Using Virtual Reality to Teach the Fundamentals of Programming

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What is TAP?

- The Technology Ambassador Program (STEC 4800) at GGC allows enrolled students to develop a project that they are completely in control of.
- They get full power to choose what technology they want to use, and how they want to develop the project.
- Each project has a goal to teach a new concept to the audience, and bring them one step closer to technology.

Hypothesis

Our hypothesis, was that students would be able to learn more effectively using Virtual Reality than traditional methods

Project Description

- Project Python VR was a game designed for Virtual Reality to teach participants the fundamentals of programming
- Taught the different data types, manipulating data to create new values, how to store and use variables, and “if statement” logic
- The game was set in outer space to immerse participants in a new and exciting setting
- A non-VR, WebGL version was also developed for those who could not play the VR version


Welcome to SandBox Mode!
Spawn Int
Spawn an Integer
An integer is a whole number
Spawn Float
Spawn a Float
A float is a number with a decimal point
Spawn Boolean
Spawn a Boolean
A boolean is a True or False value
Spawn String
Spawn a String
A string is a list of characters, usually words or phrases


Checking Value Inside Box X


Easy Level 1 - Introduction
Welcome to Project Python! You are a spaceship repair technician and you must solve the code to repair the ship.
This board will contain instructions and hints on how to solve the puzzle in every level. Make sure to read them!
The first level is about simply assigning a value to a variable. This is as easy as picking up the String orb "Hello!" and placing it inside of the box labeled "x"
(Hint! Click on the green circle above the box while holding the value!)
When you think your answer is correct, press the "Check Answer" button. If the spaceships repairs, you did it! If something goes wrong or if the answer is incorrect, hit the "Reset Level" button above and try again.


if x == "Hello!":
repairShip()

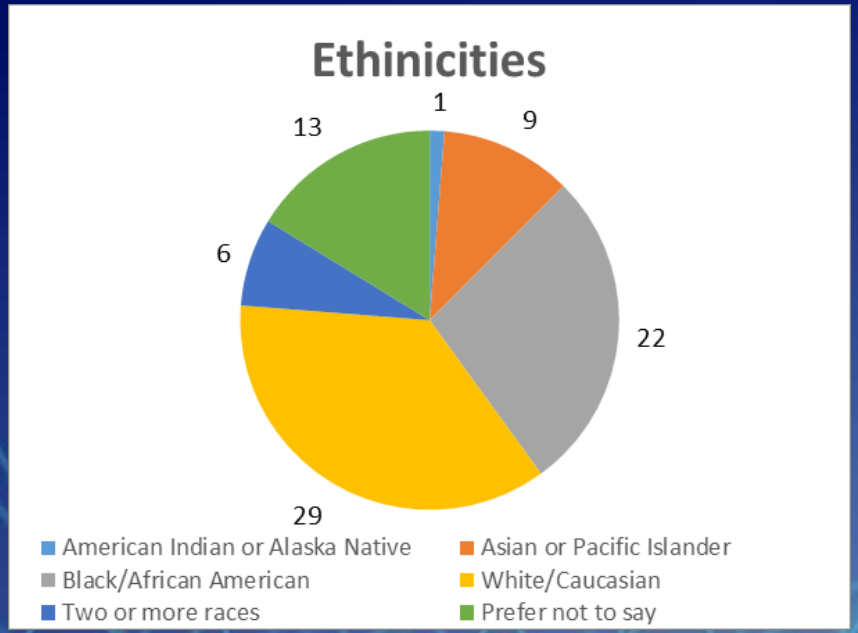

Have Fun!

