



Traces of women in the consolidation of mathematics in the state of Pará

Vestígios das marcas femininas na consolidação da matemática no estado Pará

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ABSTRACT

The research proposal, highlighted in this embryonic doctoral journey, highlights the intention to investigate the life stories and professional practices of women who worked on the Mathematics degree courses at the Federal University of Pará (UFPA) between the 1970s and 1980s. It is important to emphasize that mathematical knowledge has historically been constructed within a hegemonic spectrum made up of male characters.

Keywords: Women, Mathematics.

RESUMO

A proposta de pesquisa, destacada nesta embrionária caminhada doutoral, destaca a intenção de investigar as histórias de vida e as práticas profissionais das mulheres que atuaram nos cursos de Licenciatura em Matemática da Universidade Federal do Pará (UFPA) entre as décadas de 1970 e 1980. É importante ressaltar que conhecimento Matemático foi construído historicamente, dentro de um espectro hegemônico, formado por personagens masculinos.

Palavras-chave: Mulheres, Matemática.

1 INTRODUCTION

The research proposal, highlighted in this embryonic doctoral journey, highlights the intention to investigate the life stories and professional practices of women who worked on the Mathematics degree courses at the Federal University of Pará (UFPA) between the 1970s and 1980s. It is important to emphasize that mathematical knowledge has historically been constructed within a hegemonic spectrum made up of male characters. It is assumed that the place of women in Mathematics has been made invisible by one of the structural pillars of Western society, which is patriarchy, sustaining the idea impregnated in common sense that "men are naturally better at Mathematics than women". The participation and contribution of women in mathematics are important topics for study and research. Throughout history, women have faced barriers and discrimination in this field of knowledge, but many of them have managed to overcome these obstacles and make significant progress. Based on the studies of Joan Scott (1995), the concept of gender is used as a category of analysis, thus identifying the existence of a historical process of discursive construction around the supposed inferiority of women. Through various approaches, in different periods and through various practices, this process has obstructed the presence of women in spheres of knowledge power, thus



restricting the opportunity to demonstrate the absurd inequality in the differentiation of intellectual capacities based on sex or gender.

2 OBJECTIVE

For centuries, women have been prevented from accessing formal education, including mathematics. Their achievements and discoveries were often minimized, ignored or attributed to men. This historical marginalization has created a false narrative that women have not played a significant role in mathematics. Consequently, women continue to affirm the male standard and reinforce the mathematical profile, which is seen as neutral, pure and true. Therefore, this research is justified by the importance of valuing female participation in mathematical knowledge. In this sense, this research aims to highlight and problematize the invisibility of female participation in the development of mathematics throughout history, demonstrating that this erasure is part of a context forged in the power game legitimized in the discourse sanctioned by Western modernity.

3 METHODOLOGY

The study in question is characterized, primarily at this stage, as qualitative research, which uses bibliographical research as a procedure for data collection, with the aim of formulating a preliminary State of the Art. According to Ferreira (2002), the purpose of this type of research is to map and discuss academic productions, seeking to explore aspects and dimensions that allow for an in-depth study of a specific topic.

As this is a research project in progress, a search has so far been carried out for theses on the participation of women in mathematics, whether in research or teaching. Preliminary searches are being carried out on the Sucupira, CREPHIMat¹ and Brazilian Digital Library of Theses and Dissertations (BDTD) platforms. Therefore, the scope of the bibliographic survey was limited, at this stage of the research, to works available online, using the descriptors: women in mathematics, gender relations, women's science, female mathematics teachers.

¹ The Virtual Reference Center provides information on research in the History of Mathematics carried out in Brazil, as well as publications and teaching resources related to this field of scientific study.



Table 1 - Works inventoried so far

Platform/Ye	Author	Titles
CREPHIMat/2002	DIAS, A. L. M.	Engineers, women, mathematicians: disputes and interests in the professionalization of mathematics in Bahia, 1896-1968.
Sucupira/	Fernandes, M. C.	The insertion and experience of women in mathematics teaching: a gender issue
Sucupira/200	Cavalari, M. F.	Is Mathematics Feminine? A Historical Study of the Presence of Women in Mathematics Research Institutes in the State of São Paulo
BDTD/2008	Souza, M.C.R.F	Gender and Math(s) - games of truth in the numeracy practices of students in youth and adult education
BDTD/2011	Casagrande, L. S	Between silences and invisibilities: gender relations in the daily life of school classes
BDTD/2012	Oliveira, O. H. B	Math class: the didactics of masculinity and femininity
Sucupira/201	Heerd, B	Teaching knowledge: Gender, Nature of Science and Science Education
BDTD/2015	Menezes, M. B	Women's Mathematics: the marks of gender in the professional career of the founding professors of the Institute of Mathematics and Physics of the University of
Sucupira/201	Leopoldina, M	Gender, Teaching and Research in Mathematics: a case study
BDTD/2017	Silva, L. B	Careers of female professors in the exact sciences and engineering: a study at an IFES in the Northeast
Sucupira/201	Rosenthal, R.	Being a woman in Nature Sciences and Mathematics
BDTD/2018	Silva, A. M.	Towards a feminist science
BDTD/2018	Silva, M. P.S. L.	A contribution to the history of women in science in Brazil: Heloísa Alberto Torres, the first director of the National Museum/UFRJ
Sucupira/201	Pereira, J. C	The Inclusion of Women in Science: The Effect of a Visibility Device
BDTD/2020	Lopes, Maria Maroni	The teaching of mathematics at the Natal Domestic School: contributions to a dialog on the role of women in the North of Rio Grande do Sul (1911 - 1961)

