EDUBOT

Interactive Cooperator for the Development of Educational Robotics

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***Abstract*— This article shows the problematic, the objectives and the main results of the project EDUBOT, carried out in the educative institute "Ciudad Santiago" of the township Santiago Putumayo in Colombia where the work group detected learning and educative needs. Trough didactical activities and accompaniment was implemented the educative robotics as teaching methodology, focused on abilities strengthening of each student. Were realized activities with recyclable material as base of learning about previous robotics concepts and briskness using the LEGO robotics kit in the robot arming process. During the course the workshops focused in the students to introduce them about de robotic kit also they realized teamwork and strengthen the attention, memory, concentration, fine motor, laterality and abilities empowerment.**

At the end of the project the group managed to assemble a robot using the LEGO kit with accompaniment of electronic students. Were collected 8 worksheets about memory and concentration reinforcement, one for each meeting held with the group.

Keywords—Tools; Interactive; Attention; Memory; Concentration; Educative robotics.

I. INTRODUCTION

In the general Colombian educational framework given to different tests, results, including general development, it is evident that despite the search for better results, progress is presented in a slow and little innovative or creative development, surely given by monotonous methodologies and the lack of investment in better tools for education. As a result of which more innovative capacity is demanded by teachers and students, taking into account the processes of educational inclusion [1] [2] [3] in the institutions it is necessary to look for alternatives that facilitate the development of competences in the different areas and to assist in the learning process of children with special educational needs.

At the national level, it is necessary to mention the difficulties that some students have in learning the themes dictated in the educational cates of schools and colleges, among the most relevant the literacy and logical reasoning that evidence is seen at the time of admission to universities [4] [5] [6]; So that some regional education sectors have tried to adopt new technologies that facilitate or accompany the teaching process as the educational robotics that in Colombia has been modestly applied in the education of children and young people in the form of play activities that gradually motivate the creation and construction of small prototypes encouraging basic knowledge about this discipline [7]. It becomes more important as far as an educational area is concerned, making use of these new tools in teaching for little children who are just beginning their exploratory stage where an impact with more didactic, innovative and flashy resources becomes more evident , In order to generate a more dynamic and creative future trend in these children.

II. THE PROBLEM

In the department of Putumayo located in the south of Colombia, where some of the most vulnerable areas of the country are settled, vulnerability caused by the presence of illegal groups that result in the inaccessibility of different external resources to the department, In addition to the already obsolete educational methodologies used at the national level and intrafamily problems have made areas such as those described already present a deficit in academic performance and even more so in smaller grades where they study little children who are more susceptible to all this problem , Which leads to shortcomings in attention, concentration, memory, interest and motivation to study.

The specific case is located in one of the educational institutions of the Municipality of Santiago Putumayo in which a group of approximately 20 students with learning educational needs has been detected; Among the most

serious cases present are disorders of reading (dyslexia), writing (dysgraphia) or calculus (dyscalculia), because children learn in different ways and possess skills and talents inherent in their personality, so it is necessary Strengthen basic learning capacities (attention, concentration and memory) to achieve school success.

III. OBJECTIVES

1. Recognize the LEGO robotic kit with children and build a robot that helps strengthen basic learning fields.
2. To determine the main contributions that educational robotics provides in the learning of students with educational needs.

IV. TARGET PUBLIC

We worked with students between the ages of 5 and 12 who attend grades from pre-school to fifth grade at "Ciudad Santiago" school whose location is in the urban area of the municipality of Santiago; to the south of Colombia, in the department of Putumayo, sector of the Upper Putumayo.

V. PROJECT DEVELOPMENT

The development of the project was carried out during the months of April to November of the year 2016. A total of 8 activities were performed.

Activity 1: Meeting of socialization about EDUBOT and group presentation.

Figure 1. Photograph of the group of students with learning educational needs of the educational institution "Ciudad Santiago"

Activity 2: In the insertion process in educational robotics with the group was realized a creativity workshop making use of tangram fiches and the strengthening of teamwork.

Figure 2. Picture taken during the creativity workshop with tangram fiches.

Activity 3: He focused on the construction of a toy car with recycled material like as bottles, springs and lids. Explaining during the process the benefits of teamwork, the value of perseverance in the face of study difficulties and learning through play.

Figure 3. Photograph of 3 students putting together a cart with recycled material

Activity 4: Was realized the first interaction with the LEGO kit, relating each component of the kit to human physiology.