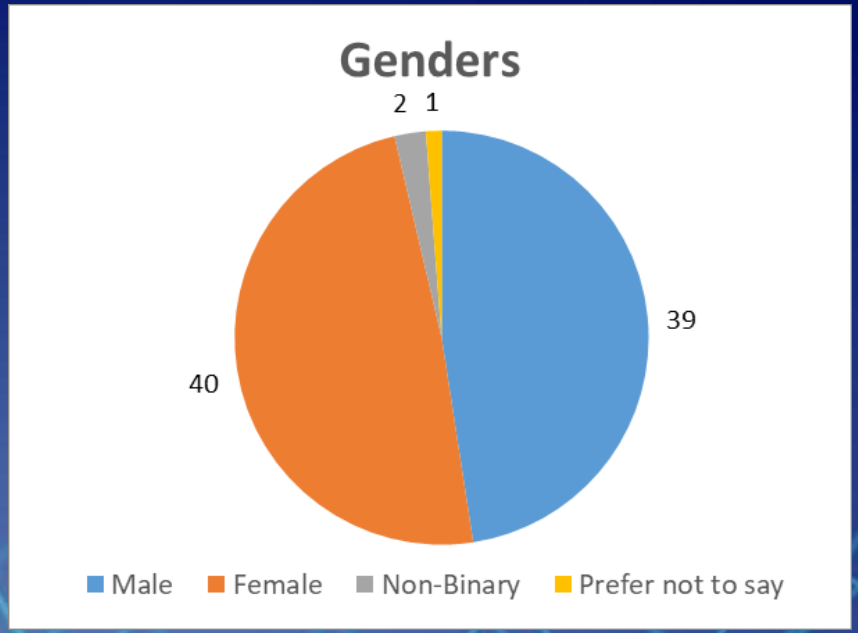

Have Fun!


