

HISTORY OF MASTER’S AND DOCTORAL DEGREE TRAINING FROM 1965-2013 IN BRAZIL: A MAP OF THE PUBLIC EDUCATION SERVICE IN THE POSTGRADUATE SYSTEM

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Abstract

This article presents a historical map of the political structure and the financing model of the postgraduate system *stricto sensu* in Brazil. It offers a historical analysis based on the study of the National Plan for Postgraduate Education 2011-2020, whose primary objective is to foster the development of the public service of higher education in Brazil. This article presents a history of the numbers of doctorates and master’s degrees granted in Brazil from 1960 to 2013. It emphasizes the central role of the Coordination for the Improvement of Higher Education Personnel (CAPES) in structuring public policy for the postgraduate system. Finally, it assesses the number of scholarships provided by past governments and establishes a comparative perspective on the investment in Brazilian postgraduate education.

Keywords: Postgraduate system, Education, Coordination for the Improvement of Higher Education Personnel (CAPES), Public policy, Development

Introduction

Public policy to encourage knowledge production is paramount for the promotion of socio-economic development in contemporary societies. A society’s scientific and technological capital determines whether that society can be described as developed. The maintenance and competitiveness of interdependent sectors, such as health and infrastructure, mining and

transport logistics as well as sanitation and agricultural production, demand continued investment in intellectual and fiscal resources.

Globalization and the network society (Castells, 1999) circumscribe a series of frictions between states and multilateral agencies in the development of policies that promote education and scientific production. Knowledge is a classic form of domination among nations, and the high speed of knowledge production and its network dissemination marks a new relationship between the state and the produced knowledge. In this dynamic, a number of aspects are essential to the management of the public good, such as economic power for negotiation, democratic governance, political autonomy and accountability.

Therefore, the state should create conditions to ensure the maintenance of knowledge and to promote access to and the free circulation of this knowledge. Against this background and considering the changes in the nature and functions of educational institutions, this study aims to analyse the Brazilian postgraduate system through a historical mapping of its development from the mid-1960s to 2013. All of the indicators of the period suggest that Brazil could overcome its modest position in the ranking of the scientific production of nations if its trajectory is maintained.

During the analysed period, the postgraduate system exhibited growth according to a rising curve with respect to the number of programmes, master's and doctoral courses, professors, graduate students and scholarships. Using 1976 as the reference year, when the evaluation process of the postgraduate system was introduced, the following growth rates are observed at Table 1:

Table 1. Number of active courses

Level	1976	2004	2009	2013	Growth (%)		
					2013/1976	2013/2004	2013/2009
Master's	518	1,793	2,436	3,160	510%	76%	30%
Professional master's	0	119	243	581	0%	388%	139%
Doctorate	181	1,058	1,422	1,923	962%	82%	35%

Source: CAPES.

It is important to compare 1976, 2004 and 2009 with 2013. The growth rate is as follows: from 1976 to 2013, there was a 510% increase in the number of master's courses and a 962% increase in the number of doctoral courses (in 1976, there were no professional master's degree courses in Brazil). From 2004 to 2013, the number of master's degrees increased by 76%, and the doctorates increased by 82%; the growth rate of professional master's courses was 388%. Using the last three years as a reference, the postgraduate growth rates exhibited the following development: the number of master's courses increased 30%, the number of

doctoral courses increased 35%, and the number professional master's courses increased 139% (Comparative study adapted from: CAPES, 2010, p. 45). Table 2 compares the participation of public and private institutions for this educational level:

Table2. Number of courses (master's, professional master's and doctoral), growth (%) and distribution (%) in public and private institutions, 2004-2009

Master's courses	2004	2009	Growth (%)	2004	2009
Public	1,501	2,001	33%	84%	82%
Private	292	435	49%	16%	18%
Professional master's courses	2004	2009	Growth (%)	2004	2009
Public	67	135	101%	56%	56%
Private	52	108	108%	44%	44%
Doctoral courses	2004	2009	Growth (%)	2004	2009
Public	958	1250	30%	91%	88%
Private	100	172	72%	9%	12%
Total courses	2004	2009	Growth (%)	2004	2009
Public	2,526	3,386	34%	85%	83%
Private	444	715	61%	15%	17%
Total	2,970	4,101	38%	100%	100%

Source: CAPES.

