RESEARCH ARTICLE | NOVEMBER 17 2023

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AIP Conf. Proc. 3040, 050043 (2023)
https://doi.org/10.1063/5.0175551

Women in Physics in Uruguay: The Beginning of Gender Policies

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Abstract. We present the current status of women in physics and compare it to the situation 15 years ago, when the National Research and Innovation Agency (ANII) and the National System of Research (SNI) were created. A researcher in Uruguay is categorized into one of three levels and, as in many other countries, the number of women decreases at higher levels. In all research areas (not only physics), at the lowest level, 40% of researchers are women; at the intermediate level, 16%; and at the highest level, only 5%. Physics, in particular, has no women at the top level. A similar situation occurs regarding academic positions at universities. In this work we show that these numbers, and those corresponding to female students, have remained almost unchanged for the past 15 years despite the initiatives to tackle this issue. During the last few years, some efforts have been made to bring the issue of gender inequality at the university level to the table. In particular, many working groups have been set up to address this issue, formulating guidelines at the faculty and university levels to promote gender equality and develop protocols against discrimination and harassment. We discuss some of the advances toward gender equality that have been carried out, in particular in the scientific area. We also analyze the main policies that have been implemented so far and other possible steps in this direction. Although it is too early to be able to assess the effects of these new strategies, we hope that this summary will allow us to establish a reference for future analysis.

INTRODUCTION AND COMPARATIVE GENDER SITUATION

Uruguay is a country of 3.2 million people that has a small physics community. The University of the Republic (UdelaR) is the only public university in Uruguay to prepare students for science careers. About 110 students per year are enrolled to study physics, of whom 30% are women. Unlike our previous work [1, 2], which showed almost no change in the percentage of female physics students, in the present work we report that this percentage is now decreasing. Although the ratio of women to men who obtain MSc and PhD degrees is similar to those who earn a bachelor's degree, the number of male students is increasing (at all levels) while the number of women remains the same. This situation worsens in academic positions, where the number of women declines markedly as levels of categorization increase. In Uruguay, researchers are divided into four levels according to the National Researcher System (SNI-ANII, founded in 2007), from researchers who are at the beginning of their scientific careers to established researchers from level I to the top level: level III.

In general, not just for physics, according to SNI categorization, 50% of entry-level scientists are women; at the next level (level I), 44% are women. At level II this percentage drops to 39%, and at level III, to 23% [3]. In physics the situation is even worse: in Figs. 1b and 1d we present the gender distribution according to the research position in physics in Uruguay in 2008 and 2021, respectively. University academic positions in physics show a similar pattern. In fact, in Uruguay we do not have any female physicists at the top level, either within the university or research ranking system. Figures 1a and 1c show data for postgraduate students. Fifteen years ago, the ratio of female to male postgraduate students was 1:3 for master's degrees and almost 3:4 for PhD studies. However, this is not reflected in the actual number of entry-level and level I researchers (Fig. 1c). Furthermore, our ratio of female to male students

Women in Physics
AIP Conf. Proc. 3040, 050043-1–050043-3; https://doi.org/10.1063/5.0175551
Published by AIP Publishing. 978-0-7354-4718-9/$30.00

has dropped dramatically (Fig. 1c): for master's and PhD students the proportion is approximately 1:5 and 1:4, respectively.

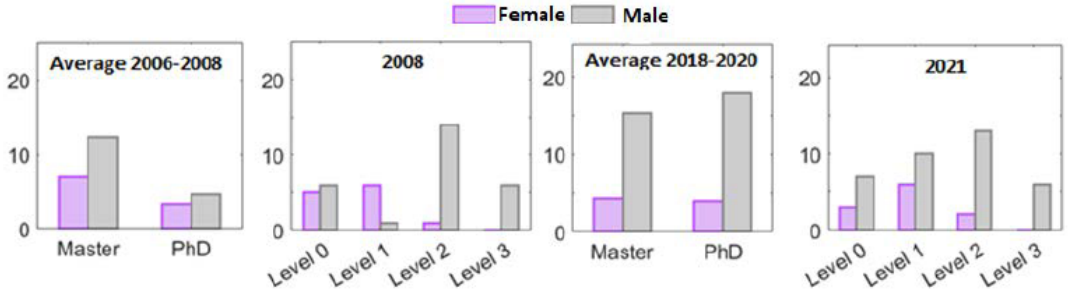

FIGURE 1. Change over 13 years in gender distribution (b) and (d) for SNI levels in physics fields, and (a) and (c), average number (over a 3-year period) of physics students carrying out doctoral and master's studies. Level 0 represents entry-level researchers.

Figure 2 presents the evolution of physics students in 2006–2020. As can be seen, the total number of women pursuing master's and doctorate studies remains approximately constant (Fig. 2b). The drop observed in master's students (2011–2013) is accompanied by a rise in doctoral students. However, the number of male pursuing postgraduate studies is growing for both MSc and PhD degrees. The UdelaR began promoting gender equality policies at the beginning of 2010, but the policies reached the STEM area only in 2017–2018. We delve into this situation in the next section.