Have Fun!
30:00

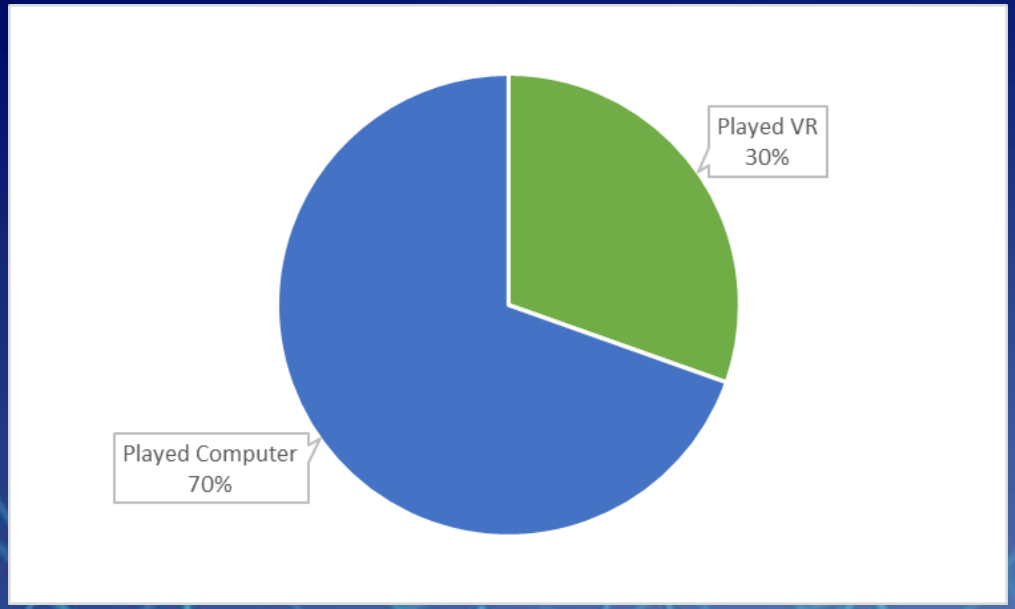
Results and Analytics

Demographic - 92 Total Students



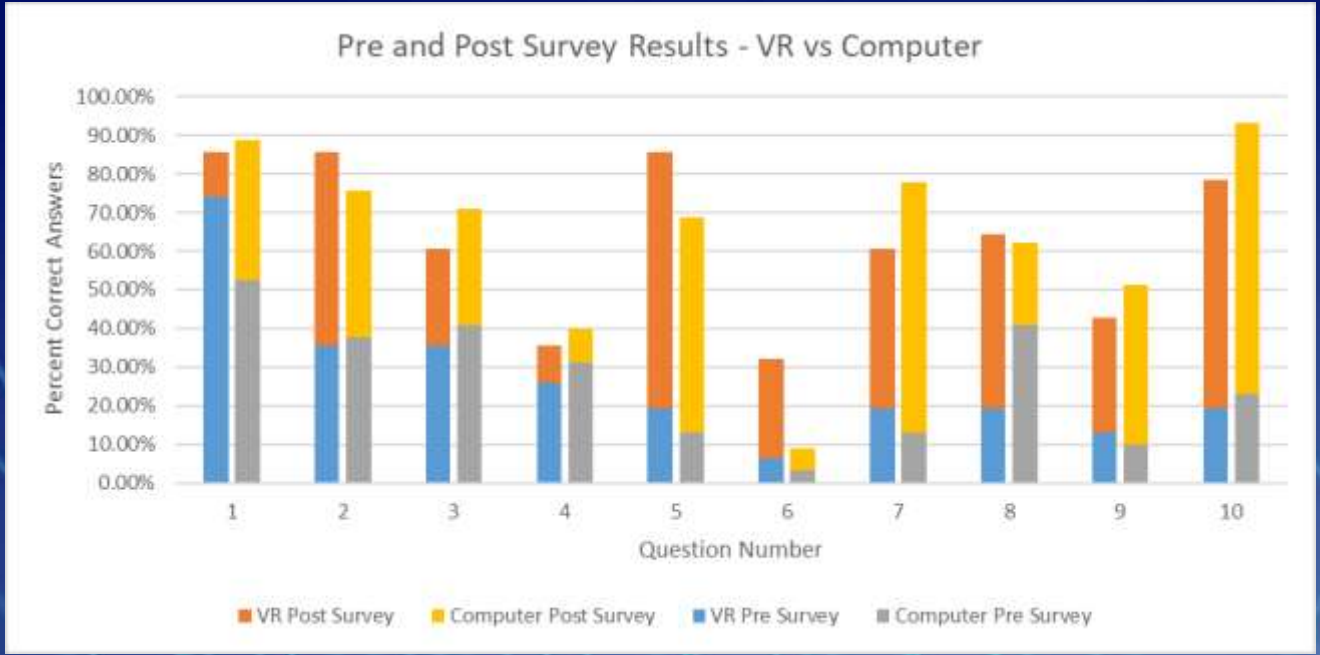


How many played VR



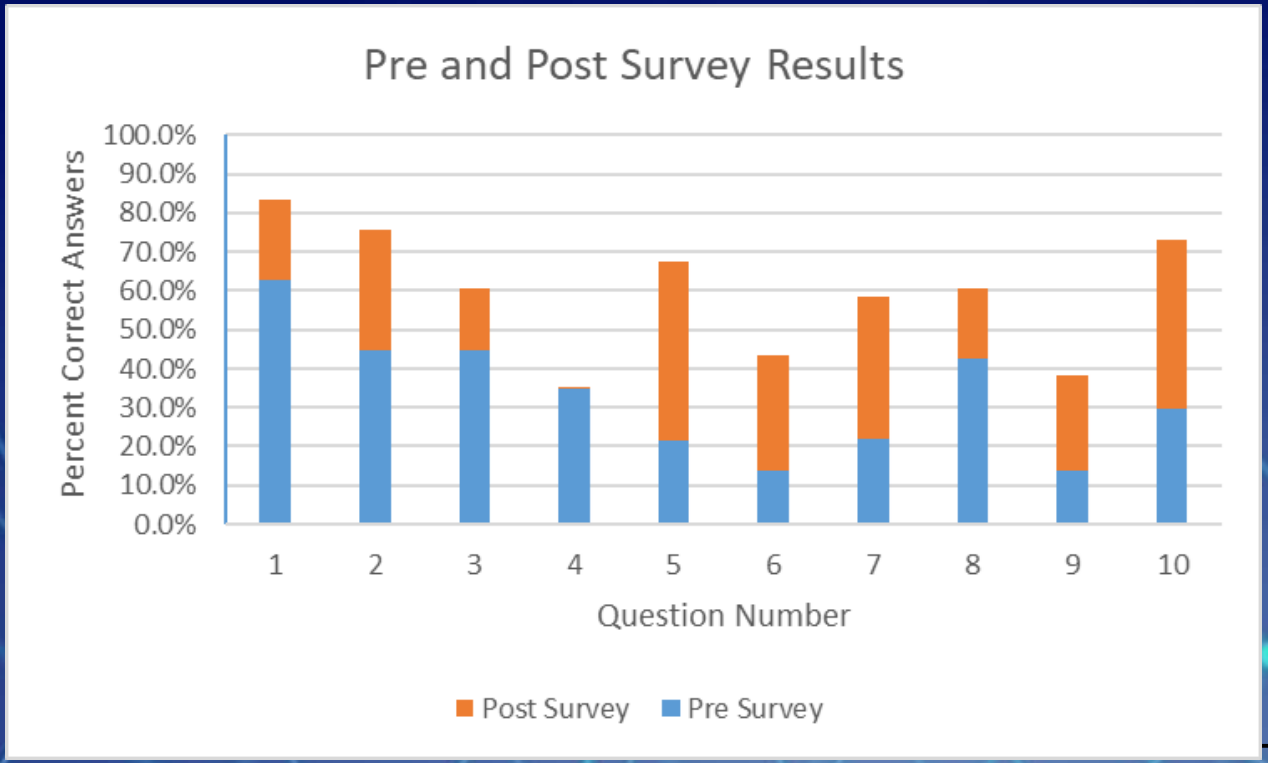
- Out of 92 total students only 28 played the VR version.
- 64 students decided to play the computer version instead

