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Education in Brazil:

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Keywords *Gender, Physics, Brazil*

Abstract

An overview of the Brazilian educational system is presented with the main focus on the lack of representation of women in the exact sciences and minorities in higher education.

I- Introduction

The participation of women in professional life in Brazil has been increasing in the last decades. Today within the 20 most competitive careers, women are the majority in graduation in 15 of them. Women are also the majority of undergraduate students and half of the professors in the universities [

1]. This situation is still far from representing equity between genders. Female students are not present in all fields. In particular, the percentage of female students in the exact sciences is small. In addition, in all fields, the percentage of women decreases at each step of the career ladder. For example, in physics the

percentage of female researchers at each career level not only decreases [2,3,4,5] as the position is more senior, as illustrated in Figure 1, but is the same for the last ten years [2]. This situation is very similar in other countries of Latin America [6]. This suggests that either no change is happening in this field or the change is so slow that a ten year analysis is not enough to perceive it. Naturally, this raises the question of the origins of this absence of females in the exact and physical sciences. The answer to this question is quite complex and involves not only global factors, such as a lack of role models, but also cultural and educational aspects. A description of the evolution of the educational system in Brazil is provided below and an analysis of the current system is provided as a framework for understanding the under-representation of women in the power structure of exact science.

II- Historical Background

Basic education in Brazil started at the end of the sixteenth century when the portuguese administrators established themselves with their families in the new continent. The education of the offspring of this elite was under the supervision of the catholic priests. During this period the Jesuits, whose mission was to evangelize, also provided basic education for indians and workers under the agenda of getting them under the supervision of the

church. Education was focused on humanities and, in particular, on Latin, philosophy and arts. The girls either were kept illiterate or were trained by nuns to read and write and perform basic domestic affairs. Teaching was only for three years and reading was restricted to religious texts.

The increasing power of the church, and the illuminist ideas that were becoming quite popular in intellectual circles in Europe, led the king of Portugal in the eighteenth century to select the Marques do Pombal as the minister of economy. He revolutionized the economy of Portugal and modernized the city of Lisbon during a very centralized period of Portuguese administration. In order to achieve his economic goals he had to control the political arena, and consequently oppose the church. He created the public school system and expelled the Jesuits from the colonies. The new school system included science and modern languages and excluded some of the topics explored by the Catholic schools. The schools were still separated by gender and the girls' schools did not cover the scientific topics explored in the boys' schools. This idea, based in a vision of a more modern and developed Portugal, faced the problem that at that time Portugal did not have enough teachers to replace the priests. In Brazil the situation was more dramatic because of the absence of people properly educated to take over the task of teaching to the children of the Brazilian elite [4]. After the period of the Marques do Pombal in power, the Catholic schools returned to operation and Brazil developed a dual system in which private and public schools operated in parallel. The ideas of the Marques do Pombal, of having a more illuministic and scientific education fortunately survived [7,8].

In the nineteenth century the royal family of Portugal moved to Brazil in a self inflicted exile due to the invasion of Napoleon. Teaching expanded, with preceptors being brought from Europe. In 1827 a more formal education at the fundamental level was formalized. While the boys studied grammar, geometry and sciences, the girls were restricted to languages and arts. In addition, the girls were allowed to study only until the 5th grade [9]. Women that had the desire of studying further had to go to schools outside Brazil which restricted this group to a small number of girls coming from rich families.

The middle schools, as a consequence of the Pombal versus Jesuits fight were divided into schools with focus on humanities, in order to become a medical doctor called Schools of Classical Studies or "Clássico", and schools with technical topics, named Schools of Scientific Studies or "Científico". A separate set of high schools were also dedicated to training teachers for the fundamental levels, called "Normal" Schools.

The high education system was created at the end of the nineteenth century. No university existed at that point aside from isolated medical and law schools. Women, however, were not allowed to enter these colleges. In 1879, thanks to a decree from the Emperor D. Pedro II, women were granted permission to enter the schools of medicine and law. The idea of allowing women in higher education was generated because the daughter of a friend of the Emperor, Maria Luiza e Albino Augusto Generoso Estrela, had to do her studies in the United States. After 1879 a few women ventured into the colleges of medicine and law. Unfortunately, most of them never worked because the population did not accept female professionals.

In exact sciences, the first woman to graduate was Edwiges Maria

Becker in 1919, as an engineer. The next was Carmen Portinho. She got her degree only in 1926. The first woman to graduate in physics in Brazil was Yolande Monteux in 1937 more than a decade later when compared with the engineers, and more than three decades later when compared with the first medical doctors.

