Meninas.comp Project: Programming for Girls in High School in Brazil

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Abstract—The field of computing has not been a popular area of study for young women entering the University of Brasilia (UnB). In 2015, female students comprised a mere 5% of the students seeking to enroll in a Computer Engineering major. In an effort to popularize the field of Computer Science among girls in High School, the Meninas.comp Project (Girls.comp, in English) is being carried out in the public high schools of Brasíla, in Brazil. The project is coordinated by female professors from the Department of Computer Sciences at the UnB. This article reports on one of the activities of this project, presenting the hands-on workshop with programming for public high schools. These programming workshops are attended by students from 10th, 11th and 12th grades. The workshops include game programming, robotics and developing apps for mobile phone.

Keywords—Women, Computing, Education, k-12

I. Introduction

The Department of Computer Science at the University of Brasília (UnB) currently offers three undergraduate degrees related to Computer Science (CS): Bachelor of Computer Science (since 1987), Teaching Computing (since 1997), and Computer Engineering (since 2009). In 1987, when the Bachelor course began, 32% of the undergraduate students were female. However, this number decreased over time and, by 1997, this percentage had fallen to 10%; by 2013 it was only 6%. The Teaching Computing degree ratio oscillates at around roughly 11%, while Computer Engineering, which had already begun with low numbers, has seen them fall to less than 12% in the past three years. In 2015, young women comprised a mere 5% of the students seeking to enroll in a Computer Engineering major.

In 2010, a group of female professors from the Department of Computer Science created the Meninas.comp Project: Computing is a girls' thing too! (https://www.facebook.com/meninas.comp) with the goal of introducing the field of computing to girls in high school. To popularize CS among girls in high school, the Meninas.comp project is being carried out in the public high schools in Brasília, the Capital of Brazil.

Meninas.comp shows the vital role computer science plays in developing the country and encourages girls in high school to enroll in a CS major in their undergraduate programs. The project is comprised of motivational lectures, hands-on classes and the development of the project for high school female students. In this paper, we will describe the hands-on workshops in public high schools. Programming lessons are not included in the curriculum at government high schools in Brazil. Therefore the Meninas.comp project fills this gap by teaching girls programming in public high schools, mainly in disadvantaged areas.

II. hands-on Workshops

Female professors and students from the Department of Computer Science at the University of Brasília have given many lectures in the last nine years of the project. These talks take place at the university or in public schools. We have already visited many local high schools in Brasilia and other surrounding sites.

These activities present what CS professionals do, as well as the essential role computing plays in the development of our country. Female professors, professionals and graduate students in Computer Science deliver these lectures.

The Meninas.comp project develops activities such as hands-on workshops for programming, robotics, and electronics for girls' high schools. The classes carried out in this project take place at the university or in public government schools, preferably in disadvantaged areas. We have already visited many local high schools in Brasilia, and other surrounding sites. The classes are:

- In the programming class, the girls use Kodu software [2] to develop a game. Kodu lets the girls create games via a simple visual programming language. This way, with Kodu, the girls create their game without even knowing a programming language.
- In the robotics class, we use Arduino, where the girls build and program their robots. The girls learn coding. Basic programming and electronic concepts are presented. Girls learn to make electronic circuits with basic components, with LEDs, resistors, jumpers, and others;
- Programming classes with MIT App Inventor [3]. During the lessons, the girls learn to code their apps for Android. In Brazil, Android smartphones are very popular.

III. Result and Discussion

Our first hands-on workshop was with Kodu, in 2011. Kodu is the tool to develop games in a playful way. Figure 1 shows the workshop at the National Conference of Science and Technology in Brazil, in 2011. This one hour workshop was repeated many times a day over the week. This workshop happened, also, in different high school in Brasilia.

The second workshop is "Girls, let's develop the first app for your cell phone". In this class, we used the MIT Inventor App. We developed this workshop in the UnB' laboratories, it's an opportunity for girls get to know the biggest university in Brasilia. This workshop has been taught since 2015. Female students in Computer Science and Engineering from our department are teachers of these classes (Figure 3).

The third workshop is robotics with Arduino. During the workshop, high school girls without experience in programming learn about LED, C programming and code the first application to do semaphore. At the beginning of the project, professors taught these classes. Nowadays the former school participants of our first courses, who are currently studying CS majors at UnB, are teaching these classes (Figure 2).

Fig. 1: Kodu Workshop hands-on.

We have developed these workshops many times for nine years, at high school, UnB and events (Campus Party Brasilia, National Conference of Science and Technology in Brazil, and others). We now have six former high school students that they are female students on CS majors at UnB.

IV. Conclusion

The Meninas.comp Project has been operating since 2010 to include girls in Computer Science and Engineering majors at the UnB. Our goal is to empower these girls. Our hands-on workshops have happened, mainly, in the UnB laboratories because that is an opportunity for girls from the disadvantaged areas to get to know the UnB.

It is a challenge to increase diversity in CS majors at UnB. However, in 2018, 23% of the students who enrolled in
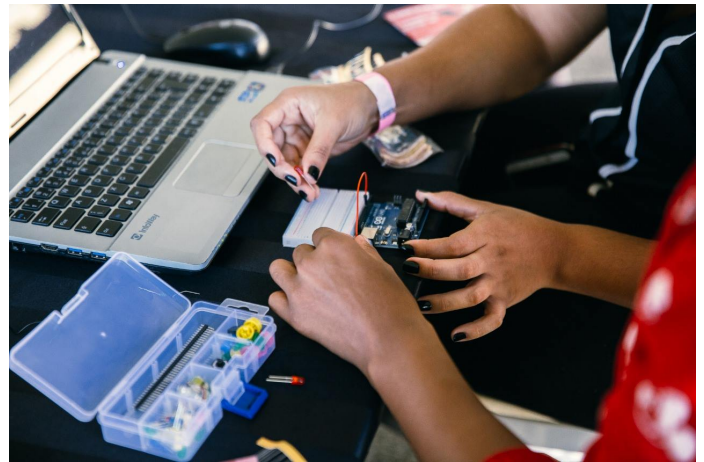

Fig. 2: Arduino Workshop hands-on.

Fig. 3: Android Workshop hands-on.

Computer Engineering are female. This rate is the best since the creation of the major in 2009. Nowadays the teachers of these workshops are, mainly, female undergraduate students of CS majors who did our workshop when they were students in High School.

References

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