

The Importance of the Use of Technological Tools in the Sesi Senai Catalão Schools-Brazil

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Abstract: *The article discusses the development of the educational robotic tool through the application of LEGO KIT applied to students of Basic Education of SESI/ SENAI in Catalan. To support this work, we sought theoretical arguments in relevant articles that deal with the subject in the academic and institutional Google database SESI and SENAI, which from the reading and analysis of the theories cited in the texts, provided the content for the argumentation of the discussions on the mechanisms for applying the LEGO KIT to EBEP students. The methodology was the selective and exploratory bibliographical review, through the reading of institutional material and interview of the pedagogical team of the institution and students participating in the project, comparison of performance results of participation in the FLL Tournament, ENEM, SISUTEC and vestibular. After the case study it was verified that educational robotics can be an innovative and dynamic tool of the teachinglearning process in an educational institution.*

Keywords: *Kit lego. Robotics. Innovation. Education.*

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I. Introduction

In Brazil, the Ministry of Education and Science (MEC) created in 2015 a working group to identify innovative practices in Basic Education, as regulated by Decree 751 of July 21, 2015. This national working group is composed of representatives of the Ministry of Education and education specialists, whose duties are to monitor the development of the initiative for innovation and creativity in basic education, to ratify reference documents on innovation and creativity, and to organize regional work aimed at mobilizing teachers, students, parents, community and local governments (BRAZIL, 2015).

The SESI-SENAI Catalão School was inaugurated on December 28, 1988. It was the result of a partnership between SENAI-GO, City Hall and the Mineração de Goiás Fértil (now Ultrafértil), Mineração Catalão and Copebrás. Currently, the school offers professional education in the levels of learning (basic and technical), qualification and professional improvement, technical qualification, and EBEP - High School articulated to Professional Education. Another type of service is the advisory services and technical and technological assistance that help in the development of products, in the absorption of new technologies, improvement of the quality and productivity of the production lines according to Lego Zoom Project (CESAR, 2005).

Innovation in education consists of finding ways of transforming old models and breaking paradigms, calling on all those involved in the teaching-learning process to reflect on the needs in the formation of change and improvement of the quality of teaching, as well as on the possible alternatives for its realization, as Feitosa (2013) points out. Technological innovation in education is an important subject of study for concrete answers to the frequent questions of students regarding the applicability of the content studied in the classroom in their professional life.

The conventional teaching-learning process (chalkboard and chalk) often makes it impossible for the student to visualize in practice the need to study content, especially in the areas of exact (Mathematics, Physics, Chemistry) according to Feitosa (2013). Pedagogical Robotics (RP) or Educational Robotics (RE) consists of learning by means of the assembly of systems constituted by robots. These automatic devices are actually cognitive devices that students use to explore and express their own ideas, or "an object-to-think-with," in the words of Papert (1986).

In the studies carried out, it can be concluded that the RP has provided a different way of working the learning of concepts, from the assembly and control of robotic devices, via computer. The RP dissemination process includes, in its methodology, the realization of workshops involving teachers and students. According to D'Abreu (2004), the stages of these workshops are: the demonstration of the functioning of electronic components, motors, sensors and lamps; the formation of working groups; assembly of robotic devices by

groups; the development of computer programs responsible for robot control; the discussion of the scientific and technological aspects inherent to the robotic device, under construction, based on the curricular concepts that are intended to work; testing and completion of projects; the presentation of the projects to fellow workshop participants and other guests.

In robotics applied to education, the important thing is the process, the progress of the work and not the result by itself. It is essential to explore all possibilities, seeking learning through individual reflection and group interaction (student-student, student-teacher, student-robot, teacher-robot) and then proposing alternatives for solving problem situations through improvement ideas and approaches. The RP allows interaction with the concrete (robot) and abstract (program) in the same project, providing the opportunity for the student to observe the action (robot movement) of his reasoning executed in a physical artifact.

