

Gender (im)balances in teaching and research activities in Brazil

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Abstract

Gender differences in teaching and research activities in Brazilian universities is the main focus of this paper. We point out initially that teaching and research are inseparable and necessary activities in graduate programs in the country, especially in public universities. We take into account the characteristics of gender relations, as well as the lower prestige attributed to teaching responsibilities relative to involvement with research and, above all, to publication of research results. Data presented here were obtained from data bases made available by governmental agencies responsible for general statistics and for evaluating educational and scientific programs and policies. Women progresses in education and their participation as human resources in science and technology in the country is considered, with emphasis given to the description of the category of teachers. Analyses of gender differences in teaching and research in graduate programs of a major Brazilian university, involving almost 2000 researchers are presented. Evidence suggests that women receive a larger share of teaching assignments which might jeopardize their involvement with research, as well as their publication outcomes. Literature that might help understand gender division of labor in science and subordination of women in society in general is discussed.

Introduction

At its origins, Brazilian science was mainly developed in public research institutes. These places, in the early 20th century, concentrated the pioneers of Brazilian science. Over the decades, however, the main *locus* of Brazilian research moved gradually to public universities, which flourished around the country, especially after the 1950's. These changes, as well as the establishment of government research funding agencies (in the 50's and 60's), were followed by a series of public policies, in the 1970s and 1980s, aiming at the development and training of human resources for the sector.

Nowadays it is evident that research activities are mainly developed in graduate programs where teaching and research activities are considered as inseparable, one contributing to the development of the other. The major institutions involved in this process are public universities, responsible for more than 80% of the country's knowledge production generated annually (Leta *et al*, 2006). Thus, it is a consensus, supported by public policy, that any teacher affiliated to a public university is also a researcher. Involvement with research is a condition for admission and indispensable for career progress in Brazilian higher education institutions. The term teacher-researcher is, therefore, recurrently used; combining teaching and research seems to be the proper role of the teacher-researcher in the current university model in Brazil.

Taking into account the difference in prestige attributed to research and teaching in the university, as well as the characteristics of gender relations, especially the fact that women tend to assume less prestigious activities in general, should it be expected a balanced distribution of academic roles between men and women? Another question could be posed: would there be differences in teaching and research assignments for men and women the different subject areas?

The aim of this paper is to present some data about the gender imbalances in the distribution of teaching and the research activities in one of the biggest Brazilian public universities. Our hypothesis, related to theory and evidence pointing out to women's greater difficulty in rank advancement in science (Long, 1995), is that the weight of teaching and research activities is different for males and females in academia: the latter tend to assume greater proportions in teaching, especially at undergraduate level, while the first tend to concentrate in activities related to the graduate level, including teaching and research.

Data characteristics

This work is part of a project that focuses on gender differences in Brazilian science, especially gender differences in teaching activities and productivity in graduate programs of Brazilian public universities. Data utilized in analyses are based on official documents obtained from Brazilian federal government agencies that generate statistics aiming at, among other things, the evaluation of educational and scientific policies and outcomes. The Brazilian Census Bureau (IBGE) and two Ministry of Education agencies, one devoted to the study of educational results and statistics (INEP) and the other in charge of evaluating graduate programs (CAPES), are the sources of data here analyzed. These agencies regularly provide primary information about the activities of men and women in high education and science in the country.

For the present work we also selected a sub-set of information related to teacher-researchers affiliated to the Federal University of Rio de Janeiro (UFRJ), one of the biggest public universities of the country. The data presented refer to 1,946 teacher-researchers linked to at least to one of the 71 graduate courses registered at UFRJ from 2002 to 2003. All graduate courses regularly evaluated by CAPES through a national evaluation system, and having received grades from 3 (lowest) to 7 (highest), are included in the analysis. Information about graduate activities, as involvement in teaching and research, as well as detailed information about scientific production of each teacher-researcher were obtained from CAPES PDF files available. These files were downloaded and, based in these documents, we built a database which contains, besides the name of each teacher-researcher, the name and level of the courses he or she teaches, the time spent in teaching activities as well as his or her scientific production.

Women educational attainment and career choices in Brazil

The great conquests that characterize women participation in education and in the labor force in most western countries, from the second half of last century until the present days, are also found in the Brazilian context. Presently, the majority of almost five million of university students are women; women entered massively into graduate studies and into previously masculine careers as medicine; and women are also almost 50% among the category of science and technology researchers (CAPES, 2007).

