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IMPACT OF EMERGENCE WITH ROBOTICS AT EDUCATIONAL INSTITUTION AND EMERGING CHALLENGES

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***Abstract*—** This paper tends to examine the current state of educational system with the subject of robotics, also to identify the emerging challenges, and trends, and focuses on the use of robotics as a tool to support creativity and 21st century learning skills. Finally, conclusions and recommendations are provided to encourage collaboration and networking among researchers and educators in India to support the advancement of robotics in education.

Keywords: *Educational Robotics, Technology in School, Creativity*

I. INTRODUCTION

Over the past decade, robotics has attracted significant interest from educators and researchers as a way to develop cognitive and social skills in kindergarten to high school students and to support learning in science, math, technology, information technology, and school subjects or Interdisciplinary educational activity.

The article begins by investigating the latest innovations in the field of educational robotics. Contemporary issues and new challenges are then discussed; Finally, some recommendations are offered to align robotics with learning theories, especially constructivist and constructivist, to promote collaboration and networking between researchers and educators and build a robotics education community in India.

II. INVESTIGATION OF THE FIELD

The most important principles of robot theory are designability and designability. According to Piaget, it is the use of skills that gives children understanding (Piaget, 1974). Papert also said that knowledge construction is more effective in situations where a weak person creates a human organization, whether it is sand on the beach or a technical object (Papert, 1980). The teachers' role is to give students opportunities to participate in practical research and to give students tools to develop knowledge in the classroom. The educational robot creates a learning environment where children can interact with their environment and work on real problems; In this case, educational robots can be the best tool for children to have a good learning experience. Research in this area shows that robots can influence student learning in various subjects (physics, mathematics, engineering, computer science, etc.) and personal development, including cognitive, metacognitive, and social such as: research skills. , creative thinking, decision making, problem solving, communication and collaboration are essential skills for the 21st century workplace.

Three different approaches to Educational Robotics are reported in the literature:

1. Theme-Based Curriculum Approach: curriculum areas are integrated around a special topic for learning and studied mostly through inquiry and communication

2. Project-Based Approach: students work in groups to explore real-world problems;

3. Goal-Oriented Approach: children compete in challenges in Robotics Tournaments taking place mostly out of school, such as FIRST Lego League (**http://www.firstlegoleague.org**),RoboCupJunior (**http://www.robocupjunior.org**), World Robotics Olympiad in Greece (**http://wrohellas.gr**) and more.

On the other hand, there is no progress in robotics in Indian educational institutions. However, many construction robot kits were created and introduced in the 21st century, and improved solutions and multi-friendly designs (LEGO Mindstorms NXT, Arduino, Crickets, etc.) paved the way for students of all ages to recognize robots. Professional efforts in schools over the last decade have shown children's participation and interest in digital activities to achieve academic and/or developmental goals.

III. NEW CHALLENGES

Educational robotics, considered a branch of educational technology, suffers from the problems known to the latter. The following articles examine and discuss some important current issues and future challenges for the robotics education community.“Technology is everywhere, except in schools” However, as a recent OECD report noted, "technology is

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everywhere except in schools." Although experts are optimistic about the development of technological learning opportunities, there is uncertainty about the ability of education systems and institutions to adapt to change and to improve and strengthen.

IV. TECHNOLOGIES IN SCHOOLS

Encouraging education and skills development is one of the key factors in developing the capacities of researchers/researchers and 'scientists' from an early age, including scientific thinking and soft skills such as critical thinking. , problem solving, creativity, collaboration, and communication skills.

However, much of the use of technology (including robotics) in schools does not support 21st century teaching skills. In many cases, new technology reinforces old ways of teaching and learning. Today's science labs in schools seem to be inadequate to develop critical thinking, problem solving, creativity, collaboration, and communication skills because they are designed to be disciplined, and scripted experienceswho often follow "research books". “In cases that have already been decided. In relation to the above question, an important distinction arises between "technical knowledge", the detailed knowledge required of technical engineers and scientists to carry out their work, and "scientific knowledge" or technical writing, which refers to knowledge, skills, and techniques for all citizens. According to the discussion of the so-called technology of the 21st century, the current societal development pushes educational technology to move from technology (or computers) to technology and the use of computers or writing. In terms of robotics education, it needs to change from only being used to provide technical skills to future STEM workers, rather than using robots or reading and writing, so that its information is accessible and in a book for everyone in the future. Robotics technology will play an important role, if used in the above vision, it can provide good education, develop important skills needed in the 21st century workplace and provide the best "technological literacy" to the new generations. prepare for life in a "creative society"

