

From Coding to Creativity: Using Sphero Robots to Inspire STEM Learning

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Abstract

The "Robot Dancer" project, created by students from Georgia Gwinnett College's (GGC) Information Technology program, is an innovative exploration of the intersection between robotics and dance through coding. Our team utilizes the Sphero robotic ball to program a custom dance routine, utilizing various programming languages and techniques to create a fully functional robotic dancer. Our groups also developed several side projects to attain all ages and skillset. Maze-solving and drawing projects were created to offer an alternative to those who wanted a challenge. Our goal is to inspire interest and passion in technology among middle school, high school, and college students, with a particular focus on underrepresented groups. Through these projects, we not only teach the fundamentals of coding and robotics, but also explore the creative possibilities of technology and the arts. Our projects offer a fun and engaging opportunity for students to interact with computer language and understand programming concepts such as decision structures and loops, while also fostering a deeper appreciation for the potential of technology. We aimed to introduce our community to the world of coding by providing them with a foundation in basic and fundamental concepts commonly used in advanced programming languages like Python and Java.

Introduction

The Technology Ambassadors Program (TAP) is a unique program offered by Georgia Gwinnett College that focuses on service learning and aims to foster student development in the areas of scholarship, leadership, service, and creativity. TAP seeks to engage students from diverse backgrounds, particularly those who are underrepresented in the field of Information Technology.

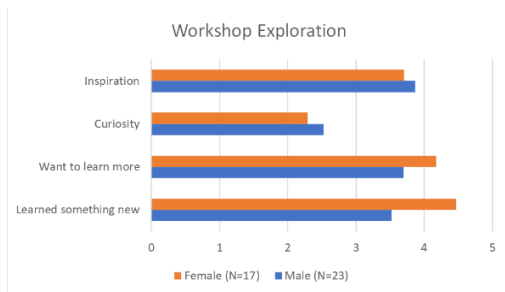
As part of this program, students are given the opportunity to work on research projects that are designed to promote technology education among their peers. The students in TAP create demos and interactive workshops that showcase their projects and provide opportunities for their fellow students to engage with the material in a fun and interactive way.

Methods

To execute our plan of creating an engaging project we used visual programming tools like the Sphero EDU app, which uses a visual block-based coding language based on Scratch to provide a simple interface for programming Sphero's movements. Our first project was "Robo Dancer" which is where we used two types of Sphero robots and coded four different programs to tell a love story through 'dancing'. Later we focused on the versatility of Sphero by creating simpler projects that varied with the skills of the community we were trying to reach. One such project that demonstrates this best was our "Maze Master" where older kids were given blocks of code and 2 minutes to solve a maze while younger audiences were allowed to manually drive the robot. When conducting our workshops for intro level college students we encouraged them to explore the various ways they believe technology and the arts could overlap. They were presented with opportunities to participate in our classes by using a Sphero robot to code their own mini programs using functions.

Results

Our Sphero workshop was effective in increasing knowledge and interest in programming and robotics, especially among underrepresented groups. We collected data through surveys, which showed the impact of the workshop on gender, race, and ethnicity. Positive verbal feedback from participants indicated a desire to pursue further opportunities in technology, such as ITEC classes or TAP programs. One student even approached us to express their interest in joining TAP after our third workshop. Parents at the Atlanta Science Festival were also interested in Sphero, asking where they could get one for their children. At the STARS event, judges recognized our impressive projects and the potential impact of Sphero on the community. Overall, our workshop successfully impacted both our peers and the broader community.



Discussion and Conclusion

Based on the results of our study, we have arrived at the conclusion that the participants in our program not only enjoyed the process of learning new technologies but also gained a deeper understanding of fundamental programming concepts. Additionally, we observed that our participants were able to apply their newfound knowledge and skills in practical ways, such as building and programming their own robots. We are thrilled to have had the opportunity to spark an interest in the STEM field among our participants, and we hope that this experience will encourage them to pursue further exploration and education in related subjects.

References

Sphero - <https://sphero.com/>

Acknowledgements

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