Despite these improvements, significant "unchanges" are also found in women educational and work situation. The gender differences in career choices remain: women are overrepresented in nurturing, caring and educational activities but almost missing in some areas of science and technology. In computer science and engineering, 80 to more than 90% of students are men whereas in nursing, social work, nutrition, librarianship and the teaching professions, 70 to more than 90% of students are women. This horizontal sex division of labor is accompanied by a vertical sex division of labor that is related to differences in work progress and persistent lower salaries for women (CAPES, 2007, Buchmann et al., 2008).

Gender differences are also clearly perceived when the focus of analysis turns to the human resources in science and technology. As it is also the present characteristic of the United State (NSF, 2009) and in most OECD countries (OECD, 2007), Brazilian women have also an

outstanding participation as human resources in science and technology (HRST). To show gender equilibrium in HRST in Brazil, data from Annual Survey of the Brazilian Census Bureau (IBGE), representative of the Brazilian Population, is presented. HRST categories considering the ISCO⁴ criteria were selected for analysis and following OECD criteria of inclusion (OECD, 2005).

Table 1, below, shows that women contribute with more than 55% of the total HRST in the country. However, a closer look at each of these professions indicates a massive presence of women – both in absolute and relative numbers - in professional categories which are typical female choices: the nurturing and caring professions (teachers and life and health science professionals and technicians) (Zimmerman et al, 2006). These categories make up together almost 42% of total HRST. Especially outstanding is the weight of the “teachers” category, notably in the lower school levels. This heavy gendered profile of many professional categories involved in the HRST segment suggests that strong cultural and/or discriminatory processes can still be at work in Brazilian society, probably restricting life changes of women in knowledge society.

Table 1. Women as HRST professionals and technicians in Brazil, 2007.

HRST Occupations	N of people	% of women
S&T Professionals	657,010	18.5%
Life and Health Science Professionals	808,684	59.4%
College and University Professors	229,421	51.3%
School Teachers with college degree	1,967,948	83.4%
Other Professionals	2,504,434	52.9%
Technicians: School teachers without college degree	1,342,136	82.1%
Technicians associated with S&T Professionals	1,286,113	11.4%
Technicians associated with Life and Health Science Professionals	952,080	76.1%
Other technicians	3,249,103	36.1%
Total HRST Occupations	12,996,929	52.6%
Other Occupations	85,848,640	43.3%

Sources: Olinto, 2009; IBGE (PNAD, 2007), microdata

Table 2, that follows, shows another aspect of gender imbalances in these professional segment: the persistence of lower salaries for women in all professional categories considered as part of the HRST in the country. Notably, the low participation of school teachers in high salaries, with or without a college degree, is an indicative that the horizontal gender division of labor in science, shown in table 1, is accompanied by a vertical gender division or discrimination in work environment, as suggested in table 2. In other words, HRST professions are gender biased, and women do not attain higher ranks and its corresponding benefits – higher salaries -, in both “feminine” and “masculine” professional and technical categories.

⁴ International Standard Classification of Occupations (ILO, 2007). ISCO groups 2 and 3 are included in the analyses. The managerial occupations (ISCO groups 121, 122 and 131) were excluded following OECD criteria (OECD, 2005).A

Table 2. Percentage of men and women earning ten or more minimum wages among HRST professionals and technicians. Brazil, 2007.

HRST Occupations	%	
	Male	Female
S&T Professionals	30.3%	20.5%
Life and Health Science Professionals	46.5%	21.9%
College and University Teachers	49.9%	33.3%
School Teachers with college degree	7.3%	2.3%
Other Professionals	19.7%	7.4%
Technicians: School teachers without college degree	0.0%	0.0%
Technicians associated with S&T Professionals	2.5%	0.0%
Technicians associated with Life and Health Science Professionals	0.0%	1.5%
Other technicians	9.0%	3.0%
Total HRST Occupations	13.7%	5.1%
Other Occupations	3.2%	1.4%

Source: Olinto, 2009; IBGE (PNAD, 2007) Microdata.

Hence, both data (Table 1 and 2) suggest that HRST should be interpreted from a gendered perspective and that the overall salience of women participation in this group is highly dependent on women involvement in devaluated activities as lower level teaching.