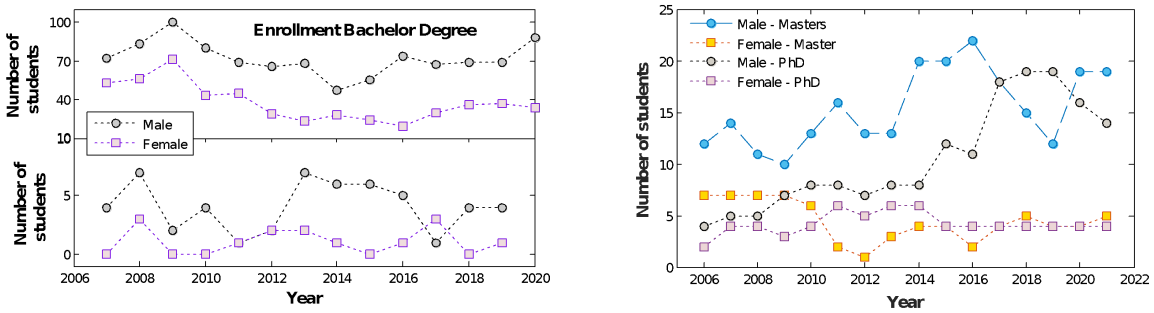

FIGURE 2. Evolution in the number of students (a) enrolling in and graduating from physics programs and (b) pursuing postgraduate studies.

There are many possible explanations for the increase of men in postgraduate studies: an increase in men in graduate studies, a greater ability to retain male students compared to female students during bachelor's studies, and finally the fact that fewer men are going abroad for graduate school. Although some students pursue their doctoral studies abroad after earning a master's degree, the doctorate and master's curves are aligned. In any case, the time lag between both curves must be considered (approximate time to complete the master's degree).

To test the first two ideas, let's see what has happened with students beginning a bachelor's degree program. In Fig. 2a we present the distribution by gender of students enrolling and graduating from bachelor's degree programs in physics in 2007–2019. We can see that the total number of students remains almost the same, but the ratio of women to men has decreased. It is important to note that over the last ten years several changes were made in the undergraduate curriculum. Therefore, this could possibly reflect curriculum changes that have reduced dropouts and increased the number of students earning a degree. However, this does not appear to be the case because the ratio of female to male graduates is decreasing. This must be studied in more detail, including the time it takes for students to complete their studies. The main reason for the decline in women seems to be the lack of motivation prior to graduation for STEM careers. Efforts in this direction are explained in the next section [4]. It is worth mentioning that before 2015 there were conditions of admission for engineering degree. This resulted in some students no longer completing the first year of a physics bachelor's program before migrating to an engineering program. The drop in enrollment around 2014 could be explained by this change.

GENDER POLICIES: UDELAR AND STEM

The importance of gender equality policies has gained special relevance at the university level in the last few years. Given that senior academics are predominantly males, even though female students make up almost half of the students in the first years of their studies, the university created a Gender Commission to study the possible issues behind this disparity. The Gender Commission for the university was then followed by Gender Commissions for the faculties. In particular, Gender and Harassment Committees have been established since 2018 in STEM areas in academic workplaces, and therefore anti-discrimination and anti-harassment policies are being developed.

In the last years some specific actions have been taken to improve working conditions that often affect women, such as availability of nursing rooms and childcare facilities (3+ years old) in the workplace during school holidays. In order to promote equal care in early childhood, parents (mother or father) have the right to a part-time job at the university until a baby is six months old. The university has also started to take into consideration the situation of women who have taken maternity leave by, for example, extending the deadlines for renewals at SNI, scholarships, or projects. They also have included a national award for young female researchers in STEM that is separate from the corresponding one for male researchers. This implementation was made based on the observation that all previous versions of this award in the STEM area were won exclusively by male researchers.

Some other policies were started a couple of years ago, especially in the Physics Department, where all evaluation committees for the hiring of professors began to include a female professor. However, this requirement has been difficult to meet due to the lack of women in high-level positions. Moreover, the two female professors available to do this task were in high demand for the task. Finally, it is important to mention that other actions have been developed to confront the problem of harassment. In particular, some protocols have been created to enable secure access to harassment complaints.

CONCLUSION

The situation of female researchers and postgraduate students in physics is getting worse. Because fewer women are choosing this type of career, the ratio of female to male postgraduate students is decreasing, and no improvement has been observed at the highest levels even though more female researchers have entered the field in the last 20 years. The implementation of some gender policies at the university, in particular in the STEM area, has been started in the last four years. Even though it is too early to study the efficacy of these policies, we want to stress the importance of beginning down this path. We hope that these new strategies help as a first step to reduce the gender gap in STEM.

ACKNOWLEDGMENTS

We thank Uruguayan agencies Basic Sciences Development Program (PEDECIBA) and National Researcher System (SNI). We give a special acknowledgment to Jimena Rodriguez for compiling the postgraduate data.

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