Figure 4. Picture taken during the presentation of the LEGO Kit

Activity 5: From the creation of a "Wall-e" Robot [8] with Mindstorms kits ev3 [9] and teamwork, the workshop focused on strengthening basic learning abilities, fine motor skills of hands and fingers For the assembly and also the practice of attitudes of interrelation for the teamwork. To assemble the robot, the group was divided into subgroups of 3 and each focused on building a part and then assemble it into a single structure.

Figure 5. Photograph of the representatives of the armed groups of robot parts

Activity 6: The building of the Robot "Wall-e" with the groups of the first session is resumed, finishing the construction of the robot parts and assembling in a single structure.

Figure 6. Photograph taken during the second assembly workshop of the Robot.

Activity 7: The Robot "Wall-e" is finished, during the activity the groups assemble the last parts and with the help of the advisors the final coupling is done.

Figure 7 Photograph taken during the third activity of the Robot.

Activity 8: In order to finish the project, the students had the opportunity to manage the constructed robot (Annex 1) by means of remote control and to overcome some tests in a track, that were designed for the improvement of the attention, the memory and the concentration.

Figure 8. Picture taken during the final activity of the project

During the 8 activities, there were developed reference cards for the strengthening of memory, concentration and attention (Annex 2). The teamwork and the assignment of roles during the assembly process, generated a good work environment and a space in which students could express themselves freely..

VI. BUDGET SPENT

item	Unit cost (USD)	Total cost (USD)
EV3 Lego Mindstorm	350	30
Shipping cost	50	50
Viatics (tranport 5 people)	20	100
TOTAL		**500**

VII. CONCLUSIONS

Educational robotics in the learning of students who present educational needs helps to strengthen basic learning fields and acquire new knowledge framed in robotics.

The use of such a striking tool as the LEGO robotics kit encourages students to learn and devote their time to didactic activities that strengthen the different abilities of each student.

As an educational tool, the robotics workshops allow to strengthen creativity, stimulates students to acquire new knowledge, discipline and leadership that are fundamental bases for establishing a life project.

The testimonies of each student about how they have improved their behavior in classrooms, the interest they have been able to develop for some subjects and the strengthening of their attention and memory have been results of the use of the development of the project.

The contribution of the completion of a project such as the arming of a robot and see its operation in the learning

process is reflected in the self-esteem that each student builds by being able to achieve an objective that at the beginning of the project would seem impossible.

VIII. ABOUT THE PROPOSER TEAM

The robotics group that developed the project is made up of 5 students belonging to the student branch IEEE active for 4 years. Being his current counselor, Ph.D Andrés Pantoja and mentor of the RAS team: Msc. Darío Fajardo who work on projects of great impact in the region of Nariño. Diego Peluffo; mentor of the Artificial Intelligence Society (CIS), who has done more than 10 international publications in the IEEE.

IX. REFERENCES

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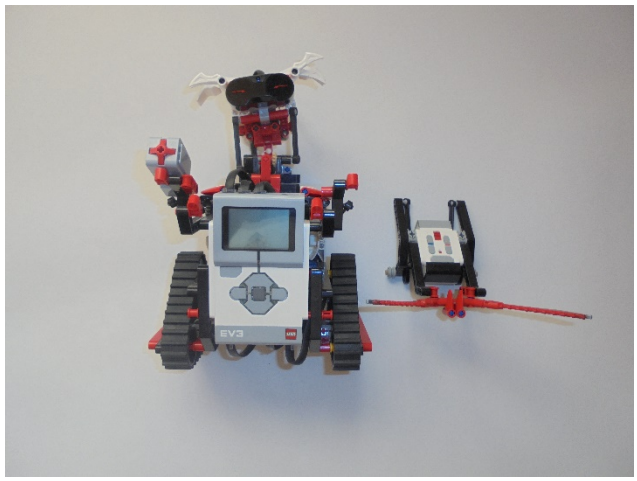
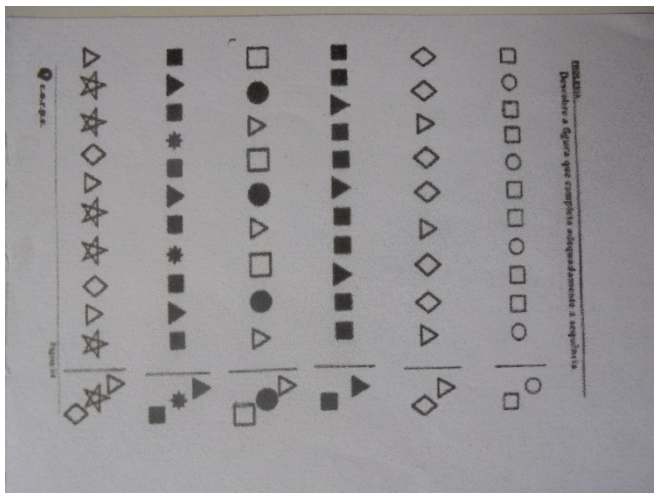
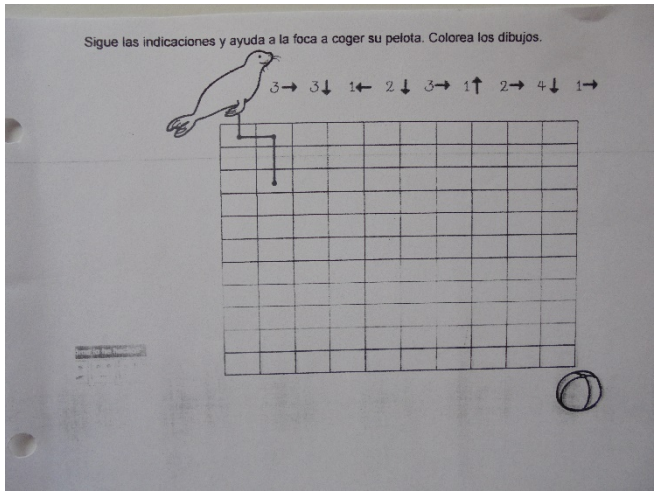
X. ATTACHMENTS