The increased participation of the private sector is clear. In 2004, it supplied 14% of postgraduate courses, whereas by 2009, this percentage had increased to 17%. It is important to emphasize that the private sector underwent the greatest growth: a 61% increase compared to 34% for the public sector. The growth primarily occurred in the number of master's and doctoral courses. During the study period, the percentage of professional master's degrees remained unchanged. This comparison reveals the regular growth of the system and the maintenance of public-sector dominance in providing this service (CAPES, 2013).

The current status of the Brazilian postgraduate system can be described as follows: by the end of 2013, there were 3,803 programmes, which accounted for 5,664 courses. Among these, 3,160 (56%) corresponded to master's courses, 1,923 (34%) to doctoral courses and 581 (10%) to professional master's courses (CAPES, 2014). In 2012, there were 71,507 professors affiliated with postgraduate programmes. Among these, 56,977 (80%) were permanent professors, 1,150 (2%) were visiting professors and 13,380 (18%) were associate professors. In the same year, there were 203,717 students enrolled in courses as follows: 109,515 (54%) master's students, 14,724 (7%)¹ professional master's students and 79,478 doctoral students (39%) (GEOCAPES, 2015).

Institutionalization of the Postgraduate Education and the National Plans for the Postgraduate System (PNPGs)

The postgraduate system in Brazil was formally established by Report 977 of the Federal Council of Education in 1965. The establishment occurred during the period of military dictatorship that began in 1964 and in the Cold War context. The system's development did not proceed without the resistance, ambiguities and accommodations of the authoritarian conservative project of the military and was affected by the debates regarding the US MEC-USAID (Agency for International Development) programme (Motta, 2014). However, based on the Brazilian Universities Statute, attempts began in the 1930s to establish a postgraduate system in Brazil. However, the document emphasized that contrary to intentions the first courses started through the establishment of international partnerships with the purpose of trade information exchange and student exchange. The inaugurated programmes (nearly all in state universities) based their curricula, programmes and forms of assessment on the American or the European model (Santos, 2003). Additionally, from the beginning, these programmes were created using treasury resources based on the free-of-charge system of public services for higher education. Several private institutions, particularly Catholic universities, formed small centres, where the students paid fees for their education.

Report 977 determined the establishment of a postgraduate system based on the US model. Thus, postgraduate education was configured according to the American curriculum with two independent levels: the master's level, which required a dissertation, and the doctoral level, which required a thesis. This importation of models and theoretical frameworks aimed "to (re)produce here the science and the international technology, to be taught according to the standards in the same category and without autonomist pretension" (Cunha, 2007).

From the beginning, the Coordination for the Improvement of Higher Education Personnel (CAPES) has been the primary funding agency for research in Brazil and supported the system's establishment. Subsequently, CAPES has sought to expand and consolidate postgraduate programmes (master's degrees and doctorates) throughout the country. CAPES differs from other Brazilian research and development agencies because it also acts as a regulator of the courses and postgraduate programmes, heavily intervening and restricting the autonomy of the universities.

During the mid-1960s, CAPES started planning the evaluation of programmes and postgraduate studies courses. In 1976, during the dictatorial period, the funding agency established criteria and parameters that classified the courses and programmes using grades from A (best) to E (worst). Several changes that have gradually occurred in the CAPES evaluation method

include the following: in 1980, the practice of peer visits to the courses was initiated; in 1982, the disclosure of individual results for the institution began; in 1984, evaluation reconsideration requests were authorized; in 1985, CAPES began the dissemination of evaluation concepts for all courses; in 1988, CAPES initiated the use of data processing in the evaluation process; since 1992, qualitative and quantitative indicators have been included in the ratings. Additionally, the procedure was divided into two levels (Leite, 2005). The CAPES system has undergone major changes since 1998. Currently, programmes are classified on a rating basis, with a maximum grade of seven for those with two levels (master's and doctoral) and a maximum grade of five for those that only offer the first level. The evaluation is mandatory and determines the allocation of funds, grants and project financing. The regulatory policy and strategies determined by CAPES for the postgraduate system produce educational, political and economic effects. In addition, CAPES nurtures the "spirit of competitiveness and individual or institutional competition" (Dias Sobrinho, 2002), which determine funding policies for individual investment and the general subsidy to the system.

