Educational robotics is important part of Curriculum at School Level.

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Abstract :

Robotics empowers **students** to visually comprehend the concepts on STEM and cultivates problem solving and higher-order thinking capabilities in **students**. By **introducing robotics** early on in the **school educational curriculum**,**students** can build interest in this field and nurture their talentsStudents learn best when they are engaged and are able to interact with their environment. They can build their own definition of concepts and themes, which are more meaningful because they are related to their own experiences and memories. Simply put it all comes down to constructivism, which means a person builds knowledge and meaning from interactions between their experiences and ideas (the environment they work/play in and the people and objects they interact with). The purpose of this study is to find out how a middle school and high school constructivist robotics curriculum impacts students' conceptual understanding of electrical circuit concepts.

Keyword: **Educational Robotics, Technology, Programming, Codes,** Curriculum

Introduction

Robotics empowers students to visually comprehend the concepts on STEM and cultivates problem solving and higher-order thinking capabilities in students. By introducing robotics early on in the school educational curriculum, students can build interest in this field and nurture their talents. Robotics as a branch of engineering involves the design, construction and operation of robots. Robots have very much been a part of our lives for a long time now, working in industry floors and assembly lines. Of late, humanoid robots have emerged to captivate the imagination and excite the interest of humans across the world. Ongoing research and development in the field of robotics and advancements made in the field of artificial intelligence, presents an exciting future for robotics and robots are poised to become more sophisticated and become an integral part of our daily lives.

The benefit of social robots to support child learning in an educational context over an extended period of time is evaluated. Specifically, the effect of personalization and adaptation of robot social behavior is assessed. Two autonomous robots were embedded within two matched classrooms of a primary school for a continuous two-week period without experimenter supervision to act as learning companions for the children for familiar and novel subjects. The paper offers three grounds: educational robotics provides an effective learning tool for students in various fields as maths, educational robotics improves students' communication, collaboration, and teamwork skills; educational robotics creates a fun and engaging learning environment for students. These grounds argue against schools that refuse to insert the educational robotics in their curriculum because of the time needed for educational robotics and of the high cost for it. Data was collected from resources that provided approaches and studies, which teachers and schools can benefit from it to know the importance of educational robotics. In conclusion, educational robotics is a useful learning tool for students, so it should be a crucial part in the curriculum of each school.

Background Research:

Effective Learning Tool: The most important reason to consider educational robotics as a useful tool in education is that educational robotics is a really helpful tool in education because it helps students to learn subjects in an effective way. It provides an effective learning tool for students in various fields as science, technology, engineering, math, physics, and biology.

Developed Important Skills: The second reason is that educational robotics enhances different types of skills that are very important for the mind's development of students Educational robotics enhances the communication skills and different types of skills needed for the future of the students. For example, educational robotics not only merges STEM but also merges many specialties such as dance, art, science, music, and literature. It gives students the opportunity to work together, so it develops the cooperation skills among student by sharing each other's ideas to come up with an ideal solution of the problems in their projects.

Fun Learning Environment: The final reason is that educational robotics is a learning tool that creates a fun and attractive learning environment for the students. It creates a combination of fun and education to make the students attracted and interested to learn. Educational Robotics gives the students the chance to work in groups and to do hands-on projects that create a fun learning environment. Students enjoy working in groups 8 EDUCATIONAL ROBOTICS with each other because learning in groups makes them understand better the concepts by communicating and sharing the ideas together in an atmosphere of fun and enjoyment. Educational robotics is based on working in groups so that motivate students to learn and have fun at the same time.

Educational Robotics: The 21stcentury skills highly depend on skills gained by educational robotics like creativity, critical thinking, problem solution, and many other skills. Therefore, educational robotics is a very helpful tool in education and should be used in all schools.

Things Required for School Level for Robotics:

A robot with a more cooperative interaction style has been found to elicit higher levels of engagement when interacting with children. Finally, in terms of preferences, it has been shown that in comparison with a tutor, a peer role is preferred in the domain of robot companions for diabetic children for example, the robot playing the role of a peer appears to be preferred over a tutor. For the present study, we therefore focus on the role of social robot as peer; a learning companion.

Subjects : Each class was based in a different room where the majority of their lessons took place (Information Technology lessons and Sports took place in different areas of the school). These classrooms were located on the same corridor on the first floor of the school building (one other empty classroom was on the same floor). The children in the two classes were separated in these classes, although break times were held in communal areas of the school. Each class was randomly assigned an experimental condition for the duration of the experiment.

Materials : The only difference between the robots used was the highlight colour of the plastic panels: orange was used in the Personalised condition, and grey was used in the Non-Personalised condition. One such hardware setup was deployed in each classroom, where it remained for the continuous two week period of the experiment.