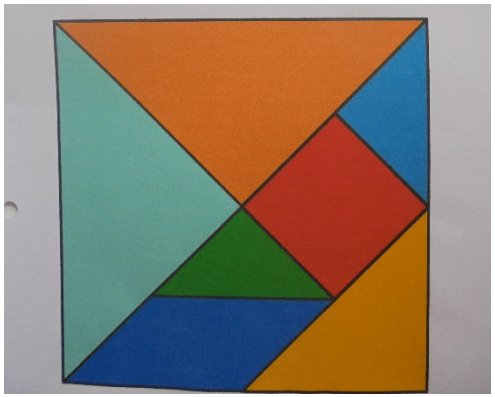


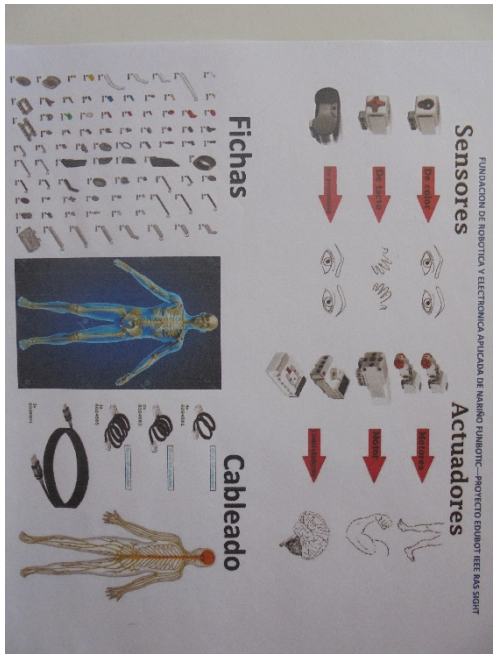
Annex 1. Robot built by the group of students.

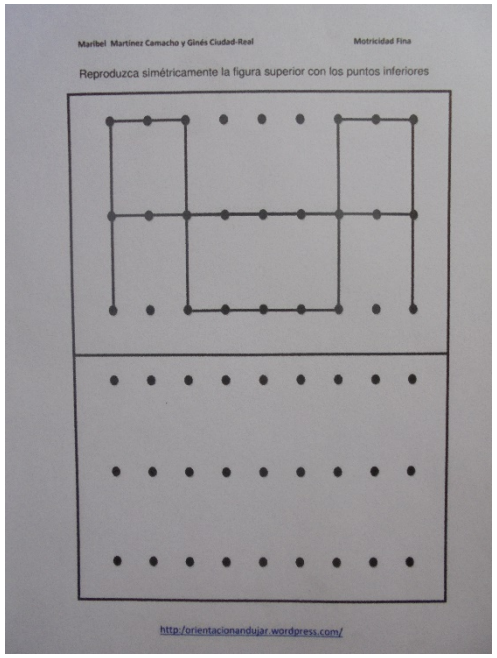
Annex 2. Fact sheets worked during the project.