The national policy for the postgraduate system is established and practiced based on the National Plans for Postgraduate Studies (PNPGs). The Ministry of Education (MEC) constitutes PNPG decision-making council. In this regard, CAPES manages policy implementation and shares policy administration with the institutions, programmes and the scientific community to meet the targets established in the plan. Whether public (i.e., belonging to the republic or a federal state) or private, the institutions follow the same rules. That is, the system is completely unified (Lira, 2011).

This is the path followed by the Brazilian state in pursuing higher education policy development in public and private institutions. Based on its legal and financial instruments, CAPES offers centralized administration by providing channels to other government entities (within its legal powers). CAPES also expresses the government's will in a unified manner for all of the federation's entities.

The following figure shows a breakdown of national postgraduate policy based on the PNPGs. MEC constitutes the decision-making body. It decentralizes the execution of its public-education policies at the level of postgraduate studies through CAPES. In turn, this entity operates in conjunction with the master's and doctoral programmes. Thus, the scientific community initiates the actions required to implement the goals stated in a PNPG (Lira, 2011, p. 6).

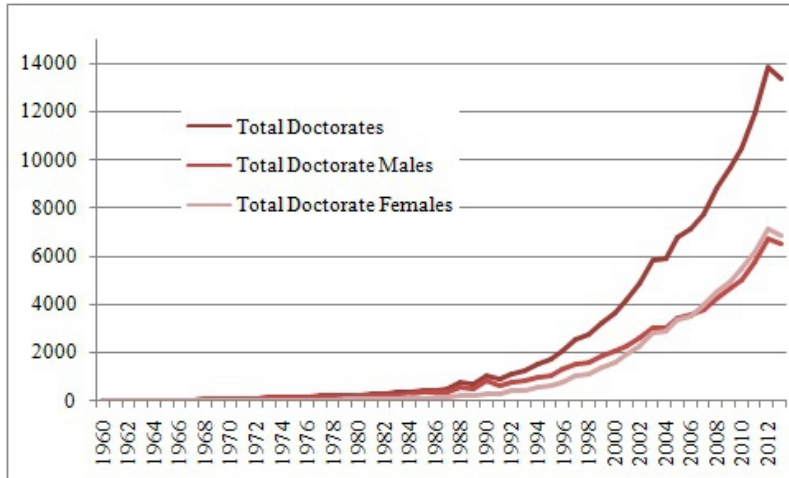
The first PNPG (1975-1979) had the mission of starting the implementation of the state planning principle in postgraduate activities. The aim was to train specialists (i.e., professors, researchers and technical and

administrative staff) for the public sector, universities and industry. The second plan (1982-1985) maintained the previously established principle of using evaluation as a reference. However, it nurtured autonomy as its core value, which was an outcome of the political climate (the so-called New Republic). The third plan (1986-1989) determined the subordination of research activities to the economic development of the country through the linkage of such activities to the national science and technology system. The fourth plan was not enacted. However, the guidelines were adopted by CAPES and emphasized the need for system expansion, the diversification of the postgraduate model, change in the assessment procedure and providing stimulus for internationalization.

The fifth plan, PNPG 2005-2010, was characterized by the introduction of the political induction principle. CAPES defined strategies in the activities developed by postgraduate programmes, acting jointly with state foundations that support science and national funds for the training of teachers at all levels of education. The plan was responsible for the improvement of the qualitative evaluation system on the postgraduate level. It was based on the nucleation concept, Qualis review (i.e., the unified ranking system for scientific journals), the introduction of the Academic Excellence Programme (PROEX), the expansion of international cooperation and ascertaining the social impact of a course.

