements being articulated on their curricula, and the assessment of international learning outcomes, and not the mere inclusion of these elements arbitrarily.



present challenges, such as the lack of English proficiency among the Brazilian population (Kamiński, 2016), lack of funding to attract international talents, obstacles related to accreditation and curriculum alignment. As a result, Brazil tends to have an insular university system (Alperin, 2013).

The internationalisation of higher education extends beyond local public policies, exchange programmes, and institutional adaptations. In fact, some fields of knowledge inherently exhibit a higher degree of internationalisation when compared to others, particularly influenced by linguistic practices, i.e., language of instruction, language of the materials studied, and scholarly output within these academic domains (Baumvol, 2018).

The differences in language choices for publication purposes across various fields of knowledge within Brazilian academia reflect the unique demands and characteristics of each disciplinary area. Some fields may heavily favour English due to their international nature, such as those considered “harder” sciences, while others might prioritise Portuguese for their more localised focus (Baumvol et al., 2021, Monteiro & Hirano, 2020).

The concepts of “harder” and “softer” sciences have been used to categorise fields of knowledge and will be useful for reading and analysing the data and for identifying patterns of language choice in this dissertation. These “harder” sciences (Agricultural Sciences; Biological Sciences; Engineering; Exact and Earth Sciences; and Health Sciences<sup>2</sup>) are typically characterised by a preference for empirical quantitative research, experimentation, and data-driven analysis, often associated with the extent to which mathematics are used (Storer, 1967). Whereas “softer” (Applied Social Sciences; Human Sciences; and Linguistics, Literature, and Arts) tackle intricate problems that demand more nuanced, probabilistic, and sophisticated approaches (Pigliucci, 2009). This distinction is not meant to establish an intellectual superiority of “harder” over “softer” sciences, but to be understood as a

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<sup>2</sup> The categorisation of areas in Brazil, according to the funding agencies, is explained in Chapter 2.

continuum where academic fields are placed according to the nature of their object of study (Pigliucci, 2009).

In Brazilian higher education, internationalisation has taken centre stage, mostly through outward mobility. However, to a lesser extent, it still attracts a diverse cohort of international researchers to work within the country's academic institutions (Ramos, 2017). These scholars, with diverse linguistic repertoires, can potentially diversify, and hence strengthen the linguistic ecosystem in the Brazilian academia.

As for language diversity, Couto (2015) described the concept and approach of ecosystemic linguistics based on parallels with biological ecosystem principles, used to study language phenomena. As in ecology, where the ecosystem is the central concept, in ecosystemic linguistics, the focus is on the interactions between the elements of the linguistic environment, such as individuals, communities and languages. Moreover, just as in ecology, fundamental features aid in the prevalence of an ecosystem, namely, *diversity*, which increases robustness, *openness*, which facilitates exchange with adjacent ecosystems, *adaptation* and *evolution*, which help to ensure survival, among others. This approach recognises that the world is a complex network of interactions, where languages and cultures intertwine and influence one another. As such, the study of the linguistic ecosystem emphasises the importance of interaction and holism, considering the totality of linguistic relationships within a broader context.

These concepts are of particular interest to me and resonate with my experiences as an international student undergoing postgraduate education in Brazil. As a speaker of Spanish as my first language, with English and Portuguese as additional languages, I have leveraged this linguistic repertoire to navigate and write within the linguistically diverse and supportive environment of the Postgraduate Program at UFRGS. I have had the agency to choose the language in which I write, and I have received assistance from colleagues and teachers when

working in Portuguese, my least proficient academic language. This context has prompted me to reflect on the impact of being immersed in Brazilian academia on my scholarly production and how my participation in classes and discussions has prompted translanguaging in academic settings. These reflections have led me to explore the broader implications of language use among international scholars in Brazil.

International scholars contribute to the creation and dissemination of knowledge, and their presence raises important questions regarding the role and impact of international researchers on national academic production and how language proficiency influences their scholarly activities. Therefore, this study is guided by the central question: **What contribution do the academic output and language skills of distinguished international researchers working in Brazil make to the linguistic landscape of Brazilian academia and the promotion of higher education internationalisation in the country?**

This question focuses specifically on the academic output of international researchers working in the Brazilian higher education system, offering a distinctive perspective to help better understand the dynamics of internationalisation. This investigation into the role of language proficiency contributes to the broader discussion on internationalisation and its impact on research activities. It acknowledges that academic practices and language choices may vary across disciplines and that exploring these variations can provide valuable insights into the complex relationship between language and academic production.

To answer this question, a CV<sup>3</sup> Study was conducted. This study systematically gathered data from the Lattes<sup>4</sup> profiles of international researchers who are recipients of CNPq (National Council for Scientific and Technological Development) research productivity grants<sup>5</sup>, from the eight distinct fields of knowledge officially adopted by

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<sup>3</sup> Curriculum vitae.

<sup>4</sup> Online platform used in Brazil to manage academic curricula, which serves as a centralised database for researchers, allowing them to register and organise their academic and professional information.

<sup>5</sup> CNPq research productivity grants are presented in Chapter 2.

CAPES: Agricultural Sciences, Applied Social Sciences, Biological Sciences, Engineering, Exact and Earth Sciences, Health Sciences, Human Sciences, and Linguistics, Literature, and Arts. The data encompassed their academic output, comprising articles, books, book chapters, and complete works published in event proceedings, as well as their self-assessed language proficiency. To establish meaningful insights from this data, an analogous dataset was compiled from Brazilian researchers sharing the same characteristics in terms of field of study and CNPq grant status for comparative analysis.

The present dissertation consists of seven chapters, with this introduction being the first one. In Chapter 2, I contextualise the study by presenting the Brazilian higher education system, and its main actors. In Chapter 3 I cover the role of language in the internationalisation of higher education, language diversity in academic production, as well as previous studies on Applied Linguistics. Chapter 4 describes the methodological procedures of the CV Study. In Chapter 5, the results of the CV study are presented and analysed. Chapter 6 discusses the findings, triangulating these new insights with the context presented in Chapters 2 and 3. Chapter 7 synthesises the results of the study and presents the implications for the Brazilian scholarly and research scenario. Additionally, the study acknowledges its limitations and provides insight into potential avenues for future research in this field.

## Chapter 2: Higher Education in Brazil

In this chapter, I explore and present the Higher Education scenario in Brazil, contextualising and introducing the main actors in the Brazilian higher education system, and providing a panorama of the internationalisation of higher education in the country.

Brazil was one of the latest countries in the region to establish universities, yet one of the fastest to grow and expand. Laus and Morosini (2005) defined four phases to the development of Brazilian higher education, starting with the first colleges or royal academies at the beginning of the 19th century, followed by the foundation of the first Brazilian university, *Universidade de Rio de Janeiro*, in 1920, which prompted the second phase. This period was characterised by a major focus on training, mostly on professional courses in medicine, engineering and law, rather than on research, despite having highly qualified international researchers, mainly from Europe, in their academic staff (Oliven, 2002).

The third phase started with the 1968 university reforms, which were based on “*administrative efficiency, departmental structure and the indivisible triad of teaching, research and extension*”<sup>6</sup> (Laus & Morosini, 2005, p. 114). According to the authors, a Humboldtian model of higher education was established as it was done in Germany and in the United States, holistically weaving research and teaching. Another characteristic of the period was the development of postgraduate education and the sending of Brazilian academics abroad for advanced training, mainly for pursuing doctoral degrees. To fund and regulate graduate education, the federal agency CAPES was established, which “*organized the first evaluation of the graduate programs that links financial support to performance*” (Balbachevsky & Guilhon-Albuquerque, 2021, p. 242). CAPES, together with CNPq, aided in the expansion and development of research and teaching qualifications (Durham, 2012).

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<sup>6</sup> Own translation for “*eficiencia administrativa, estructura departamental y la triada indivisible de enseñanza, investigación y extensión*” (Laus & Morosini, 2005, p. 114).

During the 80s, research activity in Brazil did not only take place at universities. Funding agencies such as CAPES, CNPq, Finep (Financing Agency for Studies and Projects) and FAPESP (São Paulo State Research Foundation) associated directly with the researchers, creating a research system parallel to the university structure (Durham, 2012), i.e., research was promoted inside and outside universities, and researchers did not have to be linked to academic institutions to be applicable for funding<sup>7</sup>.

The fourth phase described by the authors began in the nineties, with the 1988 Constitution and the ratification of laws to regulate higher education, and followed international trends;

Higher education needed to become more flexible in its policies as reflected in the different modalities in which it was offered; the role of central government needed to be reduced; The system needed to be expanded and the way university quality was evaluated expected improvements. The internationalization of the university became a key factor in education in Brazil<sup>8</sup> (Laus & Morosini, 2005, p. 114).

The growth of the higher education system in Brazil was rapid, making it the biggest in Latin America by 2004, with 1,637 institutions (Laus & Morosini, 2005), a number that continued to grow. According to the 2022 higher education census (Brasil, 2023a), it rose to 2,595 institutions: 2,283 private (roughly 88%) and 312 public (12%).

One of the factors that prompted the growth of the higher education system in Brazil was the policies implemented under Lula da Silva and Dilma Rousseff's governments.

Programmes such as the Federal Universities Restructuring and Expansion Programme

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<sup>7</sup> Nowadays, CNPq grantees need to be linked to an academic institution.

