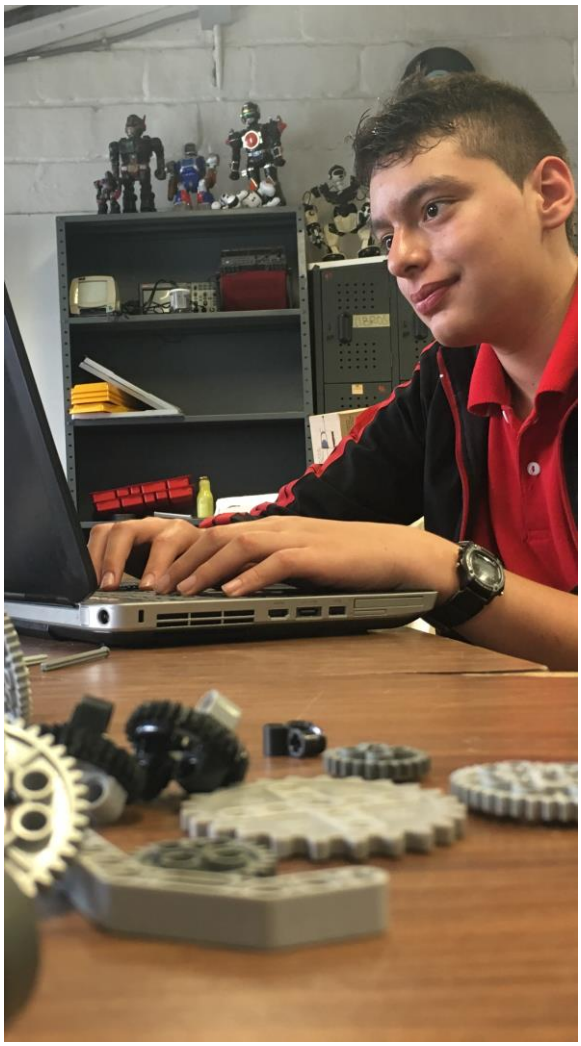
i-COW PRO: International Collaborative Work Project

Juan Pablo Rivera Barrera

Engineering and Information Technology teacher
Loyola School for Science and Innovation
Middle and High School
Medellín Secretariat of Education
Medellín, Colombia

CONTEXTUALIZATION



The Loyola School for Science and Innovation has been improving its curriculum by extending the amount of hours that students have to accomplish each week at the school. The students need to attend a schedule of eight academic hours per day. During this period, they need to complete a comprehensive curriculum that emphasizes in collaborative work and scholar research developing projects that involve mathematics, science, social studies, language (English as foreign language), arts, and computer and engineering literacy. The curriculum also stresses the importance of autonomy and critical thinking, as well as computational thinking by learning programming, automation and robotics.

The main goal of this process is to develop the logical and systemic thinking, appropiating it to children of early school age, by technological tools and software fundamentals that allow the students to interact in its context as digital citizen. Robotics has been used as one of the pedagogical tools, that more than an object of study itself, is used within this process as a bridge to achieve the goals around computational thinking and appropriation of technological and software tools.

i-COW PRO is a project that foresees to share the experience of collaborative work and school research based on problems and necessities identified by high and middle school students. Our students are living a very special moment: In the context of a city that was strongly marked and wounded by war and drug trafficking in Colombia that now is leading a post-conflict stage and a new era of peace in our country.

Overal i-COW PRO Goal

Developing research scholar projects based on collaborative work between students from Medellín Loyola School and schools abroad. Our students will share the problems they identified in Medellín and Colombian context, with students from other countries with a totaly different social reality, and both groups will propose and develop solutions based on collaborative work.

Specific Aims

Motivating scientific research in middle and high school students as a tool to develop communication skills, teamwork, critical thinking, problem solving and social responsibility.

Promoting among teenagers the use of information and communication technologies, as well as social networks, as tools for scientific research with social commitment.

Providing an interactive oportunity of cultural exchange for middle and high school students.

Promoting the exchange of ideas among teenagers to provide solutions to problems identified in social contexts other than their own.

Offering an opportunity to strengthen a second language to middle and high school students.

Promoting the exchange of curricular matters related to science and technology between middle and high school teachers of the Loyola School from Medellín and teachers of educational institutions of other countries.

Who makes this proposal?

Juan Pablo Rivera Barrera as a teacher of the National department of Education of Colombia in the the Educational Institution Loyola School for Science and Innovation which is part of Medellín Secretariat of Education. This is a public institution that services middle and high school students. Since 2010 Juan Pablo has been working on a curricular proposal on computational thinking and the use of robotics in the classroom as a pedagogical tool to develop skills in critical thinking, teamwork, communication, problem solving, and appropriation of ICT tools. In 2013, within the framework of "Virtual Educa Colombia", he begun to support the training processes in ICT and robotics that Medellín Secretariat of Education through the "Vivereo del Software" offers to the community, and offered the first robotics course for teachers of public secondary schools in the city, as part of the ICT USE AND APPROPRIATION strategy. This process that had a significant impact on the academic community of Medellín, and initiated a trend in the city to use robotics teaching as a pedagogical tool to train digital citizens.

