

# Informal Activities in Robotics Club to Enhance Disadvantaged Area Students' Interest in STEM

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**Abstract.** Activities in robotics club in extracurricular activities has a positive impacts on member scholar and social life. Students become familiar with new technologies and became more confident to pursuit a career in STEM both academically and professionally. Skills and competences are not exclusive generic (technological) but also transversal (communication, problem solving, project management, working in team etc.). Club's activities play an important role in increasing intrinsic motivation of scholars for STEM learning. To maximize the impact of club former students of the school professional in the field of electronics, computer science or robotics were asked to volunteer in the activities.

## 1 Introduction

Education is the fundamental in transmitting and creating new cultural and human values and in the development of the student as an individual. Changing the emphasis on education in favor of developing, stimulating, increasing the interest in learning should start from putting in practice the knowledge.

The youth are attracted and sometime slaves of the gadget and new technologies. Their skills and competencies in information and communication technology are extraordinary. The educators strongly believe that students should be not only users but also connoisseurs of new technologies and to experiment by themselves in order to have a deep understanding of science behind gadget screen. [1]

Students in rural areas, often economically disadvantaged, may face real handicaps compared to their colleagues in urban areas. To keep up with technology, students from such area need to be up to date and, at the same time, encouraged to immerse in and with new technologies. From the perspective of educators, students should be not only users but also connoisseurs of new technologies.

## 2 Main aim and objectives of robotics club

The NGO association Alliance of Educators for STEM - ESTEEM Romania in cooperation with the Faculty of Physics at Alexandru Ioan Cuza University of Iasi supported the establishment of robotic clubs in various school institutions in urban and rural areas. The activities adapted to the students age, needs and interest are trying to introduce students to new technologies, basic of sensors, actuators and robots. First step in establishing a robots club was a survey of the students' interest in becoming member of such club and the type of expected informal activities. The main objective of the clubs is to introduce to the students basic concepts ensuring the understanding of

robots. The clubs support and encourage members' passion for electronics mechatronics, robotics and nanotechnologies [2]. The clubs also has the role of representing members' interests, helping them in organizing public demonstrations of accomplishments and products and in participating in scholar robotics contests.

The main activities of the club are based on the use of sensors and actuators adapted to Arduino microcontrollers. The main activity is to explore, experiment, develop and find solutions to practical problems, depending of students age and interest. Proposed activity carried out within the club are very diverse starting from simple games to very serious problems:

- personalizing my robot;
- understanding the robots' needs and designing "sense and movement" organs;
- implementing idea and constructing my robot;
- understanding and programing robots brain, arms and feets;
- playing the robots with thinker or configuring Arduino software (IDE) programs;
- syntax and programming elements;
- understanding the Arduino environment and developing diverse projects;
- preparing and implementing new teaching and learning tools by adapting technical solutions used in building robots;
- etc.

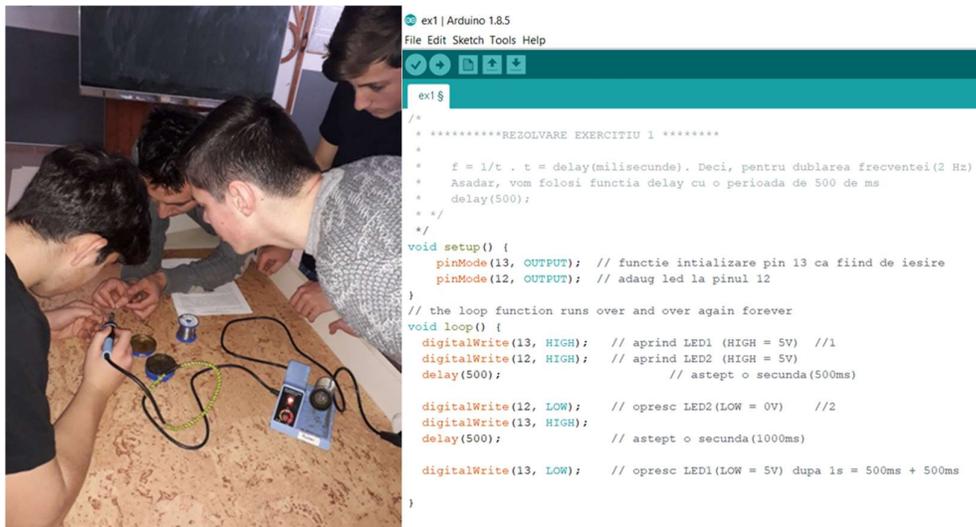


Fig. 1 Starting with simple problem solving and simple programming the microcontroller

### 3 Conclusion

Even the schools have a limited budget for equipment and instructors must find time for extrawork the success of Robotics clubs is evident. The practice demonstrate that less expensive materials can be used to develop club activities with high impact on students' motivations and involvement in informal activities of the club.

### References

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