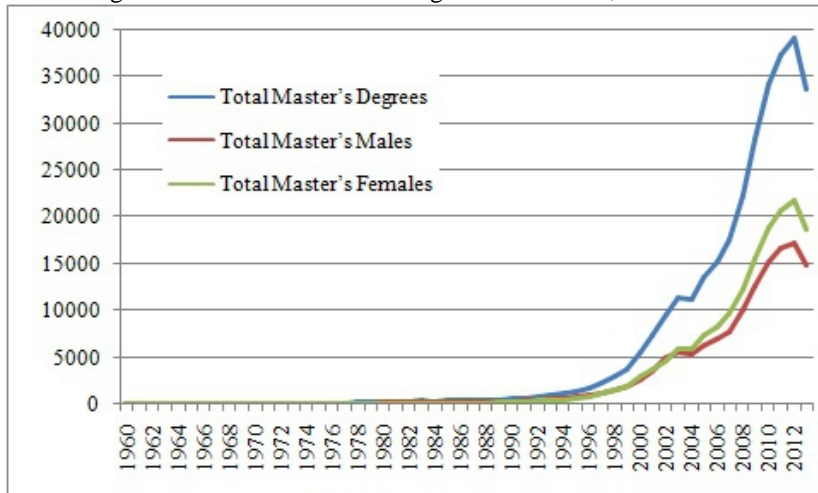
The current plan, PNPG 2011-2020, was presented by CAPES in 2010 and aims to define new guidelines, strategies and goals to provide continuity with past actions and to move forward on national policy proposals for postgraduate education and research in Brazil. In tandem with the plan's implementation, the National Education Plan (PNE) (2011-2020) is being developed, which establishes the coordination of proposals and activities. This plan is the first to include proposals for the postgraduate system. The PNPG should be integrated into the PNE when the PNPG is ready for implementation (because the current PNPG has missed its completion deadline, there is a paradoxical situation in which a plan's preparation and its implementation are occurring simultaneously).

In the 1960s, Brazil's National Postgraduate System was founded with 38 courses, of which 11 were doctoral and 27 master's degrees. During the first two decades, growth was insignificant. However, beginning in the 1990s, the system significantly expanded, and in 2013, CAPES evaluated 3,803 postgraduate programmes. The growth is depicted in Figures 1 and 2, which show the number of master's and doctoral degrees granted in the country from 1960 to 2013



SOURCE: CNPq

Figure 1. Number of doctorates granted in Brazil, 1960-2013.



SOURCE: CNPq

Figure 2. Number of master's degrees granted in Brazil, 1960-2013.

A comment is required on the sharp increase in the participation of women in this level of education. From 1960 to 1990, female representation was not significant among researchers. However, since the 2000s, the representation of women has become the largest share in the total number of master's degrees and doctorates granted in Brazil.

Administrative and Financial Structure

The financial resources for the provision of public education on the postgraduate level in Brazil come from different agencies. In addition to

CAPES, there are the National Council for Scientific and Technological Development (CNPq), the Financier of Studies and Projects (FINEP), the Ministry of Science and Technology, the Ministry of Education and Culture and the Sector Funds, which include 1) the São Paulo Research Foundation (FAPESP), 2) the Carlos Chagas Filho Foundation for Research Support of the State of Rio de Janeiro (FAPERJ), 3) the Minas Gerais Research Foundation (FAPEMIG), 4) the State of Bahia Research Foundation (FAPESB), 5) the Rio Grande do Sul Research Foundation (FAPERGS) and 6) the Araucaria Foundation (Paraná). These six foundations represent the largest investors among all of the sector funds in postgraduate studies in recent years (Schwartzman, 2010).

In 2013, CAPES evaluated 3,803 postgraduate programmes, which were distributed in the following categories: 1,107 academic master's degrees, 383 professional master's degrees, 47 doctorates, 1,740 master's and doctorates. The largest number of programmes were in the field of engineering (11%) followed by interdisciplinary area courses (7%), agricultural sciences and medicine (6%), and biological sciences (5%) (CAPES, 2013).

