Project Ada: Championing Women in Computer Science

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Abstract. *Women have historically been underrepresented in STEM fields, including Computer Science. This article presents an overview of Project Ada, an initiative to empower women to pursue a career in Computer Science. The project, a partnership between a private university and a private sector company, funds scholarships to female students and provides support throughout their college careers. We hope this report will inspire more organizations and individuals to support similar initiatives and help bridge the gender gap in Computer Science and other STEM fields.*

1. Introduction

Female representation in the fields of Science, Technology, Engineering, and Mathematics (STEM) has been a longstanding issue. From 2014 to 2016 women represented only 35% of students enrolled in STEM courses globally [Chavatzia 2017]. The reasons for this underrepresentation are multifaceted and include several factors such as social stereotypes, gender biases, and lack of access to resources and opportunities [Casad et al. 2020].

The Brazilian Computer Society (SBC) published a report in 2019 on the statistics of college education[1], showing that women account for a mere 11.51% of incoming students in CS programs in Brazil. This pervasive underrepresentation of women in CS education highlights a significant issue in the field and emphasizes the need for greater efforts towards gender diversity and inclusion, including collective actions to promote diversity and provide equal opportunities for all individuals [Cheryan et al. 2015a].

In response to this scenario, Project Ada was created in 2019 with a dedicated mission to increase female representation and bridge the gender gap in the field. Since then, the project has awarded seventeen scholarships to female students pursuing a Bachelor's Degree in Computer Science. This article presents an overview aimed at sharing actions and strategies taken by Project Ada to address the barriers for women in CS. Additionally, by highlighting the efforts of these specific organizations to support female students, the article showcases the importance of targeted and intentional action in addressing the gender gap in CS.

This article is structured as follows: Section 2 presents works related to the topic of diversity and female representation in Computer Science. Section 3 outlines the structure for Project Ada, including the actions taken to support the Scholars, and Section 4 presents the discussion. Finally, Section 5 presents our final considerations.

2. Related Work

Gender representation in computer science is a topic that has received significant attention in academic research in the past few years, with research focusing on the factors that

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[1]www.sbc.org.br/documentos-da-sbc/category/133-estatisticas

influence women's participation in the field and intervention projects to address the gender gap in CS. In this section, we will review some of the significant studies on this topic.

In one of the earliest studies on gender representation in computer science [Fisher and Margolis 2002], the authors interviewed female students in CS programs and found that many of them felt excluded from the male-dominated culture of the field. The authors argued that this culture was a significant barrier to women's participation in computer science and recommended that efforts be made to create a more welcoming and inclusive environment.

There has also been a growing body of research on interventions to increase gender diversity in computer science. Several of these interventions are being developed in Brazil. There are events and technical workshops, such as HACKatie – a Hackathon for female participants that was used to encourage women in STEM areas [Fireman et al. 2022] – and a cryptography and mathematics workshop directed at elementary education teachers [Hoger et al. 2022].

Several recent studies also focus on university extension and outreach programs, for example, the experience report from #include girls [Barioni et al. 2022], a group that develops academic initiatives that inspire girls to pursue higher education in computing-related fields. These studies add to the growing evidence that interventions to create a more inclusive and welcoming environment for women in computer science can effectively increase gender diversity. However, much work still needs to be done to achieve true gender parity in the field.

While various initiatives aim to improve female representation in CS, this article focuses specifically on a partnership between an educational institution and a private sector company to offer financial aid and academic support to female students pursuing degrees in CS. This partnership presents a different approach to the gender gap problem, as it directly addresses the financial barriers that often deter women from pursuing careers in computing.

3. Project Structure

Project Ada is named after Ada Lovelace as a tribute to her legacy and to help inspire new generations of computer scientists that will continue pushing the boundaries of what's possible with technology. The project was initiated in 2019 as a partnership between the Pontifical Catholic University of Rio Grande do Sul (PUCRS) and Poatek, an IT company founded in Porto Alegre.

Project Ada's primary aim is to empower female students from low-income backgrounds interested in pursuing a career in Computer Science. To achieve this goal, the project offers full-ride scholarships to outstanding students who seek admission to the Bachelor's Degree in Computer Science program at PUCRS. In addition to the full-ride scholarships, the Project is structured to support the Scholars throughout their undergraduate journeys, encouraging them to pursue scientific research and helping them to develop the necessary skills to have autonomy in their career.

3.1. Student Recruitment

Since 2019, applications for Project Ada have opened twice a year. To ensure the program reaches the intended audience, the project collaborates with the State's Secretary

of Education and other institutions to communicate the application's opening, especially targeting public high schools. Through this outreach effort, we hope to attract female students from low-income backgrounds who may not have access to other resources or programs to support their interest in CS.