The reason for women's arrival in the exact sciences has many roots. One important ingredient is related to the division of the middle school into Classical and Scientific studies. Since Classical studies were considered more suitable for girls, more girls' schools were devoted to Classical than Scientific specialties.

This division of the high school system persisted until the 1970's, when three complementary changes were made: the schools for only girls and only boys were abolished, the Classical and Scientific schools were combined in one single system of high school, and the public school system was expanded to cover the entire population. The mixed schools, where all the disciplines were taught, gave rise to an expansion in women's participation at the universities.

In parallel to the lack of representation of women in the educational systems, the black population was also excluded from it. Slavery was abolished only in 1888 and most of the slaves did not know how to write or read, and over the years played the role of servants in this white male dominated society. This population had access to the fundamental and high schools in a more massive way only in the 1970's when the school system experienced an expansion. Unfortunately, this was followed by a decrease in quality of the public school system.

III- Affirmative Action Policies

The end of the 20th century and the beginning of the 21st century brought a new perspective for the country. The stabilization of the currency, and consequently of the economy, brought a perspective of steady growth that required a massive number of highly trained professionals. Until the end of the 20th century higher education was a privilege for the higher and middle classes, which was not enough for the projected increase of industry. Realizing that, the government implemented two complementary policies to increase the number and diversity of the students at university. First, in 2009, a four-year program established an expansion by 30% in the public federal universities. This program led to the creation of new majors and an increase in the number of accepted freshmen students in the already implemented courses. In a continental country this implied the creation of new campuses in remote areas. In addition to the increase of the public sector higher education, tuition at private universities was paid for students coming from low-income families.

Realizing that the students at the public universities came from high and middle class families, and that the proportion of white students was disproportionate, an affirmative action policy was put in place. This new policy imposes that by the year 2016, 25% of the entrances at the federal universities will be restricted to students coming from low-income families and 25% of the entrances will be restricted to self-declared black low-income students. The

consequences of the policies of affirmative action and expansion are still not clear. However, it is expected that in a few years from now the higher education system will be more racially balanced and the percentage of educated people in the country will be substantially increased.

The need for more engineers in the country, and the fact that the percentage of female students in engineering courses is rather small, led the granting agency, CNPq, and the secretary of Women's Affairs to propose new programs to attract high-school girls to exact science. The consequences of this large-scale program will be observed in the next five years.

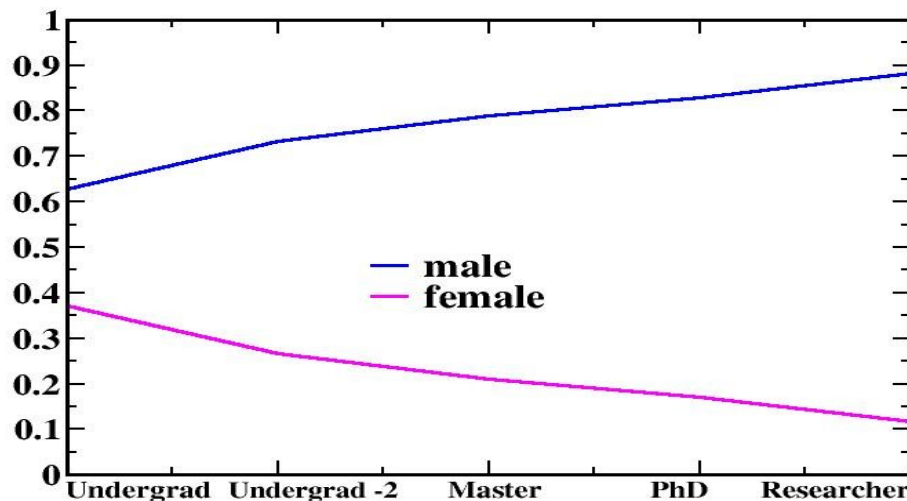


Figure 1- Percentage of male (upper line) and female (lower line) at each academic level in physics in Brazil in 2012 [Source: CNPq][10]

IV – Conclusions

The educational system in Brazil has suffered from being a colony, from

having an economy based on slavery and later on commodities, which surely delayed its expansion and universalization. Currently, the country is in a process of broadening the entrance to the higher educational system by women and minorities, which, in the nearest future, will create a more diverse working atmosphere, and consequently sustainable and humanistic development.

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