**DUBMIX:**

**TEACHING CONTROL FLOWING CONCEPTS AND MAKING MUSIC WITH CODE**

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**Abstract**

DubMix is a rhythm game created by Georgia Gwinnett College (GGC) Informational Technology students, Richard Rodas and Jin Lee. The two are involved with GGC’s TAP Program (Technology Ambassador’s Program), whose main focus is to increase interest in students who go on pursuing an IT major/minor, as well as spark interest in non-IT major students. In order to appeal to students from middle school to college, we used the keyword Music as a concept for our project. Students will be able to learn basic programming skills while producing their music track on EarSketch, and as students play with our rhythm game, they will learn how programming helps them to visualize their creativity. With a huge collection of sample libraries, Earsketch allows students to produce music regardless of genre. Designed using Unity, DubMix lets the students experience a rhythm game with songs created from EarSketch. Players will be able to test their cognitive functions by pressing buttons in a sequence dictated on the screen. This research was conducted to increase curiosity about the IT field among both non and current IT students. Our hypothesis is that students will be able to understand the basics of coding in Python. The materials we used are EarSketch and a game project built in Unity. We anticipate that the final results would be the student being able to understand the basics of Python coding.

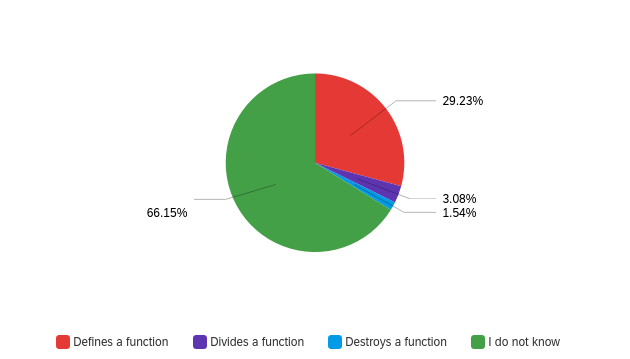
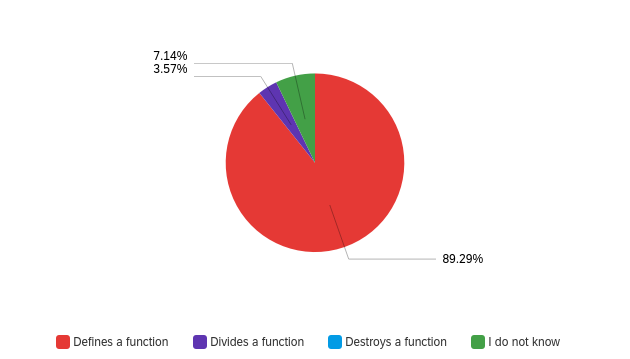
**Introduction**

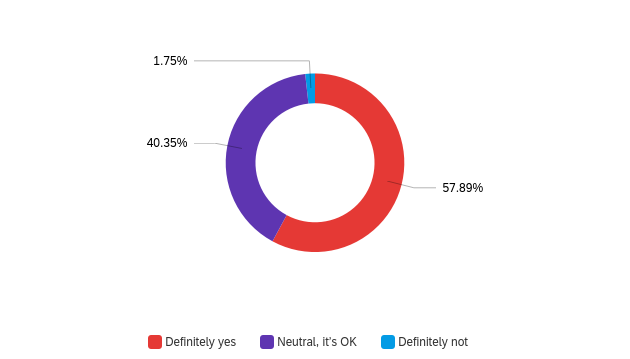
The Technology Ambassadors Program (TAP) is focused on commitment to service-learning. This program addresses a need to increase the number of students who go on pursuing an IT major/minor, especially those underrepresented in computing. You get to work on exciting projects, build peer-to-peer connections, and enhance your technical skills. The goal of TAP Project is to introduce the idea that whether you have little to no experience, you can create and discover new things to make and share.

**Methods**

DubMix is a workshop based on having students create their own music track via coding. In order to appeal to students from middle school to college, students will be able to learn to create a music track through coding on EarSketch. Using a huge collection of samples library, students can produce their own unique track regardless of genre. DubMix lets the students experience a rhythm game with songs created from EarSketch. Players will be able to test their cognitive functions by pressing buttons in a sequence dictated on the screen.

Throughout the class workshops, students would be able to learn the basic concepts of Python. The educational aspect will take place in EarSketch. EarSketch will give the students hands-on experience with introductory programming concepts such as: creating comments, creating variables, setting loops, and calling functions. In addition to programming, students will also receive experience working in a DAW (Digital Audio Workstation) and producing their style of music. The students will later have the option of playtesting our game created in Unity, giving them a sense of the game development aspect of programming. The game would have a selection of tracks with a single-player and co-op mode for each track. When a track is selected, the rhythm game begins! The player must press up, down, left, or right in a sequence dictated on the screen on time. If pressed on time, they earn points, but otherwise they lose a point.

**Results**

In the pre-survey, most of the questions answered, "I don't know," indicating that most students were not experienced with programming before. After the workshop, "I don't know" responses significantly decreased; most of the students gained the confidence to answer the questions, and more than 80% of students could answer the conceptual questions correctly. 

Students quickly implemented the programming skills on Earsketch to produce their style of music, and they were engaged in experiencing new technologies; more than half of the students answered, "Definitely yes" to the question asking if they enjoyed learning new technologies.

We also received feedback from students; some of the concepts we taught in the workshop were difficult for some students who are new to programming. For loops and while loops, for instance, were not the topic that students could fully understand in an hour-long workshop.

**Acknowledgements**

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**References**

[1] EarSketch “Make Beats. Learn Code.” , 8 March, 2022,

<https://earsketch.gatech.edu/landing/#/>

[2] Microsoft, “Visual Studio Code- Code Editing. Redefined” *RSS*, Microsoft, 8, March,

2022, <https://code.visualstudio.com/>

[3] “Qualtrics.” *Qualtrics XM*, 4 April 2022, <https://www.qualtrics.com/platform/>

[4] Technology, Unity. “Welcome to the Unity Scripting Reference!” Unity,

<https://docs.unity3d.com/Manual/ScriptingSection.html>