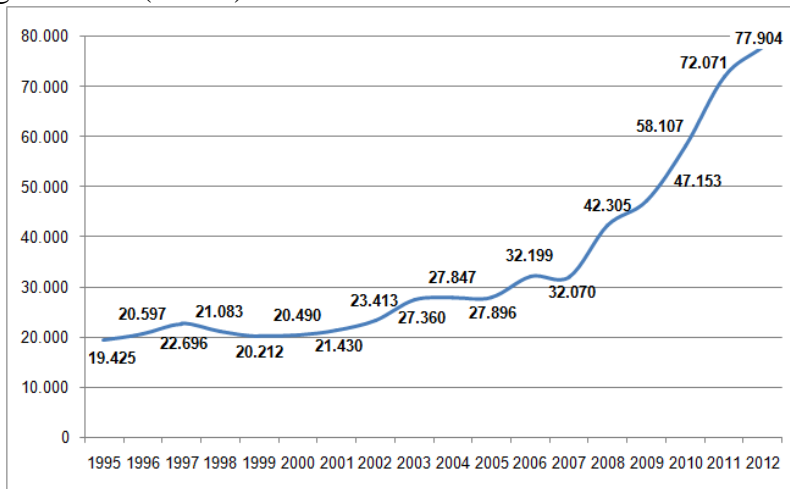
The courses offered in public institutions are free of charge, unlike private programmes, which collect fees except when a student qualifies for a government scholarship programme offered by an external, private or higher education institution. The funding offered to the students through scholarships assumes the following forms: Case 1) free education offered by the higher education institution with exemption of tuition fee, Case 2) maintenance scholarship and Case 3) tuition-fee waiver and maintenance scholarship.

It is noteworthy that the benefit is always double (i.e., Case 3) for students enrolled in public institution programmes. This privilege is not found in any other level of education.²In addition to the scholarships, CAPES is also responsible for the support of postgraduate programmes through resource transfers to the universities. This type of funding assumes the form of aid for travel expenses, academic fees and research support.

Thus, CAPES seeks to finance requests from the academic community and the programmes. Its performance is characterized by activities directed at human resources training in areas considered strategic by the government for the country's development, for example, the pro-equipment programme, which was created to stimulate infrastructure improvements for research and postgraduate courses (CAPES, 2013).

The following graph shows the number of postgraduate scholarships CAPES has funded in Brazil. The grants were awarded to different modalities, including students in master's courses as well as doctoral and

postdoctoral scholars and faculty of the National Programme for Senior Visiting Teachers (PVNS).



SOURCE: GEOCAPES, 2014

Figure 3. Postgraduate CAPES scholarship distribution in Brazil, 1995-2012.

CAPES’s annual budget was formerly intended exclusively for the postgraduate level. However, in 2007, the agency’s duties were restructured. Another task was added: the stimulation and promotion of the initial and continued training of teachers to improve basic-level education. Thus, since 2008, it has been possible to observe significant budget increases in the postgraduate level with the purpose of improving the quality of basic education. The substantial budget increase that resulted from this goal is a primary cause of the increased provision of scholarships.

Regarding financial resources distribution, the evaluation outcome is the fundamental criterion. For over 30 years, CAPES has applied a method based on the assessment of the universities provided by a consultant to rank the master’s degree and doctoral courses. This method has been viewed by faculty with substantial concern because its focus has been on the quantitative analysis of scientific production. The quality of courses and the relevance of research have not been primary factors. This fact contributed to the emergence of vigorous competition among programmes to increase their CAPES evaluation ratings and the financial resources that correspond to any such increase.

In the postgraduate programmes of highly rated universities, professors can receive benefits, such as scholarships based on productivity; funded leave to attend post-doctoral training; funding for participation in courses and national as well as international conferences; and funds for investment in consulting, facilities, laboratories and materials. The disadvantage is a lack of motivation in teaching activity at the graduate level

because such activity has increasingly brought no reward. That is, professors who wish to devote themselves to initial education find fewer available resources and typically will only participate in the activity through coercion or personal inclination (Schwartzman, 2010, p. 304).

Comparison of the Latest Brazilian Government Administrations

It is believed that the amount of resources has sufficed to maintain the postgraduate programmes in a satisfactory manner, that is, with the minimum quality required by the public evaluation policies. Unlike what was believed long ago, today, we can state that the postgraduate system in Brazil has a strong government and strong private investment, which have enabled the growth and consolidation of the postgraduate programmes across the country.

For comparative purposes, we adopt as a temporal framework the presidential terms of Fernando Henrique Cardoso (FHC) (1995-2002) and Luiz Inácio Lula da Silva (2003-2010). During the first president's government, the national public budget maintained an average growth of approximately 2% per year. During the second president's term, the government obtained an average investment growth of 12% per year. The total volume invested by FHC's government was R \$ 3.163 billion and by Lula's government R \$ 5.689 billion (with a substantial increase to 80% of the funds available to stimulate the postgraduate system).

