

# Project Science with the Caboclas Kirimbaú Auaeté: undertaken actions in the Primary Education in the state of Amazonas, Brazil

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## ABSTRACT

The project Caboclas Kirimbaú Auaeté [1] is an initiative that aims to stimulate girls to pursue careers in the exact sciences. Conceived by 5 female professors from the mathematics department of the Federal University of Amazonas (DM/UFAM), Manaus-AM, it started in 2019 and is already in its second version. It is being carried out with the support of some Brazilian agencies that foster research and scientific dissemination. The project is executed by using both the infrastructures of UFAM and the participating public schools, and mainly through the collective effort of scholarship holders and volunteers who participate directly in the planning and realization of the activities. At the elementary school level, the activities are aimed at awakening interest in science and, in particular, in mathematics.

## KEYWORDS

Women in science, basic education, scientific initiation, STEM fields.

## INTRODUCTION

The first version of this project was approved by the National Research Council - CNPq for the period 2019-2020. In this initial phase, the following groups of participants were integrated in the project - 30 elementary school students from public schools in Manaus, of which 15 were fellows of the Junior Scientific Initiation program; 9 undergraduate students from UFAM; 7 elementary school tutors and 5 professors from DM-UFAM.

In this period, the activities of the Caboclas project were divided into scientific initiation subprojects, workshops, mini-courses, exhibitions and events. The scientific activities developed in the schools involved directed studies on mathematical topics in the areas of geometry and optimization, and the results were due to be presented in meetings at UFAM and in two itinerant meetings. In the activities developed at UFAM, the members offered lectures, exhibitions, meetings, round tables and workshops aimed at elementary school students, in order to promote scientific and social interaction between the two levels of education.

With the main idea of showing that girls can do science, have their place in the area of exact sciences and in order to make them feel represented, the female students were exposed to stories about leading women in science. In addition, as part of the project, the members participated in regional, national, and international events. The female students and teachers of basic education participated with their presentation in stands within the National Week of Science and Technology of the Institute of Exact Sciences (SECT) at UFAM. The undergraduate students participated in the Amazon Math Fair in 3 municipalities in the interior of the state of Amazonas, namely, Presidente Figueiredo, Rio Preto da Eva and Iranduba. The professors of the department of mathematics participated in both the Brazilian Meeting of Women Mathematicians held at the National Institute of Pure and Applied Mathematics (IMPA) in Rio de Janeiro and in the Amazon-Andalusia Conference on PDE'S in Belém-PA. All groups of participants in the project partook in the Workshop with the caboclas, held online and at the national level during the pandemic. In these events some partial results of the project were presented, and "local reflections" versus "global data" about the shy participation of women in exact sciences were debated.

The Caboclas project team, with two more female professors from the DM/UFAM, realized the need for continuation and, in its second version, the project was approved in a call promoted by the Amazonas State Foundation for Research Support (FAPEAM), valid from April 2022 to March 2023. Presently, the project has 3 scholarship holders, one of whom is being a member of the project since the beginning and is currently graduated in Mathematics. Among the volunteers, the present version of the project counts with the direct participation of Maria Luisa Serrão Rodrigues da Cunha, currently an undergraduate student in Mathematics and who, in the previous version, was a CETI - Marcantonio Vilaça II scholar. The technical and scientific activities were developed at UFAM with the undergraduate students and professors involved, and these activities generated all the actions of the project held within the I FAIR WITH THE CABOCLAS which took place in four public schools in the city of Manaus.

## UNDERTAKEN ACTIONS WITHIN THE PROJECT

Some of the actions carried out in the Caboclas project at the elementary school level:

**PIBICs Juniors in the areas of geometry and optimization:** were conducted by the elementary school teachers in the schools who held weekly meetings with the students and every three months the team presented the reports and the frequency of activities. In addition, the project coordinators at UFAM gradually accompanied the students and the tutors in the development of the subprojects. The conducted researches were focused on the following themes: The Geometry of Vesica Pisces and The Optimization of the Feminine in Nature.

