Chapter 138

Educational policies for the inclusion of women in the labor market in exact areas

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ABSTRACT
In the last decades of the twentieth century, debates about the gender relationship, in general, have been continuously presented in society. When we define the concept of man and woman, some questions range from perceptions about biological sex to concepts constructed predominantly by socio-cultural norms established in consumer societies. We propose to reflect on issues that are directly related to the insertion of women in higher education, as well as the processes of dynamization and popularization of exact sciences as occupational spaces for feminization. We question: what are the causes of the existing educational policy movements propagating for female performance in areas of the exact sciences? What are the educational and social-political relations present in the speeches and actions of entities that promote undergraduate and graduate courses, popularizing the exact sciences for female occupation? To what extent should we consider the feminization of exact sciences courses as a policy for the inclusion of women in places occupied by men? We opted for qualitative research, having as a source the CNPq databases (National Council for Scientific and Technological Development) to identify the participation of men and women in programs offering resources for research fellows in the areas of Exact Sciences, being our main interlocutors Simone de Beauvoir (1980), Alain Touraine (2007) and Louro (2007; 2001). We noticed that the formatting of the sciences was constituted through the binary vision of masculine and feminine, allocating to science values belonging to the masculine pole such as reason, objectivity, and competitiveness of which the feminine is constituted by the opposite. If we were to seek to allocate the characteristics established in the feminine pole, it would be natural to label them as sensitive, emotional beings and, mainly, without abilities for calculation and abstraction. Therefore, with this article, we carried out a brief theoretical and documentary review related to the social constructs of the gender relationship present in undergraduate courses, as well as the presence of women in the areas of knowledge of the exact sciences. Thus, we consider this study fundamental for understanding how society sees the process of including women in the areas of exact sciences in contemporary times, without a reductionist view, but centered on discussions about women. We recognize that the gender relationship is part of the categories present in the reality of social practices, in which we perceive the insertion of discussions about women involving sex-gender-race directed at issues of inequalities in the political, economic, legal, and social spheres.

Keywords: Women. Exact Sciences. Social constructs. Educational Policies. Labor market.

1 INTRODUCTION

The gender relationship is part of a historical construct that permeates social practices. The marks of differences associated with men and women are present in the political, economic, legal, and social spheres. We noticed that the concept of gender is constructed continuously, sometimes passing through the extensions of dialogic on the differences between men and women presented biologically.

Differences between the sexes and the anatomy of the genitals contribute to demarcating a historical path related to the division of classes and work, as well as the positions held in the social and family environment.

Based on the social differences between men and women, we question how women are being included in higher education, especially in the areas of Exact Sciences. What types of public policies are there to meet/encourage this demand? Thus, we propose to analyze the insertion of women in the teaching process, as well as to reflect on the dynamization and popularization of public policies for higher education directed towards the Exact Sciences.

In this investigation process, we established as an object of study the public policies for the inclusion of women in the areas of Exact Sciences. Therefore, we opted for brief bibliographical research, using data provided by CNPq as one of the research sources. In this way, we will work with "the sources, to present the lenses that guided the entire process of investigation and analysis of the proposal" (MINAYO, 1994, p.26).

2 BRIEF OVERVIEW OF PUBLIC EDUCATIONAL POLICIES FOR THE INCLUSION OF WOMEN IN THE EXACT SCIENCES

The participation of women in the universe of scientific knowledge construction is marked by constant social transformations. According to Schiebinger (2001), the formatting of the sciences was constituted through a binary vision of man and woman, being for the masculine demarcated by reason, competitiveness, lucidity, and objectivity and for the feminine judgment of values supported by emotion, sensitivity, and trivialities.

We noticed that the movement of women's participation in the social scene, especially in higher education courses, occurred timidly because for a long time knowledge was seen as an instrument of male domination. This assertion can be confirmed when we direct our researcher's gaze to the characterizations centered on sexual differences and genitalia, contributing to implementing a vision of the biological inferiority of women to the detriment of the image of male superiority.