<sup>8</sup> Own translation for "La educación superior necesitaba llegar a ser más flexible en sus políticas como se reflejaba en las diferentes modalidades en que se ofrecía; el papel del gobierno central necesitaba reducirse; el sistema requería ampliarse y la forma como la calidad universitaria se evaluaba esperaba mejoras. La internacionalización de la universidad se convirtió en un factor clave de la educación en Brasil" (Laus & Morosini, 2005, p. 114).

(REUNI)<sup>9</sup>, University for All Programme (Programa Universidade para Todos)<sup>10</sup>, Student Financing Fund (Fundo de Financiamento ao Estudante do Ensino Superior, known as FIES) among other public policies had impressive results, raising the number of students from 3.8 million to 8 million between 2003 and 2016 (Balbachevsky & Guilhon-Albuquerque, 2021), and by 2017, 17% of Brazilians between 25 and 34 years old had achieved a tertiary education degree (OECD, 2018). However,

tertiary attainment among young adults (25-34) in Brazil still lags behind the average of OECD countries (43%), and is below all other Latin American countries with available data: Argentina (18%), Chile (30%), Colombia (28%), Costa Rica (28%) and Mexico (23%) (OECD, 2018, p. 81).

This vast higher education system requires governmental bodies to regulate, fund, and oversee its operations. CAPES and CNPq are two of these governmental agencies that contribute to the advancement of knowledge in Brazil, functioning under different ministries.

CAPES, funded in 1951 and linked to the Ministry of Education (MEC), originated from a state policy with the objective of regulating and managing higher education, in order to create a postgraduate policy; one of the characteristics of the aforementioned third phase of the development of Brazilian higher education. Its foundation stems from the perception that *“the qualification of higher education, with the creation of structural conditions for the training of personnel, would be fundamental for the development of the country”*<sup>11</sup> (Mazza, 2009, p. 539).

Earlier in 1951, the Ministry of Science, Technology and Innovation (MCTI) had founded CNPq, partly influenced by the postwar landscape, the need for innovation, and the

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<sup>9</sup> Programme which increases access and permanence in higher education by enabling alternative modalities and preventing students from dropping out, among other actions to reduce social inequalities in the country (REUNI, 2010).

<sup>10</sup> Programme which partially (50%) or fully covers tuition fees for undergraduate and specific training courses at private higher education institutions (Ministério da Educação, n.d.).

<sup>11</sup> Own translation for *“a qualificação do ensino superior, com a criação de condições estruturais de formação de pessoal, seria fundamental para o desenvolvimento do país.”* (Mazza, 2009, p. 539).

salient atomic research interests and concerns. According to Mazza (2009), CNPq intended to involve segments of society such as industry to support research, therefore, “harder sciences” were prioritised. As a means to foster scientific and technological development and contribute to the formulation of national science and technology policies, CNPq provided grants, allowing scientists to conduct research abroad, and favouring academic exchange between Brazil and the United States.

Today, CAPES and CNPq still play a significant role in Brazilian academia. During the current Lula da Silva administration (2023 - 2026), CAPES’s investment in education and research has addressed key issues regarding the valorization of people and confronting inequality. Notable actions include increasing grant values, expanding the number of scholarships, and allocating additional funds to support research activities, laboratory materials, and academic events. CAPES has also implemented programmes to combat inequalities, such as the Abdias Nascimento Academic Development Programme<sup>12</sup>, and launched initiatives to strengthen international partnerships and collaborations. Furthermore, CAPES has focused on improving teacher training by offering specialised courses, promoting the dissemination of educational technologies, and supporting academic events related to teacher education (Agência Brasil, 2023; Brasil, 2023b).

At present, CNPq contributes to the Brazilian academic system by investing in the qualified training of human resources for research through different types of scholarships:

In the country:

- initiation to scientific research
- training and qualification of researchers (internships/specialisation, further training, master's, doctoral and postdoctoral)

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<sup>12</sup> Programme that promotes the inclusion of underrepresented groups, including black, indigenous, and *quilombola* (Afro-Brazilian residents of Quilombo settlements) students, as well as those with developmental disorders or high abilities, in undergraduate and graduate courses in universities and professional and technological education institutes of excellence in Brazil and abroad (Agência Brasil, 2023).



- grants to stimulate research (research productivity, scientific and regional development, new doctorate, visiting researcher, international researcher, institutional management development, visiting institutional specialist and technical support);
- grants for technological business development.

Abroad:

- grants for further training, internships/specialisation, doctorates, sandwich doctorates, post-doctorates, senior internships and institutional agreements and support<sup>13</sup> (Neves, 2002, p. 230).

The research productivity grant (PQ grant), awarded to scholars with a PhD degree, is organised into two categories: level 1 (also known as PQ1), which is subdivided into 1D, 1C, 1B, and 1A (top level), and level 2 (PQ2) or entry-level, and “*each level provides an increasing salary complement*”<sup>14</sup> (Wainer & Vieira, 2013, p. 64). In order to assess and qualify each researcher's performance, bibliometric measurements are developed, and these measurements also guide the promotion of the grantees (Barreto et al., 2013). The grant lasts for a period of three to four years, after which the researchers must apply again. This suggests that the grants are intended to reward and motivate research conducted by outstanding and productive scholars and that they are an indicator of the quality of a researcher's work (Baumvol et al., 2021). This research productivity grant is yet another means by which CNPq promotes Brazilian research universities, which has been done since its creation (Pardini et al., 2023). In addition, public institutions, despite representing only 12% of all Brazilian

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<sup>13</sup> Own translation for “no país: iniciação à pesquisa científica, formação e qualificação de pesquisadores (estágio/ especialização, aperfeiçoamento, mestrado, doutorado e pós-doutorado); bolsas de estímulo à pesquisa (produtividade em pesquisa, desenvolvimento científico e regional, recém-doutor, pesquisador visitante, pesquisador estrangeiro, desenvolvimento de gestão institucional, especialista visitante institucional e apoio técnico); bolsas de desenvolvimento tecnológico empresarial. no exterior: bolsas de aperfeiçoamento, estágio/especialização, doutorado, doutorado sanduíche, pós-doutorado, estágio sênior e convênios e apoios institucionais.” (Neves, 2002, p. 230)

<sup>14</sup> Own translation for “*Cada nível provê uma complementação salarial crescente*” (Wainer & Vieira, 2013, p. 64).

higher education institutions, are the most research-intensive institutions, achieving an outstanding academic output of about 95% of the country's scientific production (Moura, 2019).

Another programme relevant to this study for its objective of promoting academic training abroad was the Science without Borders (Ciência sem Fronteiras) programme, created in 2011 under Dilma Rousseff's government. The Science without Borders programme sought to “*promote the consolidation, expansion and internationalisation of science and technology, innovation and Brazilian competitiveness through international exchange and mobility*”<sup>15</sup> (Brasil, 2022), and was the result of the conjoined work of the Ministry of Science, Technology and Innovation (MCTI) and the Ministry of Education (MEC), through their funding agencies CNPq and CAPES.

The Science without Borders programme was one of the largest student mobility programmes in the world (Altbach & Engberg, 2014). It offered 101,000 study grants, encompassing scholarships to send Brazilian researchers abroad—Sandwich Doctorate, Full Doctorate, Post-Doctorate, Sandwich Undergraduate, Technological Development and Innovation Abroad—and others to bring researchers to Brazil, such as Attracting Young Talent and Special Visiting Researcher scholarships. This investment was justified by the understanding

that through mobility it is possible to obtain better training for scientists and highly qualified personnel, that this mobility is necessary, that there is an urgent need to modernise education in the areas of mathematics, computer science, natural sciences and technology, that the huge deficits in the capacity

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<sup>15</sup> Own translation for “*promover a consolidação, expansão e internacionalização da ciência e tecnologia, da inovação e da competitividade brasileira por meio do intercâmbio e da mobilidade internacional.*” (Brasil, 2022).

for international interaction need to be compensated for and that the formation of networks of scientists and specialists is essential.<sup>16</sup> (Muller, 2013, p. 48).

According to Moura (2018), who analysed how the Science without Borders programme was evaluated by different social actors, during the 2011 - 2018 period, 92,880 of the 101,000 offered grants were used, from which 79% went to undergraduates and 21% to postgraduates and researchers. In the first years of the programme, the number of scholarships actually awarded to undergraduates was lower than expected due to linguistic challenges; Brazilian applicants did not meet the minimum language level requirement for admission to a university abroad (Aveiro, 2014). In fact, Moura's analysis found language barriers to have been among the main difficulties during the implementation of the Science without Borders Programme. As a means to overcome this difficulty, the solution found by the Federal Government was the creation of the English without Borders (*Inglês sem Fronteiras*) programme, considering that the United States was the country with the highest number of applicants, which received a total of 27,821 students, followed by the United Kingdom and Canada (Moura, 2018; Sarmiento et al., 2016).

The English without Borders programme, another national public policy aimed at fostering the internationalisation of Brazilian higher education, was established in December 2012 by the Ministry of Education. Its primary objectives included promoting English language education among Brazilian students to enhance international mobility for undergraduates, contributing to the internationalisation efforts of Brazilian higher education institutions and research centres, improving the language proficiency of all students in Brazilian higher education institutions, and fostering the development of language centres

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<sup>16</sup> Own translation for “através da mobilidade é possível obter uma melhor formação de cientistas e pessoal altamente qualificado, que esta mobilidade é necessária, que é urgente modernizar o ensino nas áreas de matemática, informática, ciências naturais e tecnologia, que os enormes déficits na capacidade de interação internacional precisam ser compensados e que a formação de redes de cientistas e especialistas é imprescindível.” (Muller, 2013, p. 48).

within these institutions (Ministério da Educação, 2012, p. 1). It has contributed to the internationalisation of Brazilian higher education, not only by preparing graduate and undergraduate students for the language exams required to enter English-speaking universities through the Science without Borders programme but also by providing an opportunity to achieve “*a comprehensive and structural change in the teaching of foreign languages in the country's universities*”<sup>17</sup> (Abreu-e-Lima et al., 2016, p. 41).