In this perspective, the relationship between teacher and student exists as an interpersonal and interpersonal space, which favors and facilitates learning. Hence the importance of this relationship as the constituent of a space conducive to learning. The work with the Lego Kit tool at the SESI-SENAI Catalan school aims to develop projects in partnership, working with groups of four, five or six children, allowing discussion among group members, their peers and even their families. the professionals who work in the field of computer science. In these projects, the children socialize their discoveries, the difficulties faced, how they managed to circumvent them or what strategies were used for the solutions found. It also enables students to participate in the FLL Turner program at the national as well as international level organized each year.

The present research aims to discuss the importance and the application of these technologies in favor of an education of quality and evolved that allows the development of intellectual capacities of the students. The research aims at analyzing the most innovative ways that can help every type of student, especially those with special needs. The article begins with debates of theories and studies already divulged on the subject. In this part, the constructive ideas that value robotics are emphasized, giving emphasis to the change of teaching methodologies in the 21st century. Next, it presents the methodologies, the materials and the means used in the research to finally present the main results obtained from the qualitative and quantitative analyzes of the research. The research ends with presentation of final considerations and references used.

II. Theoretical Debates

According to Zilli (2004), Educational Robotics (RE) is a very interesting technological resource rich in the teaching-learning process, it contemplates the student's full development, as it provides a dynamic activity, allowing cultural construction and, the autonomous, independent and responsible. RE, or RP can be understood as the learning environment in which the teacher teaches the student the assembly, automation and control of mechanical devices that can be controlled by a computer (CESAR, 2005).

Papert (1985) is one of the greatest supporters of the use of technology in education. He was one of the founders of MIT (Massachusetts Institute of Technology) and the pioneer in creating a programming language totally dedicated to education. Influenced by constructivist ideas, Papert developed constructionism to explain the constructivist idea; he refers to the African proverb: If a man is hungry, he may give him a fish, but the next day he will be hungry again. If you give him a fishing rod and teach him to fish, he will never be hungry again. However, this will be a solution that will last for a short time. Constructivism proposes that the necessary tools be provided so that students can discover and explore knowledge. These tools, according to Papert (1985), are computers. According to this theory, the learning process occurs through the accomplishment of a concrete action that results in a palpable product that has a personal meaning for the learner. Therefore, it posits the concept that one learns best by doing. Papert (1985) also argues that in education, the highest marked success is not having imitators but inspiring others to go further. These same students spend much of their time in school studying math and physics content and paradoxically, the concepts presented to them appear distant.

Perrenoud (2002) is a Swiss sociologist who is a reference for educators. He believes that school success and failure are not unique dependencies of the school environment. In their view, each learning should aim to prepare students for subsequent stages of the school curriculum, making them able to mobilize their school acquisitions out of the school environment, making any space a pedagogical environment. Perrenoud (2002) proposes guiding guidelines for the implementation of the teaching and learning process by competences, and this is his contribution to ZOOM Education programs.

The research design used to elaborate this article was the case study that, according to Godoy (1995) and Donaire (1997), is characterized as a type of research that aims to explain in a systematized way the facts that occur in a given context . Their use is justified by the fact that a certain reality was analyzed, that is, we investigated current phenomena that occurred during the teaching-learning process through the adoption of the LEGO Kit tool established in a strategic project to be implemented in twelve school units, the LEGO Program ZOOM - Practical Dynamics for Self-Development by the Board of Education and Technology and the Professional Education Management of SENAI - National Service of Industrial Learning, aligned with the National Department, prepared in 2014 and implemented in pilot classes at the beginning of 2015.

The case study focused specifically on the adoption of innovative techniques in education through the LEGO Kit of Robotics NXT Mindstorms with sensors and motors, used during the practical classes of students of the EBEP (Basic Education of SESI articulated to Professional Education of SENAI) of the SESI SENAI Catalão School, aiming to bring together the formation of the citizen and the training of the professional, expanding the possibilities of social and economic integration of students in establishing a new dimension for the quality of school learning.