In this projection of women's biological inferiority, reproduction of the human species is presented as one of her main functions. This view of women's servitude is presented by Beauvoir (1980, p. 45) when he states:

> The individuality of the female is opposed by the interest of the species. She appears as possessed by strange forces, alienated. And that is why, when the individuality of organisms is asserted more, the opposition of the sexes is not attenuated. On the contrary, the male finds ever more diverse ways to expend the forces he becomes master of; the female feels her servitude more and more.

Thus, we can say that the relationship between master and servant is presented as a cultural heritage transmitted by generations and disseminated through the differences between men and women through

biological standards. Beauvoir (1980, p. 73) even states that “his dominion over the world is less extensive than that of man; it is more closely subject to the species”.

The prism of male vision prevailed for a long time. In Beauvoir's (1980) studies, Western civilizations portray women through various theoretical sources, such as philosophical, historical, psychoanalytical, Marxist, and biological, and these fields of study present significant contributions to the assumption of women's inferiority and servitude.

> In the days when it was a question of wielding heavy clubs or facing wild animals, the physical weakness of the woman constituted a flagrant inferiority; it is enough for the instrument to demand a slightly greater force than the one available to the woman for her to present herself as radically impotent (1980, p. 73).

When we focus our discussion on this view of impotence and social exclusion, we realize that women are inserted in a world of oppression and human exploitation. Thus, women are defined as men's private property, oppressed by patriarchal societies.

We can still cite as an example of this vision of servitude, in a Marxist perspective, that the woman was considered the "first private property of the man, transforming the social relations, initially under the domain of the matriarchy (that is, of the power of the women), for the patriarchy, which would be the power of men" (GROSSI, 2000, p. 3). In this case, social oppression was a consequence of economic oppression, with women being reduced to their capacity for work and submission to men.

In contemporary society, the discourse of gender relations has faced the materialization of the female image. In this historical path, women went through several deprivations::

> They are denied the to move freely in society, and they are coerced and forced to dress in a certain way, in many societies they have no voice, they cannot often even earn their livelihood, and they are forced to marry and submit to their family's will. and husband, mistreating and keeping them in a situation of poverty and absolute dependence, denying them the minimum education, preventing them from exercising a profession, being raped with impunity in any war, and being denied the exercise of their rights to citizenship (RADL- PHILPP, 2010, p. 136).

This materialization of women's marginalization and stigmatization contributes to a process of historical construction marked by the deprivation of cultural, intellectual, political, and sexual rights. Rago (1997, p. 582) expands this conception to racial and ethnic aspects:

> Black women, in turn, would continue to work in the most disqualified sectors receiving very low wages and terrible treatment. [...] reveal a large number of black and mulatto women among domestic servants, cooks, washerwomen, confectioners, street vendors, and prostitutes. [...] Black women are presented as extremely rude, barbaric, and promiscuous figures, devoid, therefore, of any kind of citizenship.

In the period of the industrialization process, women occupied spinning and weaving functions. Wages were miserable, in addition to experiencing situations of oppression and subalternity. Administrative

and leadership positions were destined for men (OLIVEIRA, 1992). Women began to face salary variation, sexual harassment, physical intimidation, and professional disqualification.

In the middle of the 20th century, the feminist movement reemerged through student demands, debates on the roles configured by men and women in the consumer society, and sexual behaviors, and in Brazil, the term gender came to be used as a construct of an individual's identity. According to Louro:

> It is necessary to demonstrate that it is not exactly the sexual characteristics, but how these characteristics are represented or valued, and what is said or thought about them that will effectively constitute what is feminine or masculine in a given society and a given historical moment (2001, p.21).

Differences between men and women are also presented according to historical contexts and sociocultural factors inserted in social groups classified according to race, ethnicity, and religion, among others, establishing a gender identity. These factors contribute to the strengthening of situations resulting from demonstrations against feminism.

The category of gender begins with the claims made by the feminist movement for equal rights between men and women. In this way, from the 1980s onwards, the concept of gender enhanced the view of existing inequalities between men and women. According to Auad (2006, p. 18):

> A text submitted by Joan Scott, “Gender: a useful category of historical analysis”, arrived in Brazil. This publication helps sectors in the field of human sciences recognize the importance of social relationships that are established based on perceived differences between males and females.