In November 2013, the Brazilian government together with the Secretariat for Higher Education (*Secretaria de Educação Superior*, Sesu), decided to include French, Mandarin, Japanese, Italian, German, Spanish and Portuguese for foreigners, in the programme, given the demands of students who opted to study in universities where the required language was not necessarily English; and one year later, in November 2014, the Languages without Borders (*Idiomas sem Fronteiras*) programme was created (Abreu-e-Lima & Moraes-Filho, 2016).

As presented, public policies have played a paramount role in the expansion and development of higher education in Brazil for years, and international cooperation has been regarded as one of the main paths to aid in the development of the country. The strategic emphasis on grants and language education has aimed at collaboration and knowledge exchange at a global scale.

Taking into consideration the relevance of international cooperation for the improvement of higher education, and the mostly outbound flow of scholars, more proactive internationalisation policies in Brazilian universities are needed (Neves & Barbosa, 2020), and structural changes are fundamental. The public university system in Brazil meets most of the criteria associated with world-class institutions, i.e., leading or well-positioned institutions in Latin American universities rankings; extensive research university system;

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<sup>17</sup> Own translation for “*uma mudança abrangente e estruturante no ensino de idiomas estrangeiros nas universidades do país*” (Abreu-e-Lima et al., 2016, p. 41).

and highly qualified academic staff, which could prompt international networking and publishing (Alperin, 2013). However, Brazil's strategies for international collaboration are highly influenced by domestic goals, rather than global trends (Sá & Grieco, 2015), and they prioritise outward mobility, at the risk of human capital flight, or substantial emigration of talented individuals, also known as brain drain (Azevedo, 2014; Maués & Bastos, 2017), resulting in a paucity of incentives to attract international scholars (Alperin, 2013). For instance, a quick search on the Lattes platform shows that the total of PhDs and other international researchers working in Brazil adds up to only 25,744 scholars, a rather small population (roughly 0.62% of the total of researchers in the platform) compared to the 4,122,405 total Brazilian researchers working in the country, registered in the same platform<sup>18</sup>.

For reference, the last National Study of Postsecondary Faculty (NSOPF04) applied in the United States of America in 2004 showed that 22.1% of faculty members were foreign-born (Lin, et al., 2009). Additionally, this body of scholars was found to be more productive than their US-born peers and dedicated mostly to research rather than teaching (Kim et al., 2012; Webber & Yang, 2014). The trend of hiring a large number of international scholars (many of whom obtained their degrees in the country of their current employment) is also observed in other English-speaking countries such as the UK, Australia, and Canada. Together with the US, these countries host more than 50% of students studying abroad (Díaz, 2018). Conversely, non-English-speaking countries, namely Italy, Portugal, China, Korea, and Brazil, hire mostly local researchers, many of whom have earned their doctoral degrees abroad (Shin & Lee, 2022).

The openness to different cultural backgrounds within the US academic system has been present for decades, as "*prestigious, selective U.S. colleges use international programs to provide international and cross-cultural perspectives for their students and to enhance*

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<sup>18</sup> Data retrieved from *Plataforma Lattes* <https://lattes.cnpq.br/> on the 04th of March, 2024.

*their curricula*” (Altbach & Knight, 2007, p. 293). That is, alongside, other motivations such as profitability, by charging high fees to international scholars, and competitiveness, through the recruitment of highly talented academics (Altbach & Knight, 2007; Shin & Lee, 2022).

As Brazil increasingly recognises the interconnectedness of knowledge and the importance of diverse perspectives, well-crafted public policies that address both financial and linguistic dimensions become indispensable.

## **2.1 Fields of Knowledge**

For context, and in consideration of the relevance that the organisation of the fields of knowledge within Brazilian academia has for the present study, a brief description of them shall now ensue. The federal funding agencies CAPES and CNPq organise fields of knowledge into eight Major Areas, enabling an agile and functional way of systematising and providing information on research projects and human resources to entities responsible for science and technology administration (Brasil, 2014). These Major Areas are described as follows:

- **Agricultural Sciences:** the study of agricultural production, including crop cultivation, livestock management, soil science, agricultural engineering, and sustainable agricultural practices (Agricultural Sciences, Food Science, Veterinary Medicine, Zootechnics / Fishery Resources).
- **Applied Social Sciences:** the practical application of theories and methods from diverse disciplines to address social issues and inform policymaking (Architecture, Urbanism and Design, Communication and Information, Economy, Law, Public and Business Administration, Accounting Sciences and Tourism, Social work, Urban and Regional Planning/Demography)
- **Biological Sciences:** the study of living organisms and their interactions with the environment (Biodiversity, Biological Sciences).

- Engineering: the application of scientific principles and mathematical techniques to design, develop, and improve systems, structures, machines, and processes (Engineering).
- Exact and Earth Sciences: two distinct but interconnected areas of scientific inquiry. The "Exact Sciences" branch focuses on understanding fundamental principles and laws governing the natural world, exploring mathematical relationships, physical phenomena, chemical properties, and computational algorithms. The "Earth Sciences" branch investigates the Earth's physical, chemical, and biological processes (Astronomy / Physics, Chemistry, Computing, Geosciences, Mathematics / Probability and Statistics).
- Health Sciences: a broad range of disciplines related to human health and well-being. Researchers in health sciences investigate disease prevention, diagnosis, treatment, and healthcare delivery systems (Collective Health, Dentistry, Medicine, Nursing, Nutrition, Pharmacy, Physical education).
- Human Sciences: disciplines that study human society, culture, behaviour, cognition, and ethical and philosophical inquiries (Anthropology / Archeology, Education, Geography, History, Philosophy, Political Science and International Relations, Psychology, Sciences of Religion and Theology, Sociology).
- Linguistics, Literature, and Arts: combines the study of language, literature, and artistic expression. Linguistics focuses on the scientific analysis of language structure, as well as language acquisition, variation, and use. Literature includes the study of written and oral texts, exploring different literary traditions, genres, and periods, including Brazilian, Portuguese, and world literature. The arts encompass various creative practices, including visual arts, performing arts, music, dance, theatre, film, and multimedia arts.

Together, linguistics, literature, and arts contribute to a deeper understanding of language, culture, and human expression (Arts, Linguistics and Literature).

There is a ninth area called Multidisciplinary Studies (sometimes referred to as “Technologies” and/or “others”)<sup>19</sup>, a dynamic field that integrates knowledge and methodologies from multiple disciplines to address complex issues (Bioethics, Biotechnology, Environmental Sciences, Interdisciplinary, Materials, Sciences and Humanities for Basic Education, Scientific Dissemination, Teaching).

International researchers are present to different extents in each of these fields of knowledge. According to the National Postgraduate Plan 2024 - 2028 (Brasil, 2023c), Exact and Earth Sciences and Engineering are the fields with the most international students and post-doctoral researchers. When it comes to international faculty members,

in the broad field of Exact and Earth Sciences, the highest percentage of international professors is concentrated (24%, n=616), followed by the broad field of Human Sciences (18%, n=471) (...). The broad fields within the College of Life Sciences (Agricultural, Health, and Biological Sciences) showed foreign participation below 10% of their faculty<sup>20</sup> (Brasil, 2023c, p. 44).

In this chapter, the context in which this study takes place is presented, and the distinctions of fields of knowledge, which will be later compared, are explained. In the next chapter, the intricate relationship between language and knowledge production will be explored.

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<sup>19</sup> This field is addressed distinctly by different Brazilian institutions, however, in practical applications, and due to its multidisciplinary nature, it is not consistently considered as an area in itself.

<sup>20</sup> Own translation for “na grande área de Exatas e da Terra que se concentra o maior percentual de professores estrangeiros (24%, n=616), seguida pela grande área Ciências Humanas (18%, n=471) (...). As grandes áreas do Colégio das Ciências da Vida (Agrárias, Saúde e Biológicas) apresentaram participação de estrangeiros abaixo de 10% de seu corpo docente” (Brasil, 2023c, p. 44).



### **Chapter 3: The Role of Language in the Internationalisation of Higher Education**

This chapter examines the relationship between language and academic production in the context of the internationalisation of higher education. The multilingual dynamics of scholarly communication within academia are observed.

Language is a crucial conduit for communication and plays a central role in this process, which is shaped by various factors that extend beyond geographical borders. This chapter aims to explore how languages facilitate and influence academia on an international level.

Languages play an important role in the process of globalisation, enabling people of different backgrounds and origins to communicate and engage in various aspects of everyday life. The significance of languages in education extends beyond mere language learning, and its effects can be observed at different levels. For institutions, there is an increasing aspiration to adopt a global perspective, aligning with the emerging concept of global citizenship. And individuals, through education and active engagement, develop an understanding of global issues and, proactively, address them (Ibrahim, 2005). Warner (2011), emphasises the need to maintain the complexity of language in discussions on internationalisation by advocating for the integration of language studies with broader intellectual pursuits, i.e., a holistic understanding of language teaching that encompasses critical thinking and literacy; This perspective positions language as a key player in fostering global awareness.

