"Robótica Infantil del IEEE"

(IEEE[1] Children Robotics)

by Vanessa Serrano

The RIIEEE Project was born with the objective to spread and improve the concepts that girls and boys in the city of Cuenca – Ecuador have about robotics and technology. It is a proposal of the WIE[2] Affinity Group of Universidad del Azuay, inspired by the Scuola di Robotica[3], based in Genova-Italy. The workshops are intended to convey some messages such as mathematics and science are fun, engineering can benefit mankind, and that its gender is neutral.

I am en electronics engineering student from Ecuador and I am actually developing my undergraduate thesis on computer vision for robots. I love robotics, and I think that every person should be able to tell at least what a robot is. I am convinced that programming and building robots helps people to develop skills, specially childrens.

When I finished my studies, I was able to travel to Italy for two months. Through a friend who works in Italy's National Research Center (CNR, Centro Nazionale di Ricerca), I got in touch with the Scuola di Robotica, and I met Fiorella Operto, its President, this summer in Genova.

She encouraged me to pursue this idea that I had, wich was to emulate what the association does. We talked a lot about the varius advantages of using robotics in children education, and she specially talked about involving girl-only activities, to make them feel comfortable with technology and what they know about science in order to encourage them to pursue engineering. Since then, she has been giving me advices and following the activities I develop.

When I returned to Ecuador, I started the WIE Affinity Group in my University; then, with my dear friend and colleague Tatiana Sarmiento, the SB President Juana Córdova, and WIE members Génesis Vázquez and Mabel Ochoa, we started the RIIEEE Project. We chose the name RIIEEE wich states for IEEE Children Robotics and means *laugh* in spanish. We started collecting used and old electronics and looking for usefull parts. We thought that an easy robot to start would be a "dancer" using vibrator motors, so we made a home-made kit to teach kids how a circuit works using batteries, lights, switches and motors.

Before begining any activity on the project, this past october I had the opportunity to attend the Workshop on Robotics Education that was held in Arequipa-Perú within the Latin American Robotics Symposium. There I could relate with people who has been working in diverse approaches and different techniques to teach childrens using robotics as a tool to improve their skills. This helped me to develop a more organized workshop and to think other activities that would give children a better understanding of robotics.

The first workshop was organized with 21 kids of low resources between 4 and 10 years old. The activities that were developed with the kids included presentations, videos, demonstrations with real robots, and dynamics of creative robotics. It was awesome to watch the smiles in the kids when they got to see real robots and when they finally got their hands on electronic parts in order to build their first "robot dancer". An interesting thing was that most of the girls didn't feel comfortable doing *hands-on* with the electronics when they were in front of any boy; but were absolutely fascinated and got very creative when they were among girls.

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[1] **IEEE**. Institute of Electric and Electronic Engineers. It is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity.

[2] **WIE**. Women in Engineering. It is the largest international professional organization dedicated to promoting women engineers and scientists and inspiring girls around the world to follow their academic interests to a career in engineering. It belongs to the IEEE.

[3] **Scuola di Robotica**. It is a nonprofit association founded in 2000 on the initiative of a group of robotics and humanities scholars. Has as its purpose the promotion of culture through educational activities, training, education and dissemination of arts and sciences involved in the development of this new science (robotics). http://www.scuoladirobotica.it

Mabel heard a girl saying: "But I thought only boys could build robots, not us." And it was a joy to see her excitment and smile after knowing that we all, 5 women, study engineering and we had build our own robots. The workshop was financed by the University's Students Association; but now we need to get bigger funding to acquire educational robotics and electronics kits in order to continue with the project and develop better workshops

Next steps:

Our next activity will be held during march, in a girl-only college, to celebrate International Womens Day. We will be presenting in front of 16-17 years old girls our experiences as engineering students, encouraging them to pursue STEM careers, giving them advices, telling anecdotes and informing them about the different options of engineering courses available in our city.

Moreover, a friend from Uruguay introduced me to the Project Butiá[4]. He encouraged me to apply for a Butia's initiative called "*Quiero una USB4Butiá*" that allows to enter a proposal to receive as a one year loan, a USB4Butiá[5] board and other hardware elements. Right now we are trying to develop a workshop to teach children robot programming skills using the TurtleArt[6] software and the Butiá boards we were given.

Planning this Project and developing the activities definitely has been an encouraging experience for us and it has motivated us to continue with this dream and vision that we have, wich is to give children the oportunity to learn about robots and programming.

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[4] **Butiá**. This Project, born in the Engineering Faculty of Universidad de la República in Uruguay, seeks to create a simple and inexpensive platform to students from public high schools in coordination with teachers and inspectors of Secondary Education, to internalize programming the behavior of robots. http://www.fing.edu.uy/inco/proyectos/butia/

[5] **USB4Butiá.** It is an easy contruction USB interface, specialized in using the robot Butiá, trying to simplify its use and increase its sensory capabilities and performance in a robust way. This interface is an I/O device that increases the capabilities of a computer allowing it to communicate with other devices such as color sensors, distance sensors, actuators such as electric motors and others

[6] **TurtleArt.** It is a kind of programming inspired by the LOGO programming language. It was designed to be easy enough for children and yet powerful enough for people of all ages. It is focused on making images while allowing the user to explore geometry and programming. http://turtleart.org