It was also analyzed the fulfillment of the general and specific objectives described in the LEGO ZOOM - Practical Dynamics Program for self-development, with the general objective of encouraging technological initiation and contributing to develop basic and management attitudes and skills, bringing an experience so that the teacher work in practice the content that he has developed in theory, thus facilitating and qualifying the learning process, and the specific objectives of developing practical and dynamic classes as a simulation in the classroom, contextualize the use of technologies and concepts used in classes in everyday life and develop in students skills such as logical reasoning, leadership, cooperation, management and problem solving.

According to the LEGO Education Teaching Manual in the LEGO ZOOM programs there is a methodology that includes four phases, which are contextualize, construct, analyze and continue. In order for these phases to be implemented the SESI SENAI Catalão School counts on ZOOM textbooks of practical dynamics for self-development, which were developed to serve as a support in the application of the course and as a reference throughout the professional life of the student, containing the basic contents guiding principles listed below and the theoretical framework for creating and managing projects, developing strategies for problem solving, working together as a team, overcoming conflicts and being able to build norms of coexistence.

The curricular units and their respective guiding contents developed in the LEGO ZOOM Learning and Self-Development Program LEGO ZOOM - Practical Dynamics for Self-development are: 1) Citizenship, ethics and entrepreneurship, whose objective is for the student to reflect on the implication of his attitudes and behaviors in the social relation; 2) Environment, where the student understands the importance of adopting, in the exercise of work, measures to preserve the environment; 3) Safety at Work, the student understands the importance of preventing safety measures to prevent accidents; 4) Quality, the student can verify the measures that prioritize the quality of the services performed; 5) Competences for self-development, whose purpose is to explain to the student the importance of teamwork and self-development skills.

Thus, the students who, during the theoretical classes and best practices are selected to form the team to represent the school in the FLL Tournament, these students, in addition to seeking the technical knowledge to solve problems through the LEGO Kit, are also motivated to work together taking into account three qualitative aspects evaluated during the FLL - FIRST LEGO ® Tournament, which are: core values (core values - inspiration, teamwork and gracious professionalism); robot design (mechanical design, programming, strategy and innovation) and research design (research, innovative solution and presentation).

Since the last decade, robotics has attracted the interest of teachers and researchers to be characterized as an important tool for the cognitive development and social skills of students of different levels. Thus, this is the result of significant changes in the social sphere, whose main characteristic would be the modification of a material culture to a new technological paradigm organized around information technologies.

In the present day, many teachers have seen in robotics a very interesting and rich technological resource to intervene in the teaching-learning process, since it contemplates the student's full development through dynamic activities (ZILLI, 2004). The use of robotics in this context can focus on assembling devices, programming and working concepts related to curricular subjects, such as Physics and Mathematics. Papert (1985) argues that the human being learns best when engaged in the construction of something that he can show to others and that is meaningful to him. These computational environments, especially robotics, contribute to this form of constructionist thinking, because students get involved and interact with the development of projects.

Also for Edacom cited by Bacaroglo (2005, p.23) "educational robotics basically consists of learning through the assembly of systems composed of models." These models are mechanisms that present some physical activity, such as movement of a mechanical arm, lifting of objects, etc., like the current robots. Bacaroglo (2005) states that what is important within a work dynamic with students in a robotics class is to create conditions for discussion and to promote openness so that all students and teachers participate by presenting suggestions on problem solving. It is also important to create problems to be solved outside the school spectrum, because the difficulties are used to explore the student's ability to solve practical problems of their daily lives.

III. Methodology: Material And Methods

The information about the Lego technology set presented in this research can be found in the documents: ZOOM Technological Review, Lego Education magazine - Technological projects provided by Google Scholar. For the research was interviewed to a high school teacher who teaches robotics. The interview was made in 2016 at SENAI-SESI Catalão. The SENAI-SESI choice is justified by the fact that it is one of the best schools in the State that deals with industrial training, hence the importance of this study. The interviewee's background is rich once she graduates in computer science and her classes help her better understand the issue under debate.

For reasons of professional secrecy we will only announce the data without identifying the interviewee or providing other personal data as stated in the EC consent. The case study, which prioritizes the qualitative approach, addresses a data interpretation made according to the analyzed context, the contemplation of different points of view about the object of study and the search for a meaning from a complex view.

