Quaker Valley
Hamster World

Project Documentation 5-22-2019

Summary

The Quaker Valley School District partnered with the Center for Creativity and Carnegie Mellon's Entertainment Technology Center to leverage technology to better support learners with exceptionalities. QVSD has created a team of special education teachers, representing all four QVSD school buildings and both, life skills and general special education student populations. We split our team into secondary and elementary groups and created a prototype problem-statements for each group. The purpose of this grant is to identify the challenges of special education teachers, related to better supporting special needs youth. We will collaborate with experts in emerging technologies and prototype solutions for the benefit of student learning. Finally, we hope that the technology and solutions created through this unique partnership, are scalable and will be shared with the Remake Learning Community.

Rationale

Independence exists as our overarching goal. Often times learning new prevocational skills requires each activity to be broken into smaller tasks. Each task requires explicit instruction and repeated practice in order to acquire mastery. Since this process is not always fluid, students become dependent on his or her teacher as to what to do and when to do it. This series of prompting can be verbal or physical and is eventually faded, handing ownership of the task to the student. The dependency on prompts is often the last obstacle before the student acquires independence with an activity.

Students with special needs are not able to self-regulate in the school environment as well as within the community. Students can become upset and frustrated very easily; their range of escalation depends on their cognitive function, ability level, and individual needs. With teacher prompting, scaffolding and/or visuals, teachers are typically able to help students deescalate within an appropriate approximation of time. However, it is important for students to learn how to self-regulate to have more behavioral and hopefully academic progress. Furthermore, students that are able to self-regulate would enhance their overall independence (in and out of school).

Links

Hamster Watch Controller Software APK for Android OS:
https://github.com/johnchoi313/QVxETCxAIU-HamsterWatchProject/blob/master/HamsterController.apk

Hamster World Server Software EXE for Windows OS:
https://github.com/johnchoi313/QVxETCxAIU-HamsterWatchProject/blob/master/Hamster%20World.zip

Unity 2017.1 C# Project Open Source Code: *(CC-BY-SA 4.0 Open License, where applicable)*
https://github.com/johnchoi313/QVxETCxAIU-HamsterWatchProject/tree/master/Hamster%20Project%20Unity

Partner Organizations

Carnegie Mellon University Entertainment Technology Center (https://www.etc.cmu.edu/)
The ETC is the premiere professional graduate program for interactive entertainment as it's applied across a variety of fields, exploring transformational games, innovation by design and interactive storytelling. The ETC excels at creating an educational environment in which interdisciplinary students acquire collaboration, creativity and communication expertise while applying their artistic and technical skills through design-based research projects.

Allegheny Intermediate Unit 3 Center for Creativity (https://centerforcreativity.net/)
The Center for Creativity, an initiative of the Allegheny Intermediate Unit, provides educators with instructional resources, grant opportunities, and professional development as they integrate STEAM, creativity, and innovation into teaching and learning practices.

Quaker Valley School District (https://www.qvsd.org/)
The Quaker Valley School District is a school district covering the Boroughs of Sewickley, Leetsdale, Edgeworth, Glen Osborne, Sewickley Hills, Sewickley Heights, Bell Acres, Haysville, Glenfield, as well as the townships of Leet and Aleppo Townships in Allegheny County, Pennsylvania.

Credits

Dr. Sally Hoover
Director of Pupil Services at Quaker Valley School District and Project Leader.

Jason Harrison
Life Skills Support and Special Education Teacher at Quaker Valley Middle School.

John Balash
Director of Educational Engagement at CMU Entertainment Technology Center.

John Choi
CEO of Choitek and Lead Software Developer of Hamster World project.

Hardware

LAN Network Router

A standard wireless local area network router is needed for strong wireless communications between the main server computer and the individual smartwatches. This does not need to be connected to the internet, and only serves as a base platform to create a local wireless area network. Most standard commercial wireless routers will work. The router used and tested in this project is the **Tenda N300 Wireless Wi-Fi Router with High Power 5dBi Antennas** (it can be purchased here: https://www.amazon.com/Tenda-Wireless-Router-Antennas-F3/dp/B01CA5SN1K)

Windows PC as Server machine

Any PC running Windows 7,8, or 10 with at least 4GB RAM, at least 0.6GB of available storage memory, and WiFi capability will work. Pictured below is a standard Windows 10 Laptop. This computer is used as the central "hub" for all of the smartwatches to store their data and runs the interactive multiplayer Hamster World software.

Android Smartwatches

The Android smartwatch used in the development of this project is the **TicWatch S & E** (Pictured on left. More info on the TicWatch can be found here: https://www.mobvoi.com/us/pages/ticwatchse). Any Android device with WiFi and a recommended minimum 1GB RAM will work. However it should be noted that TicWatch uses Android Wear OS, not standard Android. Installing custom apps on Android Wear OS is much more convoluted than standard Android OS, and as such it is highly recommended to use Android Watches with standard Android OS, not Android Wear OS. We recommend using the **KingWatch KW88 Series