The same pattern appears when we consider how many scholarships were provided during each mandate. Here, too, the percentage growth is pronounced. FHC's government experienced a 2% average growth in the number of scholarships per year. In comparison, under Lula's government, this figure increased by 12% per year. The total number of scholarships awarded during the eight years of FHC's government was approximately 169,000; under Lula's administration, this figure was approximately 295,000 - a difference of 75%.

Regarding the current government, i.e., Dilma Rousseff's mandate (2011-2014), the consensus is that the budget and the number of scholarships for postgraduate students will maintain sharp growth because during its first two years, the Rousseff administration awarded more than half (52%, or approximately 150,000 scholarships) the total number of scholarships awarded over the preceding eight years.

Indeveloping this study, it was impossible to obtain accurate information on the volume of investment allocated by the private sector to education. It is known that the primary form of funding provided to this educational level is the payment of faculty salaries by the private institutions. One may add to this amount income from university fees and the funding for research sponsored by private business organizations.

However, it is difficult to estimate a value. It is also difficult to calculate the government's direct investment total based on the division of the amount allocated to public and private institutions. Generally, the state accountability process and the official reports do not provide figures on the funding allocated to research. It is acknowledged that in 2013, CAPES allocated R \$ 4.773 million for the development of the public and private postgraduate system. In comparison, CNPq had expenses of R \$ 2.065 million (CNPQ, 2014).

Most of this amount was allocated to government programmes with little chance of reaching the private sector. In 2002, CAPES established the Support Programme for the Postgraduate System of Private Institutions (PROSUP), which funds maintenance grants, school fees and thesis aid for courses rated at least grade 3. However, because of a lack of transparency (i.e., data available on web pages) it is impossible to find information on the number of scholarships or the expenditure made by this particular programme. It can be stated that such funding is directed more toward students than private institutions.

The primary reason for the shortcoming faced by the private sector is the lack of time that can be exclusively dedicated by high-level professors. However, it is unlikely that qualified technical and scientific personnel can be hired with resources from the school fees charged by the private postgraduate programmes because such programmes have fewer students and their fees must be competitive. In this context, private institutions should address the problem of retaining professors in full-time positions because PROSUP or other financing mechanisms, such as CNPq scholarships, cannot contribute to solving the problem. Such funding only serves as a mechanism of collaboration in the composition of the teaching salary (Schwartzman, 2010, p. 304).

The training of qualified researchers is paramount in the production of scientific knowledge and serves as an excellent national development indicator. In 2008, there were 132,000 doctors in Brazil, approximately 0.07% of the population. This number is substantially lower than the figure achieved in the developed countries that were considered. Despite significant advances in recent Brazilian history, one would have to multiply this number by five for Brazil to reach the ideal level. Brazil has passed the test with respect to its capacity to provide the public service of education. Now, it must face the complex challenge of increasing the number of doctors without sacrificing overall quality in education. After all, it is not only financing that counts in the pursuit of national development. That is, it does not suffice simply to increase resources. What is required is efficiency in resource management and a strong commitment to meet the PNPG (2011-2020) goals without sacrificing the progress that has been achieved.

It certainly appears that the Brazilian postgraduate system has an improving infrastructure and human resources training model. Such areas have achieved important results with respect to the nation's international position and enabled Brazil to establish an increasing degree of scientific autonomy in a short period. This fact is exemplified by the scientometric indicators of the nation's academic production. In the last ten years, Brazil has tripled its production of indexed articles in scientific journal databases. The country's attainment in 2009 of the 13th position in the scientific production ranking (2.7% of total world production) represents a clear result of the investments made during the first decade of this century.

Notes

1. The interdisciplinary area approach groups the courses outside the major thematic axes. These programmes are generally designed to gather professors from various scientific fields. The approach is suitable for small universities or university centres that are unable to develop a course with their limited number of faculty. The interdisciplinary area of CAPES is divided into four thematic areas: Social Sciences and Humanities (30%); Engineering, Technology and Management (24%); Health and Biology (24%); and Development and Public Policy (22%). (CAPES, 2013).

2. Even the University for All Programme (PROUNI), which assists needy students on the graduate level, grants this privilege because the maintenance of academic funding is conducted through loans from Student Financing (FIES).

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