Language-related issues are becoming increasingly common in international education discussions, underscoring the key role languages play in the internationalisation of higher education. After analysing the programmes of the Brazilian Association for International Education (FAUBAI) Conferences from 2013 to 2017, Baumvol and Sarmento (2019) identified the following main themes: Language Policies, Bilingualism /

Multilingualism, Content and Language Integrated Learning, Additional language(s) as a Medium of Instruction, Language for research and publication purposes, Language and academic mobility, Internationalisation at Home, and Curriculum development and pedagogical practices, placing the languages and internationalisation of higher education dynamic as a hot topic in academia.

Language education is one of the strategies used by higher education institutions to internationalise themselves, which is appealing because it provides “*an international image, prestige and reputation to the institution in question*” (Dearden, 2016, p. 11). This often involves the implementation of English as a Medium of Instruction (EMI), described as “*the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language of the majority of the population is not English*” (Macaro et al., 2018, p. 37). EMI programmes offer an additional advantage through the facilitation of student and staff mobility, attracting international partners and expanding networks. These exchanges enable participation in international events, projects and research, and it has been stated that “*refusing to implement EMI is therefore likely to result in international invisibility*” (Gröblinger, 2017, p. 3).

As discussed above, English plays an important role in the professional and academic development of university lecturers and the institutional development of higher education institutions (Naka, 2022). Scholars worldwide are expected to at least be able to comprehend and produce in English so that they can engage in the discussions taking place in their international communities, after all, English dominates communications globally, and its influence permeates into academia by being used as *lingua franca*<sup>21</sup> to disseminate knowledge through most academic journals (Altbach, 2004; Altbach & Teichler, 2001; Shimauchi, 2018).

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<sup>21</sup> Defined as “*a 'contact language' between persons who share neither a common native tongue nor a common (national) culture, and for whom English is the chosen foreign language of communication*” (Firth, 1996, p. 240).

Hamel (2007), while studying the language dynamics in academia, in an attempt to better understand the dominance of English in scientific publication, lays out a historical outlook. The author presents a chronology of languages in science elaborated by Henriette Walter (1996). Her findings show that historically, one language at a time had served as the main vehicle for science: from Sumerian (astronomy and mathematics) to Akkadian (notably mathematical demonstrations), Ancient Egyptian (religious, mathematical and medical texts), and Greek (notably philosophy and mathematics). After a hiatus in scientific research caused by the prioritisation of technological advances and conquests of the Roman Empire, science had a revival at the hands of the Arabs during the 8th century, introducing Greek Science to the West.

The heritage of Greek thinkers was translated into Arabic and then Latin, and disseminated in Arab Spain during the 11th century and Sicily during the 13th century, a period during which great scientific advances had developed, i.e., chemistry, physics and philosophy. According to Walter (1996), the Greek language resurfaced during the Renaissance, as people became interested in Hellenic philosophers; *“Furthermore, while Latin continued to be the predominant language of science, some became emboldened at this time to write scientific works in their national languages”*<sup>22</sup> (Walter, 1996, p. 31).

During the 16th and 17th centuries, national languages were used in science; *“basically French, English and later on German, gradually substituted Latin”* (Hamel, 2007, p. 55). At first, the French language took centre stage during the Age of Enlightenment up until the end of the 18th century, however, as France’s influence declined, in academia English and German grew, so much so that by the 20th century the three languages were relatively balanced in science, although, differently distributed across disciplines. This restricted plurilingualism in science transitioned to the English era in academic production,

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<sup>22</sup> Own translation for *“En outre, tandis que le latin continue d’être la langue prédominante de la science, certains s’enhardissent à cette époque jusqu’à écrire des ouvrages scientifiques dans leurs langues nationales”*. (Walter, 1996, p. 31).

influenced by the economic and political dominance of the United States of America in the post-war landscape, establishing English as the dominant language in international communication (Ammon, 2006, 2007; Hamel, 2007), and the “*default language of science, academic research and dissemination*” (Lillis & Curry, 2010, p. 1).

This discourse is being normalised and accepted by scholars all around the world, which has prompted the creation of English medium "national" (EMN) journals in countries where English is not a local language, as exposed by Lillis (2012). The author highlights the dominance of English in academia, emphasising its perceived value in effective communication and its role in determining the "exchange value<sup>23</sup>" of academic journals. She argues for a broader understanding of global academic production, emphasising the multilingual nature of scholarly work and the importance of recognising diverse knowledge-making communities. Lillis (2012) regards EMN journals as channels that open ways for scholars aiming to publish in anglophone centre journals and enable international discussions about local issues.

However, this positive perception of English as an enabler of international exchange is far from unanimous among scholars. Phillipson (1992; 2018) argues that this phenomenon fosters linguistic imperialism, sustaining the influence of the United Kingdom and the United States by imposing a monolingual, neoliberal regime. Additionally, critical voices question the use of English as the language of instruction, positing that it contributes to the perpetuation of social inequalities. Some academics assert that this preference for the predominance of the English language ultimately supports the American Higher Education system (Marginson, 2007, as cited in Neves & Barbosa, 2020, p. 151). While faculty members understand the practicality of using English as a lingua franca, they claim that it

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<sup>23</sup> The term "exchange value" in this context represents the standing and recognition of EMN journals within the global academic marketplace, with a focus on how they are evaluated and positioned in comparison to other journals, particularly those in English and often in high-status indexes.

*“may also entail a loss of diversity of scholarship through different tongues and different discourses”* (Gonzalez, 2017, p. 56).

The dominance of English in research publications may present challenges for plurilingual scholars who use English as an additional language (EAL)<sup>24</sup>. These challenges may include low language proficiency, issues with rhetorical transfer, meeting standards of intelligibility and clarity in academic writing, and linguistic and cultural barriers, despite passing standardised English tests (Flowerdew, 2019; Navarro et al., 2017; Tananuraksakul, 2012). Still, this group of scholars represents the majority of researchers seeking to publish in English (Flowerdew, 2022; Hyland, 2016).

This scenario has prompted the emergence of English for Academic Purposes (EAP), within the broader field of English for Specific Purposes (ESP). EAP is a specialised form of English instruction designed to support students in their academic activities; it takes into consideration the demands of particular academic disciplines to better prepare scholars, and meet their communicative needs so that they can participate in academic discussions (Hyland & Hamp-Lyons, 2002).

From EAP, English for Research and Publication Purposes (ERPP) emerged as an even more specialised subset narrowing its focus to the demands of writing and research publication. Its development stems from the interest in understanding and addressing the needs of plurilingual EAL scholars in the context of research and publication and the language dynamics in academia. The concept was coined by Cargill & Burgess (2008), who introduced it as

a branch of EAP addressing the concerns of professional researchers and post-graduate students who need to publish in peer-reviewed international

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<sup>24</sup> The use of the term “plurilingual EAL scholars” aligns with the stance presented by Corcoran et al., (2019), which respects the self-identification as such of scholars in the field while rejecting problematic terms such as “non-native” which may imply a deficit perspective, reinforcing monolingual ideologies and perpetuating language hierarchies in academia.

journals. It is now almost a truism to say that the vast majority of these journals are published in English, and that this presents considerable challenges to users of English as an Additional Language (EAL), regardless of the field in which they work (Cargill & Burgess, 2008, p. 75).

Flowerdew (2013) addresses ERPP-related issues, highlighting its global significance and the challenges faced by plurilingual EAL scholars. Among his findings, he discusses the resistance towards using English as a Lingua Franca (ELF), normally employed in academic exchanges for oral communication and informal writing, for academic writing, on which standardised forms of English are taught and expected e.g. Standard British or American English. The author also presents the fact that some journals still require submissions to be checked by a “native speaker”, creating yet another disadvantage for scholars whose first language is not English, perpetuating the dominance of “native speakers” of English, which he suggests, citing Davies (1999), are a minority. This situation gives these scholars whose first language is English an advantage described as a “free ride”, as they do not need to invest in learning an additional language, but can work at grasping the particular register and genres that are common in academic writing (Flowerdew, 2013).

In the same work, the author mentions two more points that are relevant to this study. Firstly, he acknowledges a positive aspect of the use of ERPP, mainly that it enables *“scholars to communicate with each other across borders and thereby promote the global dissemination of knowledge”* (Flowerdew, 2013, p. 2). He further remarks on the use of English as an international language in other fields, and questions why it is not used for scholarly publication in the same way. Secondly, Flowerdew mentions the Institute of Scientific Information (ISI), the largest academic journal indexing system, which explicitly prioritises journals that publish works in English and sets a trend, suggesting that journals

with full texts in English are likely to be more influential within the international research community.

This scenario is one of the factors that are considered in studies that observe language choice for scholarly publication, and that influences the behaviour of *discourse communities*; a concept present in the ethnographic study conducted by Curry & Lillis (2004). For the authors, the term discourse community “*is often used to emphasize the language and discourse associated with a specific group or community- in particular, the texts and genres produced for particular purposes*” (Curry & Lillis, 2004, p. 665).

This notion was useful for the authors to observe the relationship between texts and practice within a group of psychology scholars from different countries (Slovakia, Hungary and Spain) and with different first languages (L1), publishing in local languages and English. Among the findings, the authors entail the perceived increasing demand for these scholars towards publishing in English, while still publishing in local languages for different discourse communities to maintain local researchers engaged, and work on their academic growth in systems where publishing in English is rewarded.