The qualitative research supposes a greater and lasting contact between the researcher, the environment and the situation to be studied. Interviewees are encouraged to think freely about the subject proposed by the researcher. According to Bogdan and Bilken, apud Ludke and André (1986, p.13).

Thus, changes in the power relations within the classroom in which students become protagonists of their actions and learning, as well as changes in the configuration of teaching, since the teacher loses its central role and all are responsible for learning process in a partnership relationship and everyone is responsible for the innovation process.

In order to collect the information, the instruments and methodological strategies for data collection in this research, we used the interview with the robotics teacher and the participant observation. In the present research we use participant observation, methodology in which the observer can participate in the day-to-day of the individual or groups under study, and have a view of interpersonal behaviors. In this modality, it privileges the method in which the observer participates in the daily life of the people under study, both openly in the role of researcher, and assuming roles in disguise, observing facts that happen, listening to what is said and questioning people throughout a period of time.

In all, more than 18 hours of observations were made in the period of April 2016, to robotics classes at the SESI SENAI Catalão (GO) school with students from 11 to 16 years of age, attending the 6th to 9th year of teaching and the first year of high school. We tried to observe the dynamics of a robotics class in the laboratory set up for this type of class: how the students interacted with each other, with the robotics kits, with the computers and with the teacher. We also observed if there were factors that could be considered innovative and what the roles of teacher and student in the teaching / learning process.

In addition, we also conducted an interview with the robotics teacher in order to obtain information that demonstrated the dynamics of robotics classes under the teaching perspective. Because it is a technique in which the researcher acquires the desired information in a clear and fast way, we did 13 (thirteen) open questions on subjects related to the concept of robotics, the role of the teacher in the classes, the importance of stimulating autonomy and work in group, the innovative practices that robotics proposes and if the teacher has already participated in robotics championships with his students.

IV. Results And Discussions

According to the LEGO Education Pedagogical Teaching Manual, in 1980, the LEGO group created worldwide the activity dedicated especially to education, through a partnership with MIT (Massachusetts Institute of Technology). Only in 1998 the LEGO Education operation started in Brazil, with the purpose of innovating the traditional model of teaching in Brazil, based on content transmission and evaluation through tests.

The LDB (Law of Guidelines and Bases of Education) understands the use of technology as a tool to aid teaching (computer, multimedia projector, educational software, etc.). In the context of technological education, students are encouraged to create and understand how the world works, applying in a rational and effective way what they have learned by interacting with technology in the real world. The LEGO ZOOM model became a big hit in Brazil. In 2003, it was launched with 9300 students and reached, in 2013, when the pedagogical didactic manual was produced, almost 1.5 million students, in public and private network. It was the realization of the dream of seeing students in schools developing skills, competencies, attitudes and values for life, helping educators inspire children, youth, and adolescents to build a better world.

Educational programs have the same philosophical, pedagogical and methodological basis. Through the use of LEGO Education's technological building resources, students work in teams to find solutions to solve problems related to relevant real-world issues. This model provides the operational, know-how and construction of knowledge in a systematic and holistic way, thus developing skills, competencies, attitudes and values for life.

The selection of different theories of learning as support for the creation of the ZOOM Technological Education Model was made before the reflection of various topics such as the need of society and the labor market. In addition, the simple understanding of a learning theory can not be applied to any type of educational activity nor does it give clues as to the best procedure to be applied to all situations, according to Oliveira (1999). Oliveira (1999) thus expresses about this subject and explained that this issue refers us to a central problem in the area of education as the relationship between theoretical proposals and pedagogical practice. There are four pillars of an education to meet the professional and personal needs of the 21st century, which will be for each individual the pillars of knowledge: learn to know, learn to do, learn to live, and finally learn to be.

Jean Piaget (1896-1980) is regarded as the creator of constructivism. He studied the development of intelligence, considering the evolution of reasoning since the birth of the human being. Constructivism proposes that students actively participate in their own learning, through experimentation, group research, stimulation of doubt, and development of reasoning, among other procedures. The individual, from his action, establishes the properties of objects and builds, the characteristics of the world.