Source: research data.

The procedure for analyzing the materials cited is still in progress, but as far as we can see, the materials listed will serve as support for building a well-founded thesis.

At a later stage of the work, interviews will be organized with the teachers who actually worked during the period defined in the research. This will be a time when memories submerged by time will be part of the thesis writing. Preliminary scripts will be drawn up, which have no intention of being a kind of primer or interrogation tool; the writing compass will be guided by the teachers' speeches, so the scripts will be secondary elements in the composition of the reports.

4 DEVELOPMENT

Investigating women in a mathematical context is challenging. From a metaphorical perspective, it is possible to imagine parallels between the feminine universe and the human construction called Mathematics, between verses and universes we can cast multiple glances, helping to pave new paths that will help in the constant transformations in power relations between men and women. Some consider mathematics to be the queen of the sciences, others don't even consider it to be a science, perhaps an artistic manifestation. It is probably very difficult to reach a consensus on the conceptualization of what mathematics really is, and perhaps unnecessary, but there is agreement in academic circles that no Western scientific construct is separate from the enumeration system and everything that derives from it.



This body of knowledge, accumulated over the course of human development, has impacted and been impacted by the power relations constituted in various periods of history, and in the consolidation of Western thought, women had their place diminished in the discourse that underpinned modernity. Until recently, in Brazil, women had to meet a number of requirements that are far-fetched for today in order to become teachers, one of which was permission from their father or husband. This and other aspects have helped to create an unfavorable outlook for women, which is even more pronounced when it comes to areas considered "hard", such as mathematics.

The research will be developed around these ideas, seeking to point the spotlight on the teaching work carried out by women mathematics teachers who worked more than fifty years ago in the initial training courses at UFPA.

In this way, the research will aim to highlight the real value of the contributions made by these teachers' professional careers. It is a legacy that should be given its due place of appreciation through the realization of the research, and therefore should not be forgotten in time.

The author of the academic text must ensure that the life story of these professionals is not left out of the stories shared, as the social role of the teachers covered in the research will certainly not be limited to their work in the classroom. It is only natural that memories of school, academic and family life will emerge.

Therefore, gender relations within the mathematical context is a concept intertwined with the need to deepen the readings in order to broaden the field of vision, so that the author can then establish links in the development of the research, which is intended to build a history of women in Mathematics, because in any other area it is possible to highlight some discourses related to the social aspects that configure women as invisible subjects, therefore, the life trajectories that involve the condition of women go through crystallized structures of a patriarchal society. Based on Foucault (1996), the power of discourse in society is analyzed, examining its relationship with social control, discursive rules, knowledge and the possibilities of resistance. In this sense, it questions the ways in which discourse is used as an instrument of power and seeks to understand how it is possible to challenge and transform established discursive structures, thus seeking to reframe the role of women in mathematics.

5 FINAL CONSIDERATIONS

As this research is still in its early stages, it is considered that the academic repertoire needed to make it a thesis is still far from being achieved. We believe that the first movements are important for the maturing and subsequent consolidation of the research, and that an important step will certainly be taken in deconstructing the invisibility of women working in mathematics. However, it is important to note that there are initiatives underway to combat this invisibility. More and more historians and scholars of mathematics



are investigating and bringing to light the stories of women who have contributed to the field over the centuries.

One of the expectations presented on the horizon of the research are the reflections of the legacy left by these women who worked in the field of mathematics in other times, so there is no way to leave the marks of the educational practices consolidated by these characters erased in history, and which will serve as inspiration for new generations of girls and women who choose mathematics in their lives. Finally, tackling the invisibility of women is a constant challenge for academic society, especially in areas such as mathematics, where recognizing their intellectual contributions is fundamental to advancing their careers.

It is therefore essential to recognize and value women mathematicians, both past and present, in order to correct this mistaken narrative and build a more accurate and representative image of mathematics as a field in which women have always been present and made significant contributions.



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