These results are echoed in subsequent studies. For instance, a study conducted by Hamid (2006) in Bangladesh, in which 36 Bangladeshi English teachers with Bangla as their L1 participated, concludes that most of these teachers prefer to publish in English, with a few of them publishing in both English and Bangla, not only because of their education but mainly due to institutional imperatives and perceptions of the comparative linguistic value of the languages, favouring English for having a “*higher symbolic value for academic publication than Bangla*” (Hamid, 2006, p. 130) and a wider readership potential.

Another study (Burgess et al., 2014) examined the success rates and challenges faced by historians and psychologists from Spanish universities and research institutions, in publishing research articles in both English and Spanish. Their findings show that the

scholars experienced higher acceptance rates and fewer revisions when submitting manuscripts in Spanish compared to English and that outright rejection was more common for manuscripts submitted in English. Despite its cost, this prompted scholars to resource to translation, suggesting its effectiveness in meeting their publication goals. Even though some of the scholars reported not feeling pressured to write in English, historians expressed concerns about the increasing emphasis on English publication, fearing neglect of other essential skills in their discipline, highlighting the tensions between privileging English in research evaluation policies and the desire to preserve linguistic diversity in scholarly publishing.

In a more recent study, Stockemer & Wigginton (2019) surveyed more than 800 authors of scientific papers in Springer Nature journals, a leading academic publishing company, in an attempt to identify factors behind the tendency of plurilingual EAL scholars to publish in English. Among their findings, it is shown again that scholars believe that publishing in English increases the reputation of their work, and they feel some pressure from tenure requirements that favour English publications.

Other interesting findings link place of employment and disciplinary differences; Scholars employed by universities are more likely to submit their articles in English compared to those working for think tanks, research centres, or other non-university environments. Regarding disciplinary differences, scholars in the natural sciences<sup>25</sup> are more likely to publish in English compared to those in the social sciences or interdisciplinary fields. As stated by the authors, “*Natural science fields and university settings are becoming increasingly globalized; in order to reach the most possible fellow academics in the field scholars face pressure to publish their work in the most-used language*” (Stockemer & Wigginton, 2019, p. 650).

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<sup>25</sup> Disciplines concerned with describing and understanding natural phenomena, namely astronomy, physics, chemistry, Earth science, and biology.



These studies collectively highlight the complex interplay of factors that influence language choice in academic publishing.

When testing the hypothesis of articles in English being more visible and cited, Di Bitetti & Ferreras (2017) found that these

have a higher chance of being cited and a higher number of citations than those published in other languages. So there seems to be a punishment, in terms of citation rates, for those journals accepting the publication of articles in languages other than English and for those non-NES scientists [bilingual EAL scholars] that publish their research work in their native language (Di Bitetti & Ferreras, 2017, p. 123).

These findings lead the authors to rephrase the saying “publish or perish” as “publish in English or perish”, given the great emphasis there is in academia towards English language publication and how failing to adhere to this tendency may result in academic invisibility.

Hamel (2013) describes the dominance of English in academic production, arguing that by the year 2000, English language works represented 82% of publications in the social sciences and humanities, and 90-95% of publications in natural sciences, and added that in the following years, English dominance increased in natural sciences journals, making publications in German to virtually disappear. In fact, “*numerous journals published in Germany, Austria or Switzerland (...) [have] changed their language of publication and often also their names from German to English*” (Ammon, 2012, p. 344). Hamel also stated that Spanish is present in only 0.5% of the articles from natural sciences and in 2.5% of the articles in human and social sciences, leading the researcher to assert that “*increasingly, non-English-speaking scientists are publishing in English while conducting their research and teaching in their own language*”<sup>26</sup> (Hamel, 2013, p. 323).

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<sup>26</sup> Own translation for “*cada vez más científicos no anglófonos publican en inglés, mientras realizan su investigación y su enseñanza en su propio idioma*” (Hamel, 2013, p. 323)

Ammon (2012) noted that the shift to English publication in human and social sciences, while widespread, has been less extensive than in the natural sciences, indicating that works in French, German, Russian and Spanish language are still considerably produced by these scholars. For humanities scholars, publishing in their L1 is even more extensive than in the social sciences, which may result from the *“frequently topical focus of texts on their own community and the enormous difficulty of meeting the stylistic standards of texts in the humanities in a foreign language”* (Ammon, 2012, p. 340).

Diverse works have shown how dominant academic structures from the Global North influence publication gatekeeping mechanisms, leading to structural inequalities and a bias towards Western ways of thinking (Canagarajah, 1996; Flowerdew, 2008; Muñoz-García et al., 2022). More recently, Kuteeva (2023) acknowledges these notions, while recognising that English facilitates increased international participation and communication, leading to changes in the language itself to prioritise clarity (probably hinting at ELF becoming more accepted in academia) stating that *“In the context of international knowledge exchanges, English serves both as a bridge and a fence”* (Kuteeva, 2023, p. 80). These topics are still being studied and, the more disseminated they become, and the more discussed they are across fields of study, the sooner structural changes may emerge, fostering a more egalitarian academic global system, and equipping plurilingual EAL scholars with tools to navigate this challenging environment.

An interesting stance from the University of Aveiro in Portugal is described by Moreira (2020) in a case study. In the pursuit of becoming a university of international recognition, the institution acknowledges the importance of language-friendly and language-skilled environments. The study highlights the challenges faced by institutions that are not in the mainstream of the Anglophone higher education sphere, emphasising that relying solely on adopting EMI is insufficient to meet local and international demands.

Instead, the institution's approach involves a delicate balance between two lingua francas: Portuguese and English. It recognises the contribution of languages, not just as tools for instruction, but as integral components shaping institutional life and graduate profiles, emphasising the importance of languages in various dimensions, from curricular paths and bilingual contexts to international partnerships and the development of international competencies among graduates.

### **3.1 Previous Studies in Brazil**

Gimenez & Passoni (2016) stated that the impact and scale of the Science without Borders, and the subsequent English/Languages without Borders programmes in Brazil, led to adjustments in higher education institutions towards internationalisation processes. In turn, for Applied Linguistics, this scenario prompted the rise of research on the internationalisation of higher education and the role languages play in it.

The nature and focus of these studies vary due to the diverse linguistic implications of the internationalisation of higher education in Brazil: from the importance of multilingualism and the need for English language learning in this context (Ferreira, 2022; Finardi, 2019), the social and linguistic challenges experienced by exchange students in Brazil (Guilherme et al., 2017; Sena et al., 2014), the need for a critical approach to internationalisation, calling for the deconstruction of hierarchical power dynamics (Finardi et al., 2019), the role of English as a medium of instruction and the need for alternative language policies to promote multilingualism (Marengo, 2022; Taquini & Finardi, 2021), to the languages used for scholarly production in Brazil across fields of knowledge (Baumvol, 2018; Baumvol et al., 2021; Finardi & França, 2016; Garcez, 2019).

In a bibliographical study, Finardi (2019) presents recent language policies implemented in Brazil. At an institutional level, the author mentions policies that favour the internationalisation of higher education through the promotion of foreign language teaching

in universities such as the Federal University of the ABC (UFABC), i.e., implementing EMI, a practice in its early stages and not yet widespread in the country (Baumvol & Sarmento, 2016, 2019; Finardi, 2019; Gimenez et al., 2018; Guimarães & Kremer, 2020; Marengo, 2022). Finardi also presents Brazilian internationalisation programmes: the aforementioned Science without Borders and Languages without Borders, and the more recent CAPES-PrInt (Institutional Programme for Internationalisation from CAPES), signalling that it prioritises internationalisation agreements with countries primarily located in Europe and North America, and emphasises the use of English and Portuguese, indicating an implicit language policy within internationalisation efforts. This study also remarks on the need for cooperation among Latin American countries to balance internationalisation efforts and avoid dependence on Northern institutions, prompting Finardi to conclude that, while “English should be seen as an international language and should be taught as such, as a mandatory language in compulsory school” (2019, p. 668), other foreign languages should also be offered according to each individual context.

Ferreira (2022), agrees with the conclusions regarding the central role of English in academia and exposes the linguistic demands of Brazilian scholars, both faculty and students, linked to the pressure to participate in international discussions through publication, customarily in English. The author also discusses that academic English is not effectively taught by private institutions or in regular language schools, since the users have to get acquainted with conventions of academic discourse that are common for their specific disciplines, arguing that “*it is universities’ duty to provide assistance for the learning of academic use of these languages*” (Ferreira, 2022, p. 17). In her essay, Ferreira calls for the institutionalisation of learning and use of English (and other additional languages) for academic purposes in universities, increasing proficiency and expanding the potential reach of the voices from the South in the international academic community.

Finardi has extensively studied the internationalisation of higher education in Brazil, and in 2019, together with Guimarães & Mendes, carried out a meta-analysis of the studies about the topic conducted by the research group of which these scholars are part: 26 articles and book chapters published over a 5-year period (2014-2018). Finardi et al. (2019) reinstate the pivotal role additional languages have in the internationalisation of higher education. The authors also describe the internationalisation of Brazilian higher education as passive<sup>27</sup>, reactive, and dependent on governmental programmes. Furthermore, their most important finding is that *“there is a gap between the principles and the language policies to guide the internationalization process in Brazil”* (Finardi et al., 2019, p. 11).