The mediation of learning is a special kind of interaction between those who teach and those who learn, in which the mediator interposes and selects the external stimuli, acting as a facilitator of learning. In this context, the teacher is expected to be a facilitator of learning and the student is required to abandon his passive position, questioning, investigating and discovering. The role of the teacher ceases to be to present information and experience and is to prepare learning situations, so that the student is challenged, instigated, confronted with problems and with opportunity for decision making.

Thus, changes in the power relations within the classroom in which students become protagonists of their actions and learning, as well as changes in the configuration of teaching, since the teacher loses its central role and all are responsible for learning process in a partnership relationship and everyone is responsible for the innovation process.

In the training and education of students in any area, it can be seen that Educational Robotics ensures an emancipatory process in the subjects. This is achieved as new stimuli and skills such as playfulness, creativity and interactivity are developed. The teacher should create conditions for the student to "learn to learn", developing situations of differentiated learning and stimulating the articulation between knowledge and skills. The author states that the teacher is responsible for mediating the construction of the process of conceptualization in the student, mobilizing him to use (cognitive) resources to solve several complex situations.

Thus, it is noticed that the robot in the classroom makes the student better understand the situation to be solved, making him seek a solution to this situation and then analyze the results obtained. Other researchers highlight the need for a reshaping of school curricula, teacher training, and school representatives so that they can adequately work the interdisciplinarity that technology can provide. The initiative also influenced the relationship between the group, allowing greater communication between the students and teachers, which in a way, was distant. It is important to stress the need for the involvement of the team (students and teachers) in the experimentation process. In addition, they indicate that curricular reformulation and the formative process of teachers, as necessary and urgent in the school.

When questioned about how they imagined a robot, for some, robots were just those with humanoid shapes, others had no idea what a robot would be. And when asked about the proposed activities, the students would like other activities to be proposed. The school represents one of the most important social institutions, since it is the link that mediates the interaction between the individual and society, allowing the child to appropriate social values and models, directly affecting their autonomy.

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To this end, technology represents part of this link, since it allows the adoption of actions that enable the educational process. In this sense, Educational Robotics in schools aims to provide students with the awakening of logical reasoning, creativity, autonomy in learning, understanding concepts and seeks to improve group coexistence, deal with cooperation, planning activities and tasks.

Students are immersed in an environment where technology is easily perceived: cars, cell phones and computers are examples that everyone knows and many use, yet few understand. These same students spend much of their time in school studying math and physics content and paradoxically, the concepts presented to them appear distant. For Zilli (2004) education is a fertile field for the use of technology, given the range of possibilities it presents, making learning more dynamic and motivating. What makes a case study exemplary is to be meaningful, complete, consider alternative perspectives, present sufficient evidence, and be elaborated in a compelling way.

The qualitative results observed through the adoption of the LEGO Kit tool at the SESI SENAI Catalão School were in line with the objectives expected with the implementation of the LEGO ZOOM Project - Practical Dynamics for Self-Development, it was observed during interviews with students and pedagogical team. During the observations of the practical robotic classes, a significant improvement in the incentive for the technological initiation and contribution to the development of basic attitudes and skills and of management to the students, also brought experiences so that the teacher could work in the practice. Content that the student studied in theory, thus facilitating and qualifying the learning process.

By means of observations and interviews we obtained positive qualitative results regarding the development of more practical and dynamic classes such as classroom simulation, improvement in the contextualization of the use of technologies, concepts used in daily classes and development of skills as logical reasoning, leadership, cooperation, management and problem management.

In addition, the LEGO Kit was adopted in the SENAI Catalão School by the MEO LEGO Group formed in 2015 by 9 EBEP students enrolled in the technical courses in mechanics, electrotechnical technicians and chemistry technicians. Months and were the representatives of the school in the FLL 2016 National Stage Tournament, held in March 2016 in Brasília-DF. The MEO LEGO team participated only in the national stage because it obtained a total of 263 points in the FLL 2016 Tournament, not enough to qualify for the international stage, but only the fact that they participated was already a positive result for both students and for pedagogical team of the SESI SENAI Catalan School.