V. TRANSFER FROM “BLACK BOX” TO “WHITE BOX” PARADIGM: LEARNERS AS “MAKERS” RATHER THAN JUST CONSUMERS

So far, the use of robots has mostly affected people pre-programmed pre-fabricated robots. The way robots are built and programmed is a "black box" for their users. Unfortunately, the same "black box" method is often followed in robotics training, where the robot is built or programmed in advance and is introduced in the learning activity as an end or a passive tool. The "black box" idea is often based on the idea that building and programming a robot is too difficult a task for children. However, it turned out that the difficulty with the robotics work was due to poor design rather than a lack of knowledge on the part of the students. Although not ideal, the “black box” corresponds to a standard model of teacher education or training manual, it shows and explains the information that is prepared, confirmed, and therefore not confirmed. Very different from these methods, constructive/constructivist methods require a shift towards creating transparent robots ("white box"), where users can build and destroy objects, robotic systems from scratch, and get a deeper use of important things. . instead of just using the technology that has been created.

The white box model of construction and planning can encourage critical thinking and student engagement (Resnick, Berg & Eisenberg, 2000). But students often hit "plateaus", unable to go beyond a certain point and unable to create something interesting every time they start. Therefore, transparent trade-offs have been made in the development of robot kits for learning, resulting in the so-called "black and white box" approach that allows children to participate in activities that are meaningful, interesting, and difficult to use. subject. manager. about robots and/or their environment. This is the case, for example, when teachers want to focus on planning in their classes without having time for students to build their own robots; In this case, teachers should bring ready-made robots into the classroom to save teaching time and allow students to install and control the robots clearly. In conclusion, it seems that teachers and educators must respond to the conflict between the "white box" and "black and white box" metaphors based on their pedagogical goals when encountering robots in their classrooms and, more importantly, based on your needs. students' needs and learning needs

V. CONCLUSION:

Based on the discussion above, it is clear that we need to rethink our approach inEducational Robotics emerges. Robotics have many opportunities in education, but the success of student learning is not limited to the implementation of robots in the classroom, as there are many things that can determine the results; Technology alone cannot disrupt the mind. The robot is not the end of enhanced learning; The real problem isn't the robot itself; but again. The robot is just another tool, and education chooses to learn through the use of technology and active learning. An appropriate educational philosophy, such as constructivism and construction, curriculum and learning environment are some of the important factors that can lead to the success of robot development. The focus should shift from technology to integration with education, emphasizing the curriculum rather than technology. The curriculum is the cornerstone of robotics education, and it is very important to integrate the main principles of education and to establish qualities and statistics for the expected results and approval of the curriculum. The task of teaching a robot should be seen as a tool to develop important skills (mental and human development, cooperation) that allow people to use their imagination, express themselves and make the first decisions

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that are important in life to be made. The benefits of robotics apply to all children; Target audiences for computing projects and courses should include the entire class, not just science and engineering students.

To reach this goal, projects with a broad vision are needed to develop the above-mentioned competences for all children, regardless of school orientation or gender. Teachers and educators should use a variety of methods to introduce technology and concepts to students to provide more opportunities for robotics and ensure there are entry points to engage young people from diverse backgrounds. Validation of various processes and methods requires a plan to operate the software, followed by testing. , refinement, and continuous improvements. Tests should be based on a system of indicators and a test model that clearly evaluates and explains the benefits of the relationship. Finally, the implementation of the above recommendations requires the creation of a strong Indian community in the field of educational robotics to further strengthen communication between researchers, teachers and students. There are local and regional robotics training networks in India, based on existing or future collaborations. However, this pioneering effort is considered successful and has great potential if these networks integrate and consolidate their activities in an Indian network that will provide better coordinated collective andwell-organized Activities linked at the Indian level, focusing on the following objectives:

- Develop and deploy educational and technical products and processes (curriculum and resources) for the educational environment. formal and informal courses that reflect best pedagogical practices and educational research in the field.
- Promote communication and interaction between researchers, teachers and students by establishing forums in the community to share experiences, activities, products and information.
- Support teacher education by establishing and managing teacher schools.
- Encourage and support the practical implementation of digital programs or robotics curricula in schools
- Testing and validating learning materials and methods in teacher training and in the classroom.
- Create interest groups to directly evaluate educational robots.
- To provide information to educational institutions, teachers, pedagogues, parents, and children about the latest developments in the field of educational robotics.

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