The application process consists of a holistic review, considering the student's background and academic achievements, an interview, and a logical test conducted with a team of professors and psychologists, to evaluate the candidate's intellectual curiosity, knowledge, and dynamism.

3.2. Student Support

Financial barriers can be a significant obstacle for many students, particularly those from lower-income backgrounds. By providing funding for the Ada Scholar's living expenses during their first 18 months in the undergraduate program, Project Ada is helping to alleviate some of the financial pressures that these students may face. This funding can help students to focus fully on their studies and extracurricular activities. This can improve their academic performance, increase their chances of graduating, and enhance their overall college experience.

We also seek to encourage Ada Scholars to pursue scientific research. As criteria for maintaining the scholarship, students must participate in a research project in the University's Graduate Program in Computer Science. The Graduate Program contains 14 research groups[2] in different CS subfields, and the students can choose the one that fits their main area of interest. The students choose a research group in the first semester but may switch as their interests evolve.

Ada Scholars work 20 hours per week in their chosen research groups, where they are advised by experienced professors and work alongside Master's and Ph.D. candidates to solve complex problems and develop technologically relevant applications. They are also taught to conduct literature reviews, design experiments, and write academic papers. The students are encouraged to publish, and present research findings in journals or conferences, and some of them already have.

Beyond academics, Project Ada also aims to engage students in a diverse and supportive environment, helping them to foster self-esteem, confidence, and a sense of belonging in the Computer Science field. The industry partnership in Project Ada adds significantly to this goal, as Poatek's seasoned software engineers and data scientists actively participate in the project by hosting workshops and roundtable discussions to introduce students to the industry.

4. Discussion

The underrepresentation of women in computer science is a well-documented issue that has garnered significant attention in recent years. Even though women have made significant contributions to the field of computing, they continue to be significantly underrepresented at all levels of the industry. This section will discuss the current state of female representation in computer science and explore potential reasons for the disparity.

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[2]www.pucrs.br/politecnica/programa-de-pos-graduacao-em-ciencia-da-computacao/linhas-e-estruturas-de-pesquisa/

There are several potential reasons for the gender gap for women in computer science. One of the most commonly cited reasons is the prevalence of gender stereotypes and biases [Khalil et al. 2015]. These stereotypes can begin as early as childhood, with girls being encouraged to pursue more traditionally feminine activities. In contrast, boys are encouraged to pursue activities that are seen as more masculine [Miller and Halpern 2013]. This can create a self-perpetuating cycle in which girls feel discouraged from pursuing computer science, leading to fewer female students in computer science programs and reinforcing the stereotype that computer science is male-dominated.

Another potential reason for the underrepresentation of women in CS is the lack of female role models in the field. Research has shown that exposure to female role models can significantly increase girls' interest in computer science [Cheryan et al. 2015b]. However, because women are underrepresented in the field, there are fewer female role models for girls to look up to, which can lead to a lack of interest in the field.

Despite these challenges, encouraging more women to pursue CS education is often cited as key to bringing fresh perspectives and diverse ideas to the growing technology industry. With this growing concern, a novel model of collaboration between universities and companies has emerged to provide financial aid to students.

This collaboration model involves companies funding universities to support student scholarships, internships, and other educational initiatives. One of its key benefits is that it enables companies to support the development of a skilled workforce. By partnering with universities to provide financial aid to students, companies can help cultivate a diverse talent pool with the required skills and expertise.

Project Ada is one such example of this model of collaboration. Since its conception in 2019, the project has awarded 17 scholarships to female students with a zero dropout rate. The students report an increased sense of belonging in STEM for being part of a group of women and believe that the project is structured to prepare them for a successful career after college, either pursuing graduate studies or joining the Computer Science industry.

5. Final Considerations

The underrepresentation of women in STEM fields, particularly in computer science, remains a significant challenge that needs to be addressed through collective and intentional actions. This article presented Project Ada, an initiative focused on providing financial aid and academic support to female students from low-income backgrounds. This model of collaboration and student support project presents a promising approach to increasing female representation in the field.

As more research is conducted on the factors that influence women's participation in computer science and other STEM fields and on effective interventions to increase gender diversity, we hope that more initiatives like Project Ada will emerge, helping to close the gender gap in CS and to create a more inclusive and welcoming environment for all individuals.

Ultimately, achieving gender parity in the CS field is a matter of social justice and equality and essential for promoting innovation and advancing scientific knowledge. By

supporting initiatives like Project Ada and promoting diversity and inclusion in STEM fields, we can ensure everyone has equal access to opportunities and resources to pursue their passions and potential, regardless of gender, race, or socioeconomic background.

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