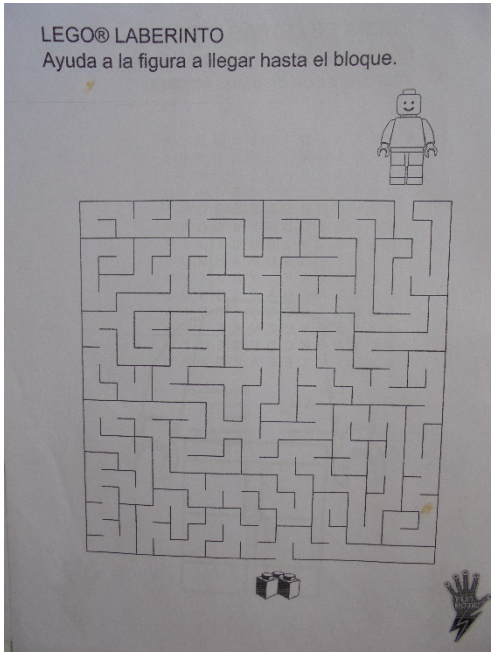


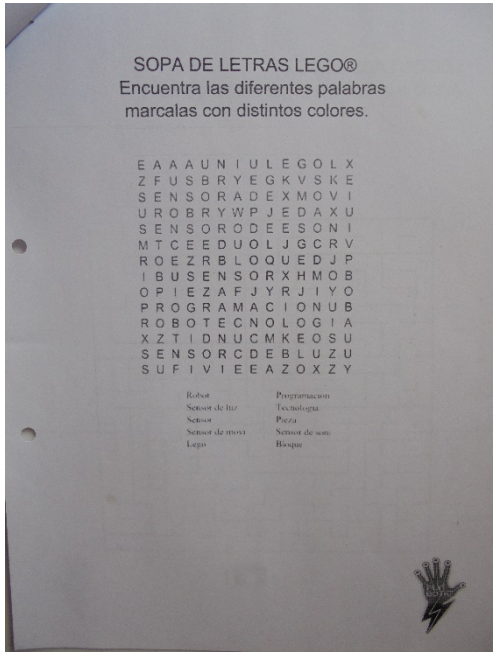





FUNDACION DE ROBOTICA Y ELECTRONICA APLICADA DE NARIÑO FUNROTIC – PROYECTO EDUBOT IEEE RAS SIGHT
Sensores
Actuadores
Fichas
Cableado


Maribel Martinez Camacho y Ginés Ciudad-Real
Motricidad Fina
Reproduzca simétricamente la figura superior con los puntos inferiores
http://orientacionandujar.wordpress.com/


LEGO® LABERINTO
Ayuda a la figura a llegar hasta el bloque.


SOPA DE LETRAS LEGO®
Encuentra las diferentes palabras
marcalas con distintos colores.
E A A A U N I U L E G O L X
Z F U S B R Y E G K V S K E
S E N S O R A D E X M O V I
U R O B R Y W P J E D A X U
S E N S O R O D E E S O N I
M T C E E D U O L J G C R V
R O E Z R B L O Q U E D J P
I B U S E N S O R X H M O B
O P I E Z A F J Y R J I Y O
P R O G R A M A C I O N U B
R O B O T E C N O L O G I A
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Robot
Sensor de luz
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Tecnologia
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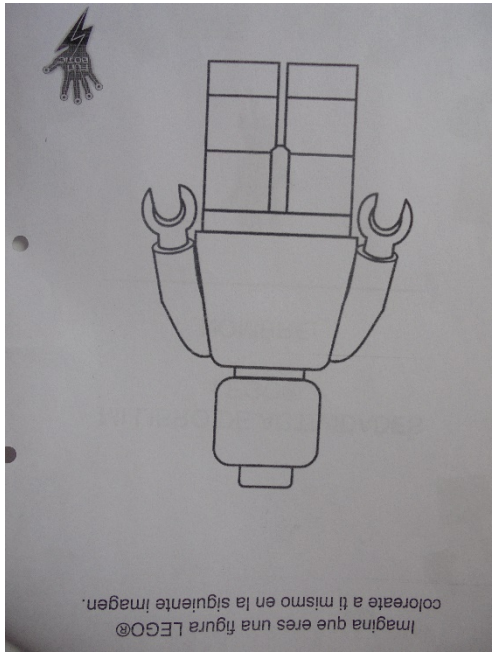
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colorearte a ti mismo en la siguiente imagen.