We noticed that the concept of gender emerged to transpose the vision of masculine and feminine and configure a new form of feminine identity, as gender relations are constructed through socio-historical-cultural experiences.

Few academic works present women who stood out in areas related to health and exact sciences, such as chemistry, medicine, physics, and biologists, among others. We realize that female invisibility is present in this place of the subject, these women being relegated to the background in the history of Science.

This invisibility and distance from the exact sciences is probably the result of an ideology that women are inferior to men to carry out the systematization of knowledge and reason in the face of the subject's socialization process (TOURAINE, 2007). For Haddad, Ribeiro, and Tassigny (2020, p. 88748) "in the second half of the 20th century, culture dictated which professions were male and which were female, with science remaining in the field of androcentrism”.

According to Barbosa and Lima (2013), the participation of women in the labor market has gradually increased. This data can be verified through the Higher Education Census of 2010, that of the "20 undergraduate careers with the highest number of recent graduates, women are the majority in 15 of them" (p. 70). However, this percentage cannot be observed in the area of Exact Sciences, because, based on the Census, in addition to the fact that women's participation is small, as they advance in their careers, their representation becomes more negligible.

In addition to the 2010 Higher Education Census, the scholarship indicators from CAPES (Coordination for the Improvement of Higher Education Personnel), from CNPq (National Council for Scientific and Technological Development), and the Secretariat for Policy for Women, provide data that (CNPq – ONLINE).

> Historically, the number of women in science decreases as one advance in the scientific career, that is, in positions considered more prestigious and in high academic posts. Female participation in CNPq Research Productivity grants, considered by the academy as a criterion of excellence, corresponds to 36% of the total number of grants awarded in 2013: 4,970 for women and 8,994 for men.

We noticed that in the national territory research funding is developed through grants, which are forms of aid to projects launched via public notices. The intentionality of financing these scholarships serves as a subsidy mechanism for research expenses, as well as services and capital goods.

These bodies established campaigns to provide the visibility of women researchers who contributed in a relevant way to the construction of the

history of sciences, but which are not so publicized and recognized on the national scene. The project developed in 2012 is known as Pioneers of Science, in which the history of Brazilian women who occupied the place of the subject through their participation in the knowledge-power relationship is written. Its objectives were *"1) to stimulate scientific production and reflection on gender relations, women, and feminism in the country and 2) to promote the participation of women in the field of science and academic careers"* (CNPq – ON-LINE).

Another aspect to analyze the invisibility of women is the configuration of gender-oriented roles. According to studies carried out by Carol Gilligan, the identities between men and women are differentiated through cognitive psychological development. While men base their actions on justice and reason, women center their actions on morality, humility, and obedience**; in their emotional capacity and motherhood** (TOURAINE, 2007).

We can verify this statement through the data presented by CNPq (ON-LINE):

> While the majority of male PQ scholarships are granted to men between 45 and 54 years of age, the highest frequency of scholarships for women, in this same modality, is between 50 and 59 years of age. There are no female representatives from 25 to 29 years old. Between the
> 30 and 34 years old, they make up only 19% of the total number of PQ scholarships for women, rising to 25% in the next range, from 35 to 39 years old. The peak of women's participation is between 55 and 59 years old, with 42%. According to the numerical criteria used, women participate more significantly in the scientific career in maturity. The age groups with the lowest female representation on the PQ scholarship coincide with the fertile period, a time when the researchers report difficulties in reconciling motherhood with a career.

We emphasize that the process of socialization of boys and girls at school and in the family converges in unequal values, which leads to different professional choices. Schools end up reproducing gender inequalities. Because of these data, we perceive the need for these institutions to promote greater

dissemination and participation of women in the exact sciences, subjectifying and including them in a space as a researcher.