In 2014, with the "Robotics for Education" project, Juan Pablo was selected by the National Department of Education to represent the Regional Educational Innovation Center; "CIER Occidente", to attend an ICT Training for Colombian Teachers in the city of Incheon, South Korea. The purpose of this experience was to train elementary, middle, and high school teachers in Colombia in the use of ICT for the education of 21st century citizens. At the end of 2014, and in order to share this experience in the academic community of Medellín, he was invited to be part of the "Vivero del Software" team to implement the strategy USE AND APPROPRIATION OF ICT. During 2015-2016 he supported the training processes that "Vivero" offers to the citizens of Medellín regarding robotics, computational thinking, and STEAM (Science, Technology, Engineering and Mathematics) model, as well as technological surveillance in education in technology. During 2016 the teacher was visiting schools in the netherlands, China, and United states fomenting this initiative. Now he is in the classrooms of the Loyola School working with middle and high school students teaching robotics, programming, and, engineering and information technology.

Why is it important for Medellín to internationalize the curricular processes?

Medellín has been doing an organized work in modernizing basic education and has been able to strongly improve the results of its student population in standardized tests, but a highly competitive society based on knowledge and with a free exchange of products, services, and ideas, requires trascendental changes and continuing innovation in its educational efforts, in order to train a population that guarantees the prosperity of individuals and facilitate a sustainable development of communities in a context of globalization.

Technological Surveillance in Education

If we dream of a Medellín with competitive citizens, technological surveillance is a fundamental effort for the development of planning, investment, and projection of educational processes. Technological surveillance in different productive sectors is a methodology that helps to strategically address the research and technological development processes. In education it has been done in a non-explicit way. Technology is a key factor in the competitiveness of education systems. Therefore, knowledge of technological advances and methodologies for their inclusion, not only in formal education, but also in all that entails the formation of Medellín Citizens, are a necessity. They allow the accurate identification of possible solutions to the problems of current models. Developed countries are the world power not only for its industry, but also because they are a reference in educational models that have made possible to reduce poverty levels and the emergence of a new society of knowledge. Knowing those models closely can improve the strategy approach in the process of a better education in the city.

Medellín has very particular circunstances in its ethnographic, socio-economic and political issues, and these, have been forging the city´s identity amid the Colombia's conflict. It makes difficult to implement educational models inpired from other contexts that have given excellent results. However, it is necessary to know how they educate in other contexts to identify aspects that allow the initiation of processes of technological transfer, adaptation and contextualization of methodologies and pedagogical models. This guarantees the universality of education processes as well as the formation of digital citizens who recreate a sustainable, competitive, and happy city.

How to meet the objectives of this proposal?

To ensure the accomplisment of the objectives proposed, a series of associated activities and products are outlined. It will be a tool for monitoring and measuring the implementation of the i-COW PRO project. See Table 1.

GOAL	ACTIVITIES	PRODUCT
Developing research scholar projects based on collaborative work, between students from Medellín Loyola School and schools abroad.	• Visiting the possible interested schools in the development process. • Stablishing a schedule of virtual meetings between students from Colombia and students from the schools that have decided to participate as partners. • To choose the research projects students from Medellín that are going to be presented to the students from partner schools. • Allocation of peers according to interests and scientific affinities between students of the two schools. • To conform peer groups and stablish a schedule of activities according to a given format.	A paper in an indexed education magazine or journal. Writed report of the whole activity. An international scholar research magazine with the projects that were developed by collaborative work for the students from both schools.
Providing a space for cultural exchange to middle and high school students.	• Establish timelines for the presentation of videos where Medellín students present to their peers in the other countries: their environments, family, neighborhood, friends and hobbies. • Advise in editing of the presentation videos.	Documentary film edited by students
Promoting the exchange of curricular matters related to science and technology between middle and high school teachers.	• Record at least a class or part of a class and share it with the teachers of the partner school. • To stablish a Schedule of virtual meetings between teachers that act as an advisor of the research projects of the students in both schools.	Documetary film. Possible paper in an indexed education magazine or journal.

Table 1. Activities of the project

Time Line

	2016								
ACTIVITY	**Marc**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**
Visiting the possible interested schools in the development.									
Stablishing a schedule of virtual meetings between students from the partner schools									
To choose the research projects to be presented to the students from partner schools, and present it.									
Allocation of peers between students of the two schools.									
To conform the peer groups and stablish a Schedule of activities according to a given format.									
To record and edit the presentation videos where students introduce themselves to their peers.									
Advise the editing of the presentation videos.									
To discuss the problem and the solutions presented by Colombian students.									
Recording at least a class or part of a class and share it with the teachers of the partner school.									
Virtual meetings between teachers that act as an advisor of the research projects.									
To write reports and papers									

JOIN THE PROJECT !

Contact information:

www.iecolegioloyola.edu.co
jpablo.rivera@udea.edu.co

Loyola School for Science and Innovation
Medellín Secretariat of Education
Medellín, Colombia