Results - VR vs Computer



- Question 6 saw the largest difference between VR and Computer results
- Overall, the increase was generally even, with Computer beating VR more often

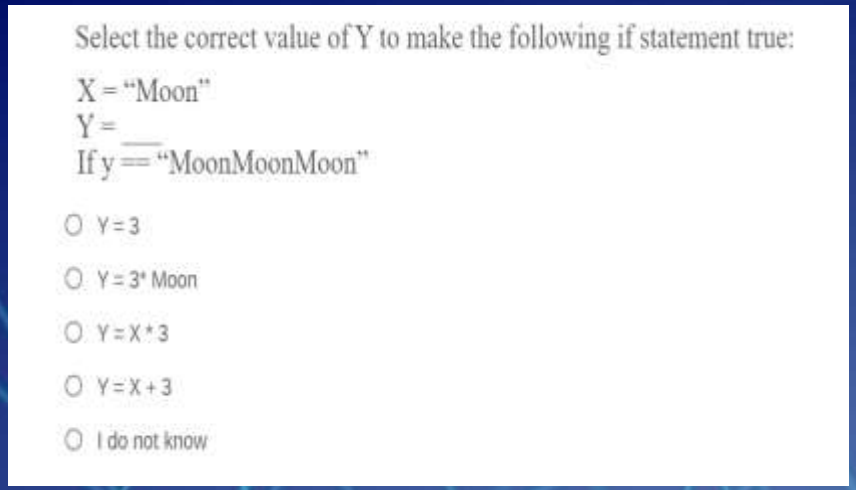
Overall Average



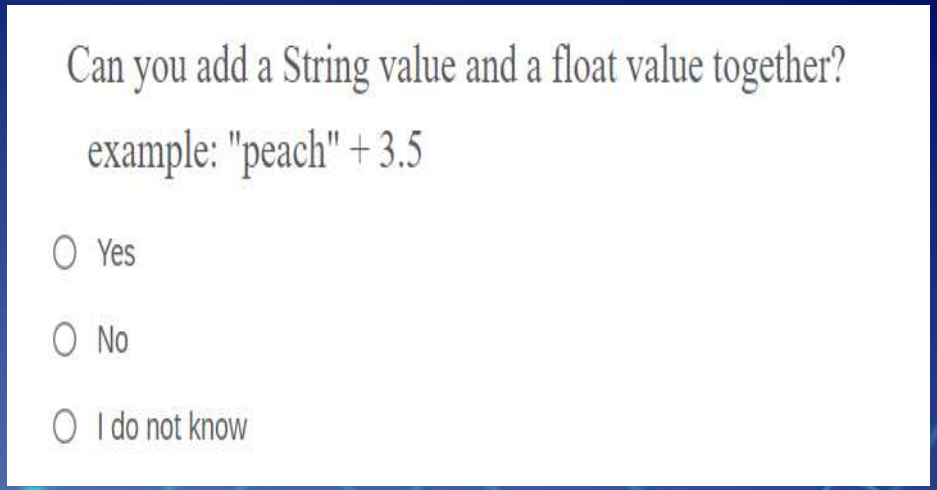
- There was an overall increase in correct answers from pre to post survey.
- The largest increase was 46% and the smallest was 0.2%