Gender imbalances in teacher-research activities

Focusing our analyses on teacher-researchers in graduate programs in Brazil, it is assumed that involvement with research is more prestigious than involvement with teaching as an academic activity. It is also assumed here that both men and women in academia look forward being involved in research and its result: publishing.

In Brazil, the importance of being involved in research and publication is highly emphasized in criteria utilized by the governmental agency (CAPES) responsible for ranking Brazilian graduate programs and evaluating Brazilian researchers. Standard measures of visibility and impact of publication in highly ranked periodicals are valued and priority is given to publication abroad. This scientific government policy is probably responsible for the rapid increase of Brazilian publication in the last decades, as well as for its international visibility.

It seems to be impossible to dissociate research from teaching, especially in graduate programs of Brazilian public universities since the majority of Brazilian researchers submitted to the evaluation criteria mentioned above are also involved in teaching activities. Thus, the questions posed here are related to gender balance in research and teaching activities. Are men and women equally involved in these activities? Are men and women equally assigned to graduate and undergraduate teaching, considering the greater burden involved in being assigned to undergraduate disciplines? And since academic areas are already imbalanced with respect to gender, are there differences between men and women participation in teaching versus research by academic fields? In order to find out responses to these questions, we investigated the activities of almost two thousand teacher-researchers affiliated to graduate programs of UFRJ.

Figure 1, that follows, presents data on the average number of disciplines organized and coordinated by women and men teacher-researchers both for undergraduate courses (Figure

1A) or graduate courses (Figure 1B). In both sets, we note slight differences regarding teaching involvement between women and male. Nevertheless, some aspects revealed in these figures should be pointed out. Regarding undergraduate courses, women outstand in teaching assignments precisely in a field characterized by a sex imbalance favoring men. Therefore, those women that faced gender barriers and entered a male dominated area are the ones relatively more overcharged with teaching. Some important gender differences also stand out when we compare the involvement of women and men in undergraduate and graduate courses. Women tend to be more involved with undergraduate courses, while men tend to be more involved with graduate courses. Notably, as already pointed out, the first is a more devaluated activity than the last.