Learning task : Taking into account the children's current curriculum, two topics for learning in the interaction with the robot were chosen, since there is a suggestion that multiple activities support the maintenance of engagement. The first was *novel* to the children, but was due to be learned in the following academic year. The second was *familiar* as it had already been the ongoing subject of learning. This dual-topic learning task was chosen to assess whether, in the context of a familiar learning environment, a robot learning companion could be applied as an intervention for an existing learning process as well as to a novel task.

Conditions : Two experimental conditions were employed: a Personalized (P) interactive robot condition, and a Non-Personalized (NP) robot condition. The robot behavior differed between the robots in three distinct respects: non-verbal behavior (gaze, movement alignment), verbal behavior (friendliness, personalization), and adaptively of progression through the learning content (to personal performance). In neither condition were the children or teachers made aware of the differing aspects of behaviour, nor of the differences between the conditions. In both conditions, the robots acted autonomously, i.e. not under the control of an experimenter or teacher.

Protocol :

The class teachers were not informed of the hypotheses of the study, nor of the differences in robot behaviour between the classrooms. The teachers administered pre-experiment knowledge tests and questionnaires, and did so again for post-experiment tests and questionnaires. During the experiment period itself, the teachers collected child performance on the normal spelling tests and maths times-table tests, which were administered weekly. Maths lessons were postponed for the two-week duration of the experimental period.

Data analysis :

For all results, the 95% confidence interval (CI) is provided for both within condition data and between condition comparisons. Where appropriate, normality of data is tested for using the Shapiro-Wilk test [62]; unless otherwise stated, the data are found to be consistent with normality, if not, then the Wilcoxon (non-parametric) test was employed.

Learning outcomes :

Three learning topics were considered, and one recall task. The *novel* topic was recognition of stone-age items; the *familiar* topic was the maths times tables (from two to twelve, inclusive); and the *incidental* topic was a weekly spelling test. The recall task was a fact introduced by the robot in its interactions with the children, the memory for which was tested after the experimental period.

Designing a Robotics Class for Middle class & High School Students :

In today's technological world, it is more important than ever to prepare our students with the right tools for their future. Teaching robotics lessons to students in school can increase their ability to be creative and innovative thinkers, and more productive members of society.

Objective :

It's no secret that jobs in the STEM field are the fastest growing careers. In fact, they are projected to grow even more in the near future. Teaching STEM and robotics to high school students in the classroom has positive results like encouraging them to pursue STEM careers and help them develop the necessary 21st century skills that will enable them for success in the future. By the time all of our students

graduate in the next few years, over half of the available jobs will be in the STEM field. So the main purpose is to prepare our students for this big workforce change.

What are the right tools?
Robotics in schools can help students turn their knowledge into creativity and innovation. This is a valuable life lesson that teaches our students perseverance and determination when faced with challenges. When students program physical robots, it's easy for them to see and correct any errors as they learn what robots can and cannot do. They develop the skills needed to create precise and accurate instructions and have fun while learning valuable lessons.

Robots such as:

-NAO Robot: The NAO humanoid robot is the ideal platform for teaching Science, Technology, Engineering, and Math (STEM) concepts at all levels. It provides hands-on experience by connecting theory with practice to discover a wide range of fields linked to robotics. With subjects such as computer science, mechanics, electronics or control, high school students can use advanced programming languages, like Python and Java to start coding.

-3D Printers: Bring STEAM to life with 3D printed objects, spark curiosity, and engage the entire classroom. Learn professional 3D design skills, simulate real-world engineering problems with your students, and develop college-readiness through advanced design thinking.

-Pepper Robot: Robotics is the fastest growing and most advanced technology used in education and research today. The PEPPER humanoid robot is the ideal platform for teaching Science, Technology, Engineering and Math (STEM) concepts at all levels.

-Misty Robot: Bring coding and STEM to life with Misty, the autonomous roaming robot that your students can program to move around and interact with humans. Misty Robot allows students to tinker with the hardware and even extend the robot's functionality.

Among other tools, that are a perfect solution for teachers and students to continue learning about robotics and STEM fields and acquire a deeper understanding. Students have the opportunity get a real feel for what it would be like working with robotics.

Advantage of Robotics curriculum at school level :
1. **Robotics can be a launching pad for students to realize their passions.**
2. **A strong robotics curriculum can create leaders.**
3. **Robotics can teach students how to communicate across different technology platforms.**
4. **Robotics can lead to community involvement.**
5. **Robotics teaches essential teamwork skills.**

Conclusion:

n conclusion, educational robotics attracts the importance of many schools as a useful tool in education and others schools don't consider it as a useful tool and refuse to introduce it in their curriculum. Today, technology and education become the most important topics, and as educational robotics is a combination of these two topics, it attracts the importance of schools,

teachers, researchers, and students.

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