The Report of the Working Group on Language Policies for Internationalisation of the Brazilian Association for International Education (FAUBAI, 2017) suggests six dimensions to be considered when analysing institutional language policies in order to reduce the gap identified. Finardi et al. (2019) describe these dimensions as follows:

The language (or languages) of admission (1) is the one used by the institution to select students, usually through entrance exams. Language teaching (2) must take into account the languages that are considered valuable for universities and students to achieve their objectives, especially those related to internationalization. The language of instruction (3) is the language (or languages) used to educate students, depending on their field of study. The language in point 4 [language of research] refers specifically to the language of international cooperation for research, 5 [language of administration] to the language of internal institutional communications and 6 [language of external communication] to the language of communications with other institutions (Finardi et al., 2019, p. 12).

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<sup>27</sup> Adoption of models appropriate for central or hegemonic countries by peripheral countries without taking into consideration local contexts and needs, or poorly adapted (Lima & Maranhão, 2009).

Another aspect highlighted by the authors relates to critical internationalisation. Awareness of the hegemonic globalisation and colonial practices within academia, i.e., pursuing standardisation of curricula deviating from local contexts and practices, is not enough to ensure a fruitful internationalisation that reduces the gap between hegemonic and peripheral countries.

Taking into consideration the degree of dependence that internationalisation activities have on public policies and governmental initiatives in Brazil, the authors conclude that the motivations behind internationalisation initiatives from the government and higher education institutions should be reconsidered; these should aim to reduce inequality and deconstruct the dominant hierarchical models by thinking locally and acting globally, fostering regional integration and cooperation (Finardi et al., 2019).

Another topic of interest within Applied Linguistics observes the disciplinary differences across fields of knowledge in terms of language practice, particularly, in academic production. In her doctoral thesis, Baumvol (2018) applied a questionnaire and conducted a CV study to analyse the language practices of scholars working in Brazil. The author compared the output (articles, books, book chapters and complete papers in conference proceedings) of 1,874 academics, and found that scholars from the “harder” sciences, especially Health Sciences, Agricultural Sciences and Engineering scholars were the most productive, publishing at least twice as many works as their peers from Linguistics, Literature, and Arts, and Human Sciences. The author also found that scholars from fields considered “harder” sciences published only in Portuguese and in English, whereas their peers from “softer” sciences did publish, although to a lesser extent, in other languages. Moreover, observing the distribution of works in Portuguese and English across fields of knowledge, Baumvol (2018) found that in the fields of Applied Social Sciences, Human Sciences, and Linguistics, Literature, and Arts, publishing in Portuguese was more common

than in English, as is the case in the fields considered as “harder” sciences. This study also found that articles are the most popular type of publication across Brazilian academia, except for Engineering, in which complete papers in conference proceedings are more common, and Linguistics, Literature, and Arts, where book chapters are the main vehicle for knowledge dissemination, although, in both cases, these top-ranked genres were closely followed by articles. The author did find some different distribution of preferences on types of publications when the language used for them was taken into consideration, stating that

with regards to the number and types of publications in Portuguese, the analyses indicated that, in general, (1) Applied Social Sciences was predominant in all four types of publication; (2) Agricultural Sciences prevailed in articles, book chapters, and complete papers in conference proceedings; (3) Human Sciences was predominant in articles, books, and complete papers in conference proceedings; (4) Health Sciences prevailed in articles and book chapters; and Linguistics, Literature, and Arts dominated in books and book chapters. In English-medium publications, all five fields of knowledge that constitute the ‘harder’ sciences were predominant in articles; Engineering, Exact and Earth Sciences, and Applied Social Sciences were dominant in complete papers in conference proceedings; and Linguistics, Literature, and Arts was predominant in English-medium books. It is worth noting that in English-medium articles, Applied Social Sciences prevailed over the other two fields from the ‘softer’ sciences (Baumvol, 2018, p. 135).

These results prompted the author to suppose that these differences, especially regarding the choice of languages, may be due to a more rapid adaptation to the requirements established by evaluation and funding agencies regarding citation indexes in the “harder” sciences. The author also suggests that the growing presence of articles in the “softer”

sciences fields of knowledge may entail a shift in the traditional publishing practice, considering that

Books and book chapters attract fewer citations, especially those with limited online access which are placed in a repository, and are often published by much smaller and local publishing houses in comparison to articles and papers in conference proceedings, which may make evaluation agencies see them as not fulfilling quality control (Baumvol, 2018, p. 177).

Baumvol (2018) also observed the self-rated language proficiency of scholars across the fields of knowledge recognised in Brazilian academia through a questionnaire, and the results indicate that researchers from Biological Sciences, Engineering, and Exact and Earth Sciences, self-assess their English proficiency higher than their peers from other fields of knowledge. This same group was also found to use English for publication much more frequently than researchers from other areas when their CVs were studied. The researcher implies that these facts are related, but it is unclear which is the result of the other. However, she does suggest that the closer familiarity with the English language of scholars from the “harder” sciences might be due to greater exposure to English texts from an early point in their academic career, i.e., since the beginning of their post-secondary education, which is not the norm for the disciplinary communities from the “softer” sciences.

When Baumvol (2018) triangulated the results of the scholars’ self-assessed language proficiency and their publication practices, the author suggested the common trends in which:

“(1) the preference of English over Portuguese in Biological Sciences, Engineering, and Exact and Earth Sciences to share knowledge might be associated to scholars’ higher self-rated English proficiency; and (2) the preference of Portuguese over English to share knowledge in Human Sciences might be related to their lower self-rated English proficiency. It should be



noted that, as stated before, the greater use of English or Portuguese is also attributed to a range of other factors” (Baumvol, 2018, p. 195)

When contrasting publishing practices across fields of knowledge, Baumvol (2018) pointed out that co-authorship of research articles is more common in the “harder sciences”. She explains that this could be due to the fact that national and international collaborations are more common in these fields, resulting in “harder sciences” scholars authoring more articles than their peers from the social and human sciences, for instance, where co-authorship is less frequent.

When further studying disciplinary differences that may influence publication practices across fields of knowledge, Baumvol et al. (2021) consider diverse facts, among which they mentioned:

- Journal articles are more important for scholarly communication in the “harder” sciences, whereas books and monographs are also considered relevant in the “softer” sciences.
- The speed of publishing is not as crucial in the arts and humanities areas as in more experimental and empirical subject areas.
- The distinct academic cultures, characterised by different levels of endo- or exocentricity, internationalisation or anglicisation, and how anglophone or local-language-oriented they may be (Lopez-Navarro, et al., 2015).
- Different availability and access to literacy brokers<sup>28</sup>, more usually resourced to by scholars from the “harder” sciences.

The authors conclude that the specific needs of each disciplinary community should be further analysed and more studies of this nature are needed, so that policy-makers are

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<sup>28</sup> Language mediators who assist others with reading and writing, to facilitate understanding and diminish linguistic, cultural and textual divides (Mihut, 2014).

informed of the realities and challenges present in Brazilian academia, and institutional changes are implemented, for the improvement of the writing competence of local scholars.

Finardi & França (2016) studied academic production in the Arts and Humanities area, focusing on Language and Linguistics, in the form of articles published in Portuguese and English, to reflect on the role of English in Brazilian academia. Their findings point to a limited production of articles in English, and a lower citation rate for these works, resulting in restricted visibility and circulation of these works at international levels. Similar findings were documented by Garcez (2019) when he analysed the academic output in the form of articles, books and book chapters in a 10-year period (2007-2017) of 37 top researchers, PQ 1 grantees (CNPq productivity grantees levels 1D through 1A), from the Applied Linguistics subarea, found through the Lattes platform. His findings indicate a preference for book chapters, totalling 706, with only 119 in English and 27 in other languages. Articles followed, with 657, of which 91 were in English and seven in other languages. Only 18 of these articles were considered high-profile international publications, resulting in low productivity at 0.04 per researcher annually. Books were less common, totalling 313, with 49 in English and five in other languages. Garcez (2019) interprets these results by referring to Applied Linguistics academic production in Brazil as insular. There are means by which scholars can publish and meet the requirements to be regarded as highly productive and rewarded for their work, hence the distribution of CNPq grants among these scholars. However, these channels are local which limits dialogue with non-lusophone scholars, only enabled by the little output in English and other languages, and the even more scarce publication of high-profile international articles.

In this section, the relationship between languages and knowledge production in the context of the internationalisation of higher education was presented, and findings from previous studies on the matter were included. These studies will be used to analyse the results

of the present work. In the next chapter, the methodological procedure of this study is explained, and the sample is described.

## Chapter 4: Methodology

This chapter outlines the methodology used to conduct the Comparative Study of Scholarly Production and Language Proficiency for this dissertation. The primary objective of this study is to describe the linguistic profile of international researchers with a CNPq productivity grant, and the linguistic diversity in their scholarly production, identifying their contributions to the Brazilian academia. To achieve this goal, a comprehensive methodology was designed to gather and analyse data from both international and Brazilian researchers with a CNPq productivity grant across eight<sup>29</sup> fields of knowledge as defined by CAPES and CNPq. The study focuses on comparing the scholarly output and the language proficiency of these two groups, aiming to shed light on the role of diversity (in terms of nationalities and languages) in the Brazilian academic production.

This study is guided by the question: **What contribution do the academic output and language skills of distinguished international researchers working in Brazil make to the linguistic landscape of Brazilian academia and the promotion of higher education internationalisation in the country?**

The specific objectives of this study are:

- To examine the academic production of international PQ grantees across all fields of knowledge within Brazilian academia.
- To identify the linguistic profile in terms of language proficiency of international scholars with a PQ grant working within Brazilian academia.