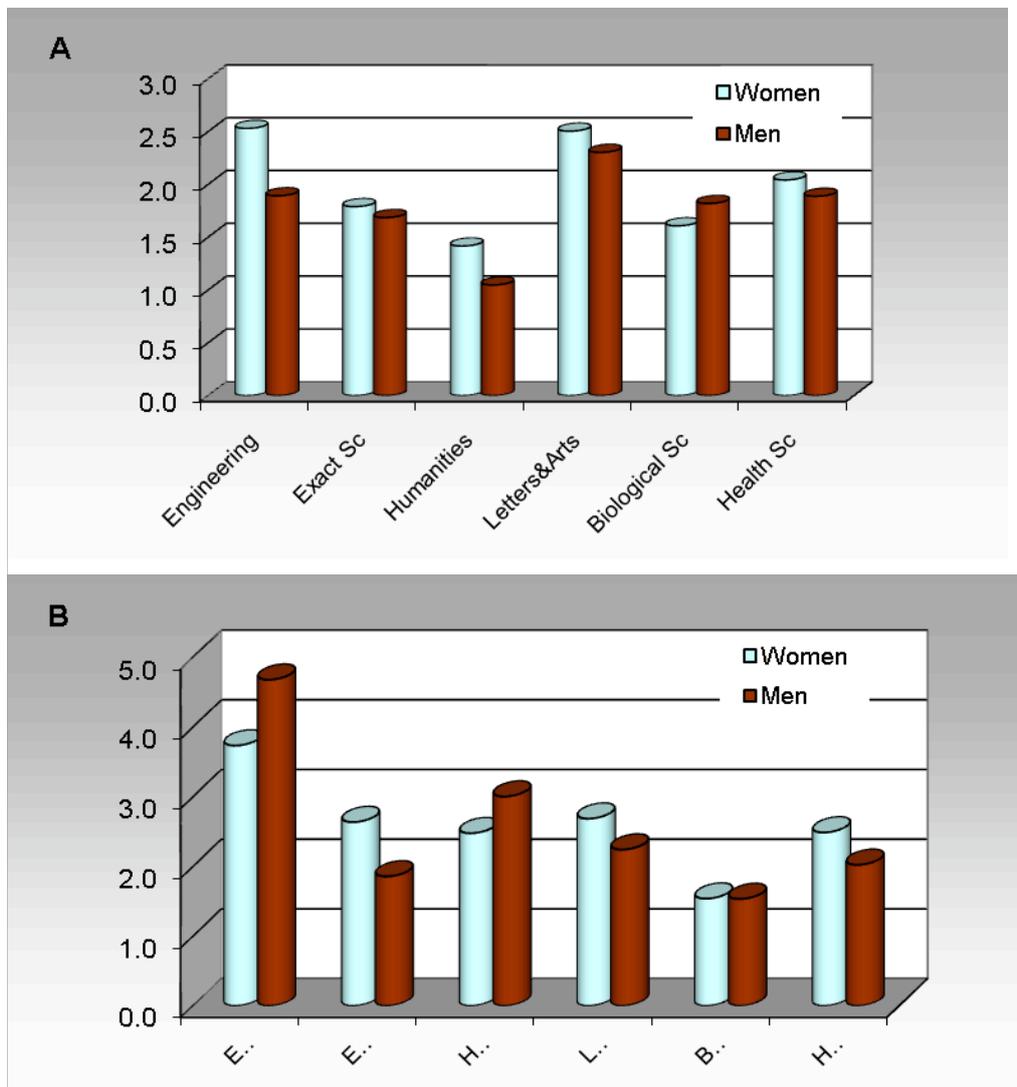


Figure 1. Average number of courses in undergraduate (A) and graduate (B) levels by gender. UFRJ, 2001-2003.

When we turn our analyses in scientific productivity - when all scientific publications by the teachers-researchers of UFRJ during the 2001-2003 period are analyzed -, as shown in figure 2 below, we can see that women tend to be less productive than their male colleagues, notably in the Exact Sciences and Engineering. These fields can be considered as typically ‘masculine’ due to the low proportion of women participation in them and these fields are the

ones in which the greater gender imbalance was found in teaching undergraduate courses. Curiously, women’s performance in Humanities is lower than men’s but it is higher in the Health Sciences. Such unexpected performance suggests further attention and analysis, seeking both for theoretical explanation and more comprehensive analyses.

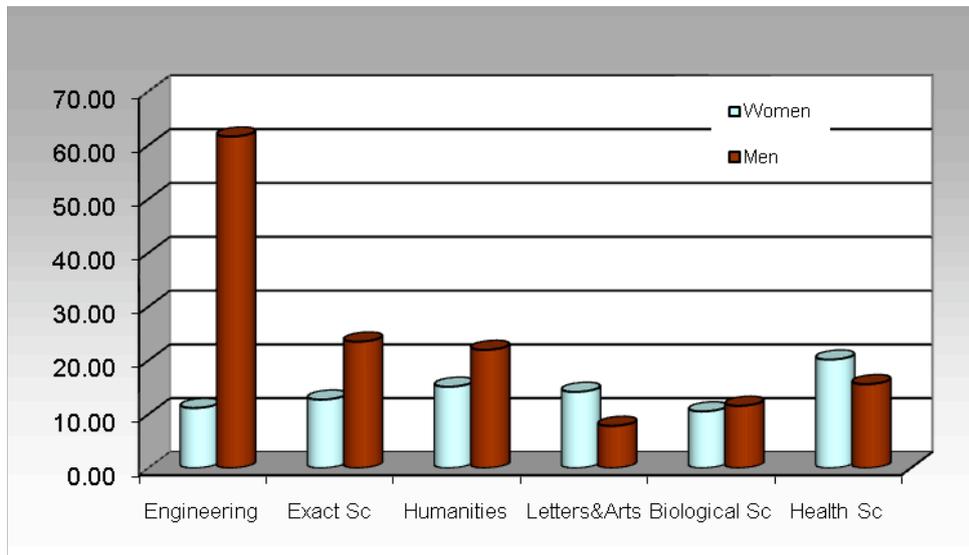


Figure 2: Average number of all types of publications by field and gender. UFRJ, 2001-2003.

Taken together, figures 1 and 2 above suggest a still not tested negative relationship between involvement with teaching and research productivity. Regardless of further search for empirical support to this idea - considering both these and more comprehensive data - the analyses presented here show an aspect of sexual division of labor in Brazilian science not yet brought to light: a strong gendered pattern in teaching activities in the university. This pattern suggest that subtle mechanisms related to gender discrimination in and/or to cultural and historical involvement of women with caring and teaching activities might be at work, maintaining sexual divides in science and affecting women occupational and career perspectives.

