A Leap for Mankind: Teaching Procedural Programming to Children

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Study Target / Focus / Purpose

This study aims to address the ongoing need for more STEM professionals in the current workforce by encouraging a focused interest in information technology at an earlier age. This study targets students and others that do not necessarily have a formal programming background.

Description of TAP program

The Technology Ambassadors Program is an interactive class focused on service learning. TAP provides the opportunity to build a project using different technologies and collectively deliver it through conferences, student involvement, workshops, and outreach events.

This study is inspired by the various simple racing games found on gaming websites. Keyboard inputs are traditionally used to interact with the games; however, we took it a step further by implementing the Leap Motion controller.

Methods

Our goal is to introduce our audience to procedural programming through an interactive activity where participants can develop their own simple racing game. Participants will learn basic logical operators and statements, such as if/else and while loops. We use block code to help simplify coding for someone to understand and create more interest in ITEC for students. Through the interactive drag-and-drop architecture of Scratch, the students will learn how certain algorithms are adopted to create the logic behind a game. At the end of the activity, we hope to ignite a strong curiosity for the computer sciences and demonstrate that everybody is capable of learning how to program. We want to encourage the students to become lifelong STEM learners and begin their STEM journey at an earlier age.

The two technologies used in this project are the Scratch programming language and Leap Motion. Leap motion is a computer hardware sensor device that supports hand and finger motions as inputs. We use this technology to add functionality to the code and be able to move a car along a track by just moving your hand left and right without touching anything.

Scratch is a drag-and-drop programming language developed by MIT, which aims to introduce children to programming and logical problem-solving in an interactive, easily digestible manner. Scratch also provides an online community where users can share interactive media such as stories, games, and animation with people from all over the world. Scratch is designed and maintained by the Lifelong Kindergarten group at the MIT Media Lab (Scratch, n.d.).

Tap Expo (Target Audience: GGC college students and faculty)

We will demonstrate the working game where participants can interact with the technologies at each of the stations. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

Super Saturday Series (Target Audience: Middle School / High School Girls)

The Super Saturday Series will feature a demonstration of the working game where participants can interact with the technologies at each of the stations. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

Classroom (Target Audience: ITEC 2110 Students)

The classroom activity will feature an interactive learning activity which will last one hour. We will introduce ourselves and we will provide the pre-activity survey. Next, we will give a simple real-life example of a programming concept.Then, we will show our working race game, and then have students code their own basic racing game by following along with our instructions. After the students code and test their own games, we will summarize what they have learned and then they will have the opportunity to try the harder courses that we developed. The students will then complete the post-activity survey and there will be an open discussion, where students can share what they have learned during the session.

Workshop Research Symposium and conference setup (Target Audience: General)

Demonstration of the working game where participants can interact with the technologies at each of the stations. Our project members will give a short description of the project to any curious event attendees, as well as to answer any other technical questions that they may have.

We will measure the results and success of the activities by administering pre-activity and post-activity surveys. The surveys will incorporate basic questions about the programming content, which will let us gauge the participants' knowledge of basic programming concepts, both before and immediately after the activity.

Results

Once we conduct our workshops and demos, we will analyze the results from the previously mentioned surveys.

1. Tap Expo
2. Super Saturday Series
3. Classroom Workshop
4. Create Research Symposia
5. STARS
6. Atlanta Science Festival

Discussion and Conclusion

Our mission is to introduce the general public to ScratchX and Leap Motion to garner interest in Information Technologies. Our racing game showcases the importance of if-then statements and loops, taught in programming fundamental classes, without overwhelming the general audience- which does not require advanced programming knowledge. Through using interactive and simple teaching techniques that engage the participants, we aspire to also motivate the GGC community, professionals, and middle and high school girls to take part in science and technology activities and to learn more about the various opportunities in the field.

References

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Acknowledgements

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Georgia Gwinnett College - School of Science and Technology