As a quantitative result, it was noticed the increase of more than 100% in the approval rate of the students of the EBEP (Basic Education of SESI (High School) articulated to Professional Education of SENAI) through the ENEM (National High School Examination), the SISUTEC (Unified Selection of Vocational and Technological Education) and in vestibular, that is, the 25% approval rate in 2014 passed to 52% in 2015, after the implementation of the LEGO ZOOM Program at the SESI SENAI Catalão School.

In early 2015, with the implementation of the LEGO ZOOM Project - Practical Dynamics for Self-Development, all students are motivated to carry out the pedagogical activities in the classroom and robotics laboratory taking into account the qualitative and quantitative values evaluated during the FLL Tournament - FIRST LEGO® League - State, national and international level competition held by the FIRST group - For Inspiration and Recognition of Science and Technology in partnership with LEGO.

The qualitative and quantitative results of the MEO LEGO team during the national phase of the FLL 2016 Tournament. In light of this analysis, it was observed that for the LEGO Core Values pillar the MEO LEGO team obtained a result of 55% exemplary (team balanced and stimulated independent of achievement 22% completed (team was able to solve problems and make decisions to achieve objectives) and 22% in development (team able to describe at least one example). As for the LEGO Pillar Research Project, the MEO LEGO team obtained a 100% exemplary result (well-formulated research process, excellent solution and sharing and exemplary presentations), the theme of the MEO LEGO research project was "The use of residues

construction and plastic packaging of high density polyethylene for the production of polystyrene ". For the Robot Design pillar, the MEQ LEGO team achieved a 67% finished result (optimizing the robot in a modular way, improving the possibilities of solutions available in the programming platform), 11% in development (improving targeting for solution) and 22% beginner (excessive parts or time for repairs and original features with no added value or potential). Of the 28 skills evaluated in the total during the national stage 206 of the FLL Tournament, the MEO LEGO team presented 54% exemplary, 29% finished, 10% developing and 7% beginner, being the scoring scale increasing by status of beginner, developing, finalized and exemplary.

During the survey of qualitative data of this research were conducted face-to-face interviews with the team of SESI SENAI Catalão School participants in the LEGO ZOOM Program during practical robotics classes and also with some students of the group MEO LEGO competitors and representatives of the school in the Tournament FLL - FIRST LEGO® national phase 2016, being questioned their experiences, sensations and contributions that the program had for the change of life (personal, professional, academic and others).

The 15-year-old "A" student living in the city of Catalão scored his participation in the LEGO ZOOM Program as positive, since participation in the robotics classes made him change his thinking and attitudes towards his personal and professional future, as reported by follow:

Entering the robotics was wonderful for me because with her I could see that there is something better than being on the street without having something to do or getting to know bad ways, with robotics I had the chance to live a world where I could change for the better me robot, I tried to be someone in this life and not a "tramp". Besides, in robotics I did not just get friends, but I created a family where one helps the other, one cares and cares about the other, the robotics made me change a boy who did nothing, for a boy who wants to be someone in life, wants to study, and make a good college, I hope to be the best in something because besides the robotics give me all this, I learned a lesson "never give up on my dreams, because giving up is not the right way".

The "B" student of 15 years of age residing in the city of Catalão participated in the FLL 2016 Tournament scored the positive results, as he showed him the need for individual and professional behavior change and improvement in interpersonal relationship, as follows:

FLL changed me in several areas: as a person, the Core Values made me someone better, as a professional, as well as experience with the project and with the robot, I learned to work as a team, as an academic, the FLL Tournament showed me the importance of having good studies, as a citizen, the season showed me the problem with the rubbish that I did not understand, in addition and several other things, the FLL Tournament brought me several friends, be it the team I participate in, mentors, other teams, people. (Student B)