Discussion

Gender divide in society is deep and persistent; it is also adaptable to different circumstances and, in many cases, not easily visible. Terms like “glass ceiling”, which refer to the difficulties women encounter at work to get promoted and attain higher level positions, or “selective deafness” referring to the tendency of not taking into account the contribution of female colleagues in academia, are examples of societal processes that are not visible or heard, but that separate men and women and jeopardize the latter in several aspects and in several ambiances, as home, school and workplace (Epstein, 2006).

Even in egalitarian societies, a myriad of subtle prejudices and practices are used by men in gatekeeping positions to limit women’s access to the better, male-labeled jobs and ladders of success... (Epstein, 2006:11)

The subordinate condition of women is guaranteed and perpetuated through power and cultural mechanisms. Pierre Bourdieu (Bourdieu, 1985; Brubaker, 1985; Bourdieu, 2002; Olinto, 1995) is one of the authors that have greatly contributed to the understanding of these

societal processes, either by dealing with the subject of male dominance in general or by focusing on the societal processes occurring in the scientific community.

The ideas of *field* and *habitus* are two basic concepts introduced by Bourdieu that help in the understanding of the maintenance of subordinate positions of women in academia. *Field* is understood as a social space which attains certain autonomy vis-à-vis other fields and develops specific rules and hierarchical structure. In a field, those who assume dominant positions are able to make this social space to act in his favor. The *scientific field* is considered by Bourdieu as an example of a social space in which interests, conflicts, recognition and domination are operating and guaranteeing better positions to ones and inferior position to others. Therefore, the position of scientists in this field is not neutral and their hierarchical positions do not merely reflect their contribution to science.

Although Bourdieu did not study the position of women in the sciences, he did devoted himself to the analysis of gender discrimination in society and his ideas on the subject can be applied to, and help understand, the hard times faced by women in science, as it is the case of gender imbalances in teaching activities presented above. It is easy to perceive that, in view of women's historical subordination to men, several mechanisms could have been developed to make it easier for men and more difficult to women to assume privileged positions and to transform their regular activities in 'scientific capital', that is, to get recognition and rewards from them.

If power mechanisms are activated by men in the science field, they receive contribution from another type of socio-cultural mechanism that would also be at work. Through what Bourdieu calls *habitus*, not only power mechanisms should be considered but also preferences and behavior that become our accepted habits. The concept of *habitus*, as utilized by Bourdieu, refers to internalized dispositions that result from experiences that mold perceptions and tendencies and lead to action. Women, through their socialization process, acquire a particular *habitus* through which their preferences and behavior might contribute to their own subordination in science as well as to the invisibility of the gendered division of scientific activities. In fact, women also could be reinforcing their present scientific status and other types of sexual division of labor, accepting as legitimate male dominance and perpetually reproducing, as if it were natural, female subordination in science and in society.

Concluding remarks

Despite great progresses in education attained by women in Brazil, evidences described here, obtained from the professional and scientific fields, show significant gender differences in these areas suggesting that career choices continue to be highly gendered, as well as the academic roles of university teacher-researchers. Initial evidence brought about here indicate that women, as HRST (professionals and technicians), show a massive presence in work categories that are typical female choices, as nurturing and caring activities, especially as school teachers. Concentrating our focus on researchers of public university graduate programs, data presented here show that women are more heavily assigned to teaching undergraduate courses, whereas higher percentage of men are responsible for graduate courses. This element of gender division of labor might contribute to the higher levels of productivity found among male researchers. Ironically, therefore, by studying and revealing aspects of sexual segregation processes that characterize these privileged occupations - the science field - one might better understand practices that maintain women in subordinate positions in Brazilian society.

The relevance of this research subject is being emphasized by several studies and by many different arguments. A line of reasoning considers that societies which guarantee more porous boundaries between people are the more productive ones (Lamont apud Epstein, 2006). A related argument points out to the importance of women participation in science and

technology is a condition of sustained development and of a mature knowledge society (Primo, 2003). Therefore, it is important to disclosure societal mechanisms that keep women away from the hard sciences and the technological area. As evidences presented here suggest, women who do face societal barriers and enter the more prestigious, male predominant, scientific and technological areas might face persisting and diversified societal mechanisms that keep them from attaining higher academic positions.

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