An 8 Year Old Educational Robotics Program – Structure, Methodology and Goals

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Abstract. The "Talents For the Industry Program", is an 8 year educational robotics program that has been running in Brazil since 2002. The program was created with the goal of developing talents with the ability to deal with technology using robotic activities as a tool to reach this goal. The program was implemented in a set of four hour weekly activities that lasts 18 months. The main objective of this paper is to show how these goals are mapped in the structure, methodology and classes of this program.

Keywords: Robotics, program, methodology, goals.

1 Introduction

There is a growing use of robotics as tool for learning and education [12]. There has also been a growing the number of conferences and publications addressing this theme. Considering the importance of this subject, this paper presents an educational robotics program that started its planning phase in 2001 and has been running since 2002, and it is nearly nine years old.

The report to UNESCO from the International Commission on Education for the Twenty-first Century [3] has inspired some educational programs in Brazil and has also been discussed within industrial associations including FIESC (Santa Catarina State federation industry association) [1]. The main conclusions of this report were: i) it compares the state of development in Brazil with other countries and compares Brazil’s development with the development of its educational system; ii) it stress the relation between the rate of technical progress of a country and the quality of human action, making evident the need to train people capable of using new technologies innovatively; iii) it shows the need for new skills in industry; iv) it stresses the need that the educational system must answer to these needs, not only giving the necessary training, but also in preparing senior staff for this task.

Considering the limitation of these entities in regular schools, FIESC decided to implement a project outside the regular schools as a more immediate option. More importantly, the results could help in designing new models and new projects. It was decided that it would develop a technology education program.
In 2001 the planning and preparation process began and the result was the creation of a program that started in 2002. This pedagogical work resulted in a course called Educational Technology Journey which was applied in three semesters or units. These courses have been applied in several cities of the state of Santa Catarina, since the first semester of 2002.

This introductory section has presented the motivations of Educational Technology Journey; Section 2 presents the Mode of the operation of the program; Section 3 presents how the classes are conducted; Section 4 discusses how the goals of the program are reached and Section 5 presents the conclusions.

2 Talents for the Industry - Mode of Operation

The Education Program called Talents for the Industry [5] aims to identify, develop and promote talent in among children and youth. The Education Program was established by the Federation of Industries of the State of Santa Catarina. The program includes educational sites, educational materials with a physical structure, staff development and the management of teachers. This structure was replicated in four sites of application of the course in different cities of the state.

The course is taught by an instructor with a technical-technological background and a complete high school education and there is an instructor per teaching site. The work of the instructors is guided and supervised by an educator. Now, after a didactic and operational adjustment the classes are composed of a maximum of 24 students divided into groups of four students.

In designing an educational robotics program, it is necessary to define a set of operational aspects such as timing, the training of instructors, group size and age, the characteristics of classrooms and materials, and educational materials. The next section presents how these aspects are implemented and the factors that led to each decision.

2.1 Frequency and Characteristics of the Groups

Groups have a single weekly meeting from 3:30 to 4 hours. This duration is relatively long for a young person but it allows for the projects to be completed in a single meeting. The classes are composed of a maximum of 24 students divided into groups of four. In general, activities with robotics materials are performed in groups. Based on the experiences of the supplier of educational material, which recommend that a group should not be less than three and no more than four, we adopted this criterion. The number of groups was initially set to eight, as it was noticed that a group with this size complicated the implementation of complex projects. The class was reduced to six teams after the second year of the project. In the definition of the age range (11 to 17) the decision was that a project of this nature would have greater impact if applied to students in the early stages of the elementary and secondary education. The educational program aims to lay the foundations of a technological culture and extent their abilities