The 15 year old "C" student living in the city of Catalão also participated in the FLL 2016 Tournament. He realized how much his participation in the LEGO Program helped him to be a better and more credible person in his dreams, not giving up on the challenges and difficulties, improved performance in the disciplines of accurate and better care of the environment through the conscious use of waste disposal, reviewing concepts and leaving the comfort zone, also decided on the interest in studying mechatronics engineering in college, as found in the following report:

I spent 8 months waiting and struggling with the project to get to the tournament, in the beginning were 45 students wanting to participate in the Trash Trek 2016 season, but over the course of a few months many gave up and others were disqualified and it was very difficult for me to stay, but I did, and this was the first lesson I could get out of the project: do not give up the dreams we have. One clear change I could see was my development in physics and mathematics. Through robotics, I found it easier and more enjoyable to study them, so I improved my performance. (Student C)

Another aspect that also contributed a lot in my daily life was my way of thinking about the world and especially about the waste that is discarded, most of the time incorrectly and for me it was not much different, I had some wrong habits of playing roles of jellies and various things on the floor. This season allowed me to leave my comfort zone and review my concepts. And to finish, I could not forget the inclusion of the Core Values in my everyday life with everyone. I never thought about attending a tournament where there was a friendly competition, and soon after arriving there I had the pleasure of not only seeing but experiencing it. From all that I related, my interest in mechatronics engineering arose. In robotics I was able to learn the true meaning of Core Values.

In light of the reports of the students involved in the LEGO Program, we noticed that the qualitative results obtained are positive taking into account the adoption of the LEGO Kit tool in the SESI SENAI Catalão School, and consequently in education. Qualitative reports of the SESI SENAI Catalão School pedagogical team show that during the qualitative data collection of this research, interviews were conducted through face-to-face meetings and electronically formalized via e-mail with the pedagogical team of the SESI SENAI Catalão School regarding the importance of the application of the LEGO ZOOM technology in the teaching-learning process of EBEP students - Professional education articulated to basic education (High School).

The team of teachers involved in the LEGO ZOOM Learning and Self-Development Program demonstrated the dynamics of robotics classes from the perspective of the teacher, the concepts of robotics, the role of teachers in class and in the teaching-learning process, the importance of stimulating autonomy and group work, the innovative practices that robotics proposes and the incentive for students to participate in the robotics competition through the FLL Tournament.

The Robotics teacher and responsible for the LEGO ZOOM Learning and Self-Development Program reported a brief history of implementation and application of the LEGO ZOOM Program, the strengths and weaknesses perceived during practical robotics classes, and the professional experiences gained with the adoption of the tool innovative educational LEGO Kit at the SENAI Catalan School. According to her, "The activities involving robotics have been applied in the SESI SENAI Catalão School for approximately 7 years, and since 2014 there has been greater visibility and investment in the pedagogical proposal. Participating classes range from high school to technical course, through the classes of qualification, improvement and learning, where there is a great involvement on the part of the students in the elaboration of hypotheses, in the resolution of conflicts and problems, in the understanding of the interdisciplinary conception and teamwork. They really feel protagonists in acquiring knowledge.

They use previous knowledge in solving problems, transfer what they have learned to solve another situation, share experiences. Since they are not all flowers, there are scattered students who think that the purpose of the activity is to play, but these cases are not so frequent and when they happen they are treated in the first class. Finally, experiences with robotics, as an ally of the teacher, awakens students' interest in something new, creating an environment conducive to social exchanges, cooperation, sense of responsibility and attitude.

The supervisor of education and technology considered significant improvements in the quality of the teaching-learning process between teachers and students of the school, also enabled improvement in the training regarding programming logic and new teaching strategies, besides that there was also a quantitative improvement in to the approval rate through ENEM, SISUTEC and vestibular, which increased from approximately 25% in 2014 to 52% in 2015, after the implementation of the LEGO ZOOM Program at the school. According to the supervisor "The LEGO ZOOM Program made it possible to train all school teachers in programming logic and new teaching strategies, making it possible to apply the theoretical knowledge in practice in all the curricular components of the courses developed by the school, thus the students to be interested in the elaboration of challenging projects.