> There was also the launch of the Call MCTI/CNPq/SPM-PR/Petrobras18/2013 – Girls and Young People doing Exact Sciences, Engineering, and Computing, which aims to encourage the training of women for careers in exact sciences, engineering, and computing in Brazil. The intention is to awaken the interest of female high school and undergraduate students in these professions and scientific and technological research. A total of 528 proposals were submitted, with a total demand for resources of R$ 18,404,136.00, of which 325 were supported, with a total value of R$ 10,990,897.98 (CNPq – ON-LINE).

The spaces that are being viewed as a place of subjectivation and inclusion of women raise a series of questions. Does the woman want to belong to this space of the exact sciences? Could these spaces provide greater visibility for women in the market and sexual division of labor?

This defining framework for investment by these bodies encourages the participation of women in higher education courses, in the areas of exact sciences, contributing to debunking the myth of women's capacity for inferiority concerning the domain of sciences.

We understand that these fostering institutions provide the opportunity for women to subjectify and include themselves in the space of the exact sciences, combating existing sexist practices in the world of work and knowledge of the sciences. But we consider it fundamental that we avoid these actions of feminization of science and do not configure a mere displacement of the condition of the frontiers of inequality.

Thus, we can say that the school environment can contribute to the woman being able to subjectify in space, but

> A series of other barriers arise that restrict their participation in the production of scientific and technological knowledge, hierarchically and territorially, in an androcentric universe of research and work (CABRAL ET AL, 2005, p. 5).

These barriers are presented in a naturalized way that we affirm their institutional and academic invisibility, helping women to believe in their non-existence. According to Melo, “one cannot overcome, overnight, cultural marks that imposed restrictions on women in the universe of socially sanctioned professional choices” (2004, p. 91). Thus, the spaces presented in society are characterized by aspects that privilege cultural constructs following the models and parameters of patriarchal and masculinized predominance.

Thus, we consider it necessary to analyze the historical construction of women as a source of relationships established by the roles they play in society. These relationships are often demarcated by the power exercised in the conception of gender that:

> As a constitutive element of social relations, based on the perceptible differences between the sexes and gender as a basic way of representing power relations in which the dominant representations are presented as natural and unquestionable (SCOTT, 1995, p.106).

Despite advances to promote women's inclusion policies in the areas of exact sciences, we still notice the existence of a Basic Education based on standards impregnated with sexist logic. Another significant factor corresponds to the sexual division of labor, in which the woman is divided between functions related to her work environment and functions related to the home and the maternal act. It becomes, therefore, difficult to conciliate the tasks destined for the family and science.

3 CONCLUDING REMARKS:

It is notorious that historically women have conquered spaces that previously only men belonged to, but their insertion and permanence in the areas of knowledge belonging to the exact sciences have not yet been achieved in conditions of equality and recognition. This is due to the binary construction process of gender relations – male and female –, which contributes to the production of mechanisms, functioning as instruments of prejudice, discrimination, and exclusion between classes and social groups.

When we reject a theory based on the domination of men over women, we fight to outline a new reality that denies discrimination and establishes a relationship of equality between human beings – men and women – before society and in the name of respect for the most varied forms of social life.

We relate the figure of an independent, free and undivided woman, who has her social affirmation centered on her function as a subject, regardless of a relationship of otherness between men and women.

In the perspective that this article signals the beginning of studies on women, it is worth noting that we launch our primary hypotheses that we will only be able to defend or deny them when we conclude our doctoral studies. However, we realize that the call for public notice is not enough for the inclusion and subjectification of women in the areas of exact sciences to occur, but that their academic training provides the appreciation of the diversity of areas of knowledge, combating the stereotyped conceptions constructed through the relationship of gender in society. For this, we need structural changes related to social and cultural constructs, as well as science teaching methods.

Thus, we consider that to combat the segregation of women in the various social sectors, it is necessary to pay attention, mainly, to family and school constructs. In the family sphere, we must pay attention to the reduction of stereotypes directed at women as the queen of the home, reducing their function to domestic and reproductive activities that influence professional choices; The greatest forms of expression of the gender relationship are present in the school environment, which should configure the overcoming of differences between men and women in the field of science. It requires the teacher the necessary incentive so that the woman can be able to decide on the career she should follow, without manipulating the stereotypes created by gender relations.

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