**Teacher training:** a LaTeX training minicourse was offered to elementary school teachers by familiarizing them with some initial and intermediate concepts regarding this tool. The course was taught by a volunteer professor from DM/UFAM and a volunteer student from the project, with the objective of showing to elementary school teachers how to create reports, tests and presentations using this software. It was emphasized that LaTeX is widely used within the mathematical milieu as it facilitates mathematical writing, as well as it could potentially help them in their work with the students in the schools.

**Exhibition of project results:** through 3 meetings at UFAM, 2 meetings in two of the elementary schools participating in the project, the latter two being called itinerant meetings, and the I FAIR WITH THE CABOCLAS. During these meetings and events, the work done by the elementary school students was presented in the form of posters, or through their own constructed material and with the use of mathematical tools to provide the public with a more visual and concrete experience of the concepts studied.

## EVENTS AND PARTNERSHIPS

Several events have been held in partnership with other projects, with the aim of putting the girls and women involved in a protagonist position, both by participating in the activities and as the targeted audience.

**I Meeting at UFAM:** the elementary school students presented the results of their PIBIC activities, while the undergraduate students presented their PIBICs conducted at UFAM. There was the participation of the partner project Cunhatã Digital (which aims at the insertion of girls in the areas of exact sciences and computing) and the lecture with the neuropsychopedagogue Beatriz Teixeira, highlighting the importance of the change in the female scenario in science production.

**I Itinerant Meeting:** was held at the Waldocke Fricke de Lyra State School, with an exhibition of the continuation of the junior PIBICs. There were activities in partnership with the Chemistry in the Square project and the PET Physics program. The latter are two ongoing projects at UFAM.

**I UFAM Meeting at VII SECT/ICE [3]:** the elementary school students presented their projects to the general public. There was also a round of conversation with the students participating in the project and students from other courses, discussing issues such as women in science, racism, prejudice, and even difficulties in academic life. And with the support of mechanical engineering students, the first Guaraci and Jaci tournament of the derivative was held.

**III UFAM Meeting:** the graph workshop was presented by the undergraduate students adapted for girls in the elementary school

partaking in the project, so that the workshop could be reproduced in their schools.

**II Itinerant Meeting CETI - Marcantonio Vilaça II:** the second and last itinerant meeting was held at CETI - Marcantonio Vilaça II (CMPM II), where the final results of the junior PIBICs were presented, besides sharing touching testimonials about the importance of the project, highlighting the relevance of the opportunity they had directly with science and all the social and educational maturing.

**I FAIR WITH THE CABOCLAS:** the fair was included in the activities of the Summer School of PPGM - UFAM, being held in four public schools of Manaus. This event was attended by one of the great Brazilian women mathematicians of today, Jaqueline Mesquita, professor at UnB, who gave the lecture "An invitation to the world of mathematics". There was also the collaboration of partner projects: Chemistry in the square, Digital Cunhatã, Women in STEAM, PET Physics and Cosmos Project; and the project's undergraduates performed activities such as: arduino, computational mathematics, artificial intelligence, application of integrals, mathematical games and soap bubbles.

## CONCLUSION

Since the approval of the first version of the project, one of the concerns was how to stimulate girls' interest in the exact sciences in practice. And during its implementation it became clear that involving them in interesting and differentiated activities as well as introducing them to success stories of prominent women in the area, would result into making them feel represented in places and positions they have never imagined before. This also would generate changes in posture and vision of all the girls and women of the project when the protagonism was exercised by them. Currently, in the second version, we reinforce the idea that working together, boys and girls, men and women, would bring the diversity to science that is so necessary for the future. Women represent 51.1% of the Brazilian population, according to the IBGEeduca website [2], and they both can and deserve to help build the latter.

## REFERENCES

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