Robotics enables students to develop the technical and scientific fundamentals of the contents studied in the classroom, presenting mathematical solutions and developing the logical reasoning for the solution of different problem situations in different areas of practice, as well as leadership, cooperation, management and teamwork, considering different contexts and data analysis, in society, in the environment, in health, in the productive segment, etc. Thus showing the importance of technology in the daily life of the human being and for the development and competitiveness of the industry.

Accompanying the students' daily life at school, one can see how much they are interested in the work with robotics, the will that all demonstrate in participating in competitions at school, state and national levels of programming and development of projects with robotics LEGO ZOOM . After the implementation of the robotics classes in the high school and technical curricular components, we had an increase of students with approval in the ENEM and in the vestibular for the area of exact ones, being that in the classes of EBEP previous to implantation to the project the index of approval in the vestibular was around 25%, after the implementation of the project, in 2015, we had a 52% approval rate, through ENEM, SISUTEC and vestibular. " In view of the reports of the pedagogical team involved in the LEGO Program, we noticed that the qualitative and quantitative results obtained are positive, taking into account the adoption of the LEGO Kit tool in the SESI SENAI Catalão School, and consequently in education.

V. Conclusion

After observing and analyzing data, we found that pedagogical robotics can be an innovative and dynamic tool for the teaching / learning process in an educational institution. The LEGO ZOOM Technological Education program allows the roles assigned to teachers and students to change, that is, the teacher becomes a mediator of the knowledge acquired by the student when they are in the case study phase and execution of the activities for resolution of the problem. With this change, learning also gains new conceptions, forms, and the teaching-learning process is energized by the student's knowledge exchange and perception of content applicability in his personal and professional life.

The student needs to take seriously and perceive the effective applicability of the subject addressed in the classroom for his professional and personal future, being the teacher the key piece to carry out a lesson based on planning and qualitative and quantitative criteria evaluated during the FLL - FIRST LEGO® League -

International level competition held by the FIRST group - For Inspiration and Recognition of Science and Technology in partnership with LEGO.

With the adoption of the innovative tool in education through the LEGO Kit who wins, first is the student, who learns more and better, and secondly, the job market, which starts to count with professionals with innovative profile, fact which is especially advantageous in times of great challenges in the labor market.

Papert (1985) argues that the human being learns best when engaged in the construction of something that he can show to others and that is meaningful to him. These computational environments, especially robotics, contribute to this form of constructionist thinking, because students get involved and interact with the development of projects. In the training and education of students in any area, it can be seen that Educational Robotics ensures an emancipatory process in the subjects. This is achieved as new stimuli and skills such as playfulness, creativity and interactivity are developed.

Thus, it is noticed that the robot in the classroom allows the student to better understand the situation to be solved, making him seek a solution to this situation and then analyze the results obtained. There is a need for a reformulation of school curricula, teacher training and school representatives, so that they can adequately work the interdisciplinarity that technology can provide. The initiative also influenced the relationship between the group, allowing greater communication between the students and teachers, which in a way, was distant.

The school represents one of the most important social institutions, since it is the link that mediates the interaction between the individual and society, allowing the child to appropriate social values and models, directly affecting their autonomy. To this end, technology represents part of this link, since it allows the adoption of actions that enable the educational process. In this sense, Educational Robotics in schools aims to provide students with the awakening of logical reasoning, creativity, autonomy in learning, understanding concepts and seeks to improve group coexistence, deal with cooperation, planning activities and tasks.

This case study proves once again that the study using new technologies has had a positive effect on students who are always connected to the technologies. New technologies produce more efficient results when well applied and diffused. It is important to note that our society can not stop the rapid growth of technologies. So it would be important for us to harness these resources for the development of science.

Students are immersed in an environment where technology is easily perceived: cars, cell phones and computers are examples that everyone knows and many use, yet few understand. These same students spend much of their time in school studying math and physics content and paradoxically, the concepts presented to them appear distant. For Zilli (2004) education is a fertile field for the use of technology, given the range of possibilities it presents, making learning more dynamic and motivating.

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