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

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WHAT IS TAP?

The **Technology Ambassadors Program (TAP**) is dedicated to service learning and supports GGC's four pillars of scholarship, leadership, service, and creativity.

As part of TAP, the students developed an educational technology demo for fellow students and created interactive workshops to showcase a project designed to spark interest in the subject matter.

Figure 1. Dylan, Daniella, and Thuy

GOALS

The aim of this project is to explore the potential of incorporating **Sphero robots** in **dance performances**. Our team's primary goal is to create a unique dance routine that showcases the **robot's capabilities**, such as its ability to roll in different directions and change colors.

By integrating technology with artistic expression, we hope to **inspire** others to consider the exciting possibilities of combining **technology** and the **arts**.

PROJECT DESCRIPTION

The "Robot Dancer" project is an exciting exploration of robotics and dance, where we use coding to program a robotic dancer. Specifically, we work with Sphero, a small robotic ball that can move and light up in response to commands sent to it.

Figure 1. Sphero

Figure 2. Playing Sphero with a tablet

The technology uses **Bluetooth** connectivity and can be controlled through both **mobile devices** and **computers**, making it accessible and convenient for users. We also used visual programming tools like **Sphero EDU app**, which provides a simple interface for programming the robot's movements

COMMUNITY OUTREACH

► SST and Atlanta Science Festival:
We demonstrated our Sphero project and invited kids to modify a program that changed the robot's matrix color and displayed text. In addition, we also created some activities using Sphero that are designed for kids to engage with and learn from:

- Using Sphero Robot to draw pictures or designs by controlling its movements manually.
- Assisting the Sphero robot in navigating through a maze to reach the endpoint.

Figure 3, 4. Kids experiment with the Sphero robot's capabilities and learn programming concepts

► TAP EXPO:
Our team used coding to program a Sphero robotic dancer. We were thrilled to showcase our project at the TAP EXPO, an event that brought together students from IT and non-IT backgrounds to explore the technology creativity.

Besides, Dylan from our team was invited to participate in a panel discussion to share his experience with other students. He talked about our team's process of using coding to program the Sphero's movements and how it has taught us important skills such as problem-solving and critical thinking.

Figure 6: Performing our project for other students

Figure 7: Dylan and two former members of TAP share their experience

RESULTS

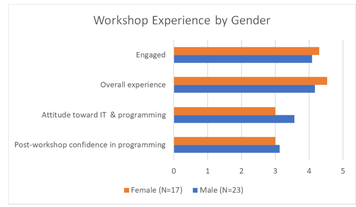

Figure 8: Post-workshop experience evaluated by gender

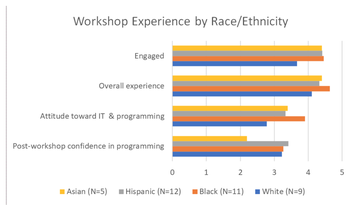

Figure 9: Post-workshop experience by race/ethnicity

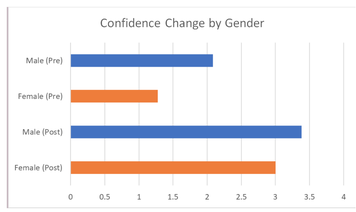

Figure 10: Before/After Confidence by Gender

Figure 11: Before/After attitude by race/ethnicity

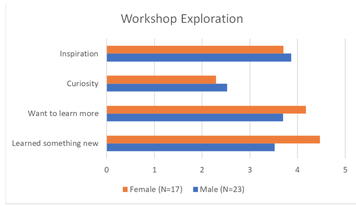

Figure 12: Post-Workshop attitudes on wanting further academic engagement

<u>Verbal Feedback Received:</u>

- A student expressed interest in joining TAP after the third workshop.
- At the Atlanta Science Festival, parents asked where they could get a Sphero for their kids.
- Judges at the STARS event were impressed with the versatility and community impact of our Sphero projects.

Conclusions

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

1. Sphero - https://sphero.com

ACKNOWLEDGEMENT

1. STARS Computing Corps - https://www.starscomputingcorps.org/
2. Georgia Gwinnett College - Technology Ambassadors Program Committee
3. Georgia Gwinnett College - School of Science and Technology