For that, four research questions are presented:

1) What are the types and quantities of publications produced by international scholars across fields of knowledge and how do they compare to those of Brazilian researchers?;

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<sup>29</sup> During the data collection process, explained below, it was found that no CVs were registered under the “Others” and “Technologies” fields, therefore, these were not considered in this research.

- 2) In what languages do PQ grantee international scholars across fields of knowledge choose to publish and how do those choices compare to those of Brazilian researchers?;
- 3) In what languages are international researchers proficient? and
- 4) Is there a correlation between scholars' language proficiency and their language choice for publication?

The research population for this study includes all international researchers with a PQ grant working in Brazil, representing the entire population, while the Brazilian researchers were sampled to be exactly the same size and distribution in terms of grant level and field as the population of international researchers. This approach ensures a balanced and representative sample for both groups. The study includes researchers from eight fields of knowledge: Agricultural Sciences, Applied Social Sciences, Biological Sciences, Engineering, Exact and Earth Sciences, Health Sciences, Human Sciences, and Language, Literature, and Arts.

The PQ grantees were chosen as the focus for this study, since, among other requirements like holding the title of doctor or lecturer, having an active and regular CPF (Brazilian ID card number), and having a formal link with the institution where the project will be carried out, they are expected to keep their profiles and CVs on the platform updated. In addition, their commitment to keep their profiles and CVs updated on the platform contributes to the reliability and timeliness of the data collected. Data collection began in March 2023, coinciding with the annual update of the new PQ grant levels.

Table 1 exhibits the filters applied on the Lattes search engine to select the first half of the CVs collected for analysis, corresponding to the international researchers working in Brazil.

**Table 1**

*Search Strategy*

<b>Lattes Platform Filters</b>	
Database	PhD, Foreign
CNPq Productivity Researchers	Category/level of grant: 1A; 1B; 1C; 1D; 2
Professional Activity	Major Areas: Agricultural Sciences; Applied Social Sciences; Biological Sciences; Engineering; Exact and Earth Sciences; Health Sciences; Human Sciences; Linguistics.
Professional activities (institution)	Country: Brazil.

Figure 1, below, shows the layout of the Lattes search engine. At the bottom of the image, there are the filters that can be applied, the above-mentioned ones among them.

**Figure 1**

*Lattes Platform Search Engine*

The screenshot displays the Lattes Platform Search Engine interface. At the top, it says "Buscar Currículo Lattes (Busca Simples)" with a link to "Busca Avançada". Below this, there is a search bar and a section for "Seleção o modo de busca" with options for "Nome" (checked) and "Assunto(Título ou palavra chave da produção)".

Underneath, there are three filter sections: "Nas bases" with "Doutores" (checked) and "Demais pesquisadores (Mestres, Graduados, Estudantes, Técnicos, etc.)"; "Nacionalidade:" with "Brasileira" and "Estrangeira" (checked); and "País de nacionalidade:" with a dropdown menu set to "Todos".

At the bottom, there is a "Tipo de filtro" section with two tabs: "Filtros" (active) and "Preferências". The "Filtros" section contains a grid of checkboxes for various criteria: "Bolsistas de Produtividade do CNPq" (checked), "Formação Acadêmica/Titulação", "Atuação profissional" (checked), "Idioma", "Atividade Profissional (Instituição)" (checked), "Outros Bolsistas do CNPq", "Nível do Curso de Pós-graduação onde é Docente", "Atividade de Orientação", "Áreas ou Setores da Produção em C&T", and "Presença no Diretório de Grupos de pesquisa". A "Buscar" button is located at the bottom right of the filter section.

*Note.* Source: CNPq, retrieved on February 5th, 2024, from

<https://buscatextual.cnpq.br/buscatextual/busca.do>

## 4.1 Academic Output

The researchers' CVs were extracted from the Lattes platform in XML format and run through the free software Coletaprod (Murakami, 2020) developed for processing the scientific production of researchers available on Lattes. The software provides an overview of an individual researcher's work, indicating, among other information, how many texts per language have been published. The categories of scholarly output collected were: Articles published in journals, Books authored or co-authored, Book chapters contributed and Complete papers published in conference proceedings. This allowed for a comprehensive comparison of the language diversity in the academic production of both Brazilian and international researchers. Figure 2, below, shows some of the filters that were used in the Coletaprod software. These correspond to the nature of the work, which had to be *complete*; type of material, which had to be *published article*, *published or organised book*, *published book chapter*; and languages, where all languages were considered.

**Figure 2**

*Filters Used In The Coletaprod Software*

Natureza	Tipo de material	Idioma
COMPLETO 197	Artigo publicado 161	Português 138
RESUMO 60	Trabalhos em eventos 103	Inglês 136
RESUMO_EXPANDIDO 7	Capitulo de livro publicado 9	Espanhol 3
JORNAL_DE_NOTICIAS 2	Textos em jornais de noticias/revistas 3	
NAO_INFORMADO 1	Livro publicado ou organizado 1	

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*Note.* Source: Coletaprod, Retrieved from the interface of the software.

Once filtered, these results were manually checked to confirm that the language specified by the researchers upon adding the work to their Lattes curriculum matched the language of each respective work. Subsequently, they were organised on a spreadsheet for later analysis.

#### 4.2 Self-rated Language Proficiency

To assess language proficiency, data from the Lattes CVs of both international and Brazilian researchers were collected, focusing on their self-reported language skills.

In the Lattes CV, researchers indicate the languages they use and evaluate their proficiency in four skills: comprehension, speaking, reading, and writing, categorising their abilities as *advanced*, *intermediate*, or *basic*<sup>30</sup>.

Self-assessment systems seem to deliver valid and fairly accurate data, as attested by several authors (LeBlanc & Painchaud, 1985; Oscarson, 1989; Wilson, 1999). These assessments were also organised on the spreadsheet, and, to transform them into quantifiable measures, a score was assigned to each level of language proficiency, with “advanced” scored as 3, signifying a high level of proficiency, “intermediate” scored as 2, indicating a moderate level of proficiency, and “basic” scored as 1, reflecting a low level of language proficiency. After that, the assigned score of each language skill was summed, resulting in a proficiency score ranging from 0 (reflecting no proficiency) to 12 (indicating maximal proficiency) for each language listed in the researchers' CVs. This method allowed for an evaluation of language proficiency and facilitated cross-language proficiency comparisons among the researchers within the study, offering an approach to analyse and interpret proficiency levels across languages.

Figure 3 shows how scholars' language proficiency is displayed on their Lattes CVs.

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<sup>30</sup> The Lattes platform uses the terms “*bem*” (well), “*razoavelmente*” (reasonably) and “*pouco*” (little) to describe language proficiency levels. However, “advanced”, “intermediate” and “basic” were chosen in this study because they are more commonly used to indicate proficiency levels in additional languages in English.



### Figure 3

#### *Self-Rated Language Proficiency As Shown In Lattes CVs*

##### Idiomas

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<b>Alemão</b>	Compreende Bem, Fala Bem, Lê Bem, Escreve Bem.
<b>Inglês</b>	Compreende Bem, Fala Bem, Lê Bem, Escreve Bem.
<b>Italiano</b>	Compreende Bem, Fala Razoavelmente, Lê Bem, Escreve Razoavelmente.
<b>Espanhol</b>	Compreende Bem, Fala Razoavelmente, Lê Bem, Escreve Pouco.
<b>Português</b>	Compreende Bem, Fala Bem, Lê Bem, Escreve Bem.

*Note.* Source: CNPq, retrieved on February 5, 2024, from a researcher's Lattes CV. The image shows the Languages section showing the self-rated language proficiencies: German (advanced comprehension, speaking, reading and writing), English (advanced comprehension, speaking, reading and writing), Italian (advanced comprehension and reading, and intermediate speaking, and writing), Spanish (advanced comprehension and reading, intermediate speaking, and basic writing), and Portuguese (advanced comprehension, speaking, reading and writing).

For example, this researcher would reach 12 points of proficiency in German, English and Portuguese, since they assess all four skills at an advanced level (3 points for each) in those languages. For Italian, they would score 10 points (advanced comprehension = 3, intermediate speaking = 2, advanced reading = 3, intermediate writing = 2), and for Spanish, they would score 9 points (advanced comprehension = 3, intermediate speaking = 2, advanced reading = 3, basic writing = 1).

### 4.3 Participants Profile

The search strategy presented in Table 1 resulted in 527 profiles of international researchers, encompassing the totality of international researchers who work across the eight distinct fields of knowledge, who hold a PQ grant and work in Brazilian institutions. After

classifying these profiles according to the field of knowledge in which they work, it was noted that some of these researchers have traversed various areas of knowledge, making it difficult to group them into any specific field. For clarity and consistency in the analysis, the focus is specifically on researchers whose work can be clearly classified under one of these fields. Therefore, researchers who have worked in multiple fields were excluded to ensure that their output in each area is accurately represented and to avoid overlapping or ambiguous categorisations. This resulted in a total of 359 CVs comprising the international researchers sample, half of the CVs to be analysed in this work. Hence, the total sample of researchers' CVs analysed in this work is 718 (359 from international and 359 from Brazilian researchers). Table 2 shows the number of international PQ grantees per country of origin:

**Table 2**

*Number Of International Researchers By Country Of Origin*

Country	no.	Country	no.	Country	no.
Argentina	82	Belgium	4	Angola	1
Peru	37	Bolivia	3	Cameroon	1
Colombia	27	China	3	Canada	1
Italy	26	Netherlands	3	Costa Rica	1
Germany	24	Pakistan	3	El Salvador	1
Portugal	18	Russia	3	Guyana	1
Spain	15	Austria	2	Israel	1
Uruguay	12	Belarus	2	Morocco	1
Chile	11	Cabo Verde	2	Nepal	1
Cuba	11	Ecuador	2	Panama	1
France	10	India	2	Paraguay	1
United States	9	Ireland	2	Poland	1
United Kingdom <sup>31</sup>	7	Japan	2	Puerto Rico	1
Iran	6	Mexico	2	Sweden	1
Venezuela	5	Romania	2	Yugoslavia <sup>32</sup>	1
Bulgaria	5	Ukraine	2		

<sup>31</sup> The United Kingdom comprises five researchers from England, one from Northern Ireland and one from Scotland.