Largest Increase Vs Smallest Increase

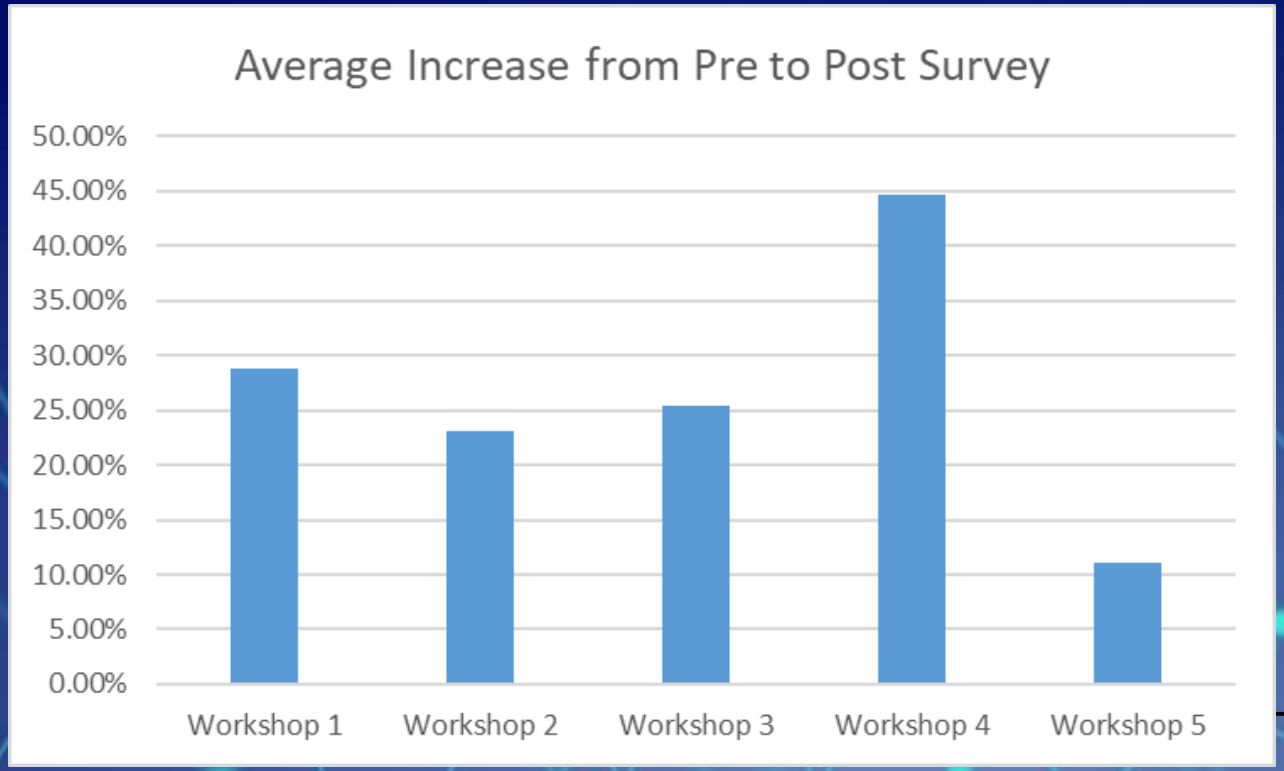
Question 4 Least Improved



Question 6 Most Improved



Average Results by Workshop



- In total, there were 5 workshops completed
- Workshop 4 saw the largest increase - 44.7%
- Workshop 5 saw the smallest increase - 11.1%

Discussion and Feedback

Results - Discussion

- Overall, the data does not support that students learn better using Virtual Reality over using a Computer
- The game itself was an effective teaching tool
- We believe that students simply are not used to using Virtual Reality, so they had to learn how to use VR as well as the content of our game
- In the future, another study can be done with students who already have experience with VR to see if the virtual environment is more conducive to learning effectively

Improvements

Some improvements can be made to the non-VR version:

- The interface could be made more user friendly. Some people struggled with the controls.
- The game was very laggy on some computers. We believe this to be caused by the computers on GGC campus.

Comments

How did we do?

"Thank you guys for being here to show us how the programming works. I'm very interested in it."

"Everything was pretty chill, didn't know how good vr was until today."

"It was fun never used a vr but it was really cool to do. The people who didn't try it are losers"

Q&A

Questions? Comments? Concerns?

Special Thanks!

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Dr. Rahaf Barakat

Mr. Carlos Soares

Mrs. Manal Nasir

Ms. Estephanie Gonzalez

The DM Lab

And You! For viewing our presentation!