<sup>32</sup> One scholar reports to be from Yugoslavia, a country that was dissolved in 1992. Their current nationality is unknown.

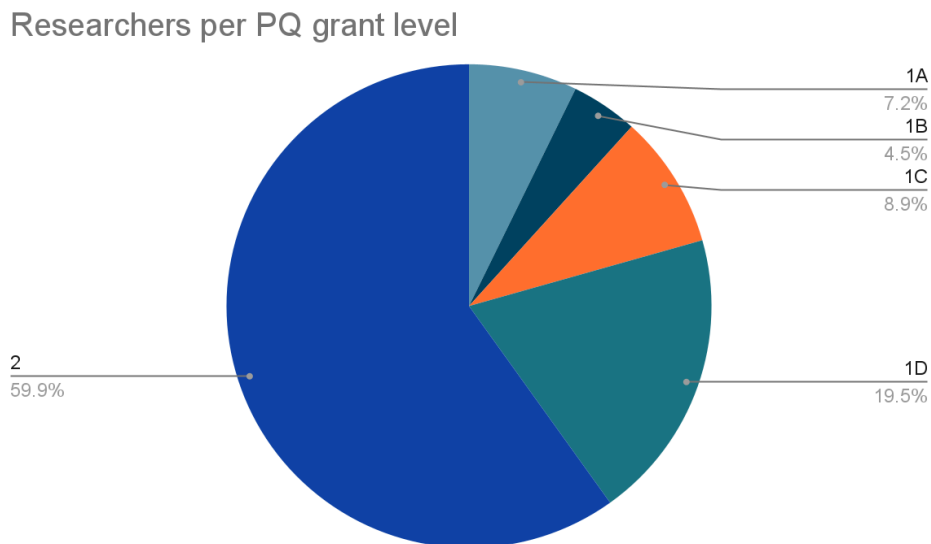
*Note.* The countries are listed in descending order based on the number of researchers originating from each of them.

As depicted in the list, 55% of the international scholars (198 researchers) come from Latin American countries<sup>33</sup>, and 59% (212 researchers) come from countries where Spanish is the local, official or most commonly used language<sup>34</sup>.

The distribution of PQ grants among international PQ grantees, which was later matched to a set of Brazilian PQ grantees with the same quantity and grant categories, is as follows: 1A: 26 researchers, 1B: 16, 1C: 32, 1D: 70, and 2: 215. Although the total number of Brazilian PQ grantees is much larger, we used an equivalent number and classification of grants for comparison. The PQ grants distribution amongst the participants is shown in Figure 4 below:

**Figure 4**

*Distribution Of Participants Among Different Categories And Levels Of PQ Grants*



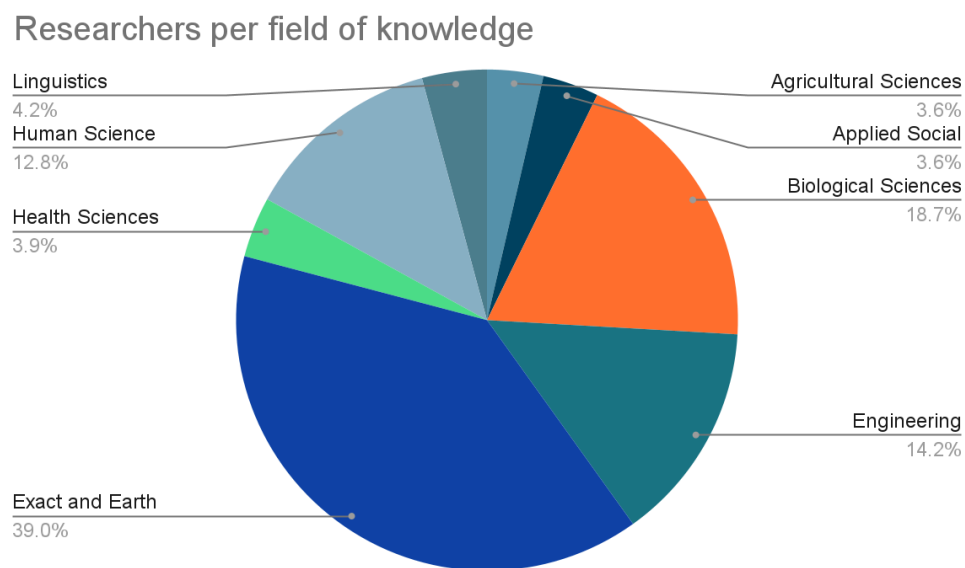
<sup>33</sup> Puerto Rico included.

<sup>34</sup> Latin American countries excluding Guyana, and including Spain.

The distribution of international researchers across different fields of knowledge, which was later matched for the Brazilian researchers, is as follows: Agricultural Sciences: 13, Applied Social Sciences: 13, Biological Sciences: 67, Engineering: 51, Exact and Earth Sciences: 140, Health Sciences: 14, Human Sciences: 46, and Linguistics, Literature, and Arts: 15. This distribution across the eight fields of knowledge adopted by CNPq and the Lattes Platform is shown in Figure 5 below:

**Figure 5**

*Distribution Of Participants Across The Eight Fields Of Knowledge Adopted By CNPq And The Lattes Platform*



To scale this sample of international researchers within each area, Table 3 was prepared, comparing the total number of Brazilian PQ grantees for each field of knowledge, with the number of international researchers selected for this study and the percentage of the total number of grantees in each field that these international researchers represent.

**Table 3***Comparison Of Brazilian And International PQ Grantees*

<b>Field of knowledge</b>	<b>N° Brazilian researchers</b>	<b>N° International researchers</b>	<b>% International researchers</b>
Agricultural Sciences	2,154	13	0.6%
Applied Social Science	1,517	13	0.8%
Biological Sciences	3,794	67	1.7%
Engineering	2,585	51	1.9%
Exact and Earth Sciences	4,088	140	3.3%
Health Sciences	2,586	14	0.5%
Human Sciences	2,623	46	1.7%
Linguistics, Literature, and Arts	763	15	1.9%
<b>Total</b>	<b>(20,110<sup>b</sup>) 15,132</b>	<b>359</b>	<b>2.3%</b>

*Note.* 20,110<sup>a</sup> is the result of adding the total number of Brazilian researchers with a CNPq grant as filtered per area. When searching for Brazilian researchers, holding a CNPq grant, without selecting any specific field of knowledge, the result is 15,132 profiles. This is closer to the real number, since in the 20,110 total, we can infer that there are profiles of researchers that are placed in more than one field of knowledge, that is, profiles counted more than once.

This distribution of researchers suggests that Exact and Earth Sciences may be the most internationalised area within Brazilian academia, in terms of the nationality of the researchers, having 3.3% of scholars from other countries, followed by Engineering and Linguistics, Literature, and Arts, with 1.9%, and Biological Sciences and Human Sciences with 1.7% of international PQ grantees. Applied Social Sciences, Agricultural Sciences and Health Sciences, on the other hand, could be regarded as the least diverse in terms of nationalities with 0.8%, 0.6% and 0.5% respectively. The low percentage of international researchers working in Health Science in Brazil could be due to the level of national regulation and professional accreditation of its courses and degrees.

#### 4.4 Statistical Tests

To verify statistical significance in the data, descriptive and inferential statistics were obtained, i.e., measures of central tendency and variability were calculated, and the Shapiro-Wilk and Mann-Whitney U tests were run using the RStudio desktop software (RStudio Team, 2020).

The median and mean were calculated as measures of central tendency. These are useful since they help identify the central or typical values in a dataset. As a measure of variability, the standard deviation was calculated, which quantifies the dispersion or variability of the data points around the mean. A low standard deviation indicates that the data points are close to the mean, while a high standard deviation indicates that the data points are more spread out from the mean. The standard deviation is useful because it provides information about the variability or consistency of the data. It also helps to assess the degree of dispersion and to understand the distribution of values within the dataset.

To confirm the normal distribution of the data, which is required to effectively analyse statistical significance when comparing two datasets, in this case, productions and language proficiency of international and Brazilian researchers, the Shapiro-Wilk test was run. This test showed that the datasets present a non-normal distribution, that is, there are significant differences within the datasets: while there are values around the mean, there are also extreme values (outliers). These results prompted the implementation of a Mann-Whitney U test, which is used to compare two datasets when the values are not normally distributed, using multiple variables: numerical (number of productions/self-rated proficiency per language); ordinal (nationality<sup>35</sup>), and categorical (PQ grant level). The results of these tests will be presented in Chapter 5.

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<sup>35</sup> Nationality, in this case, “1” for Brazilian and “2” for international researchers, is ordinal so that the test can be run and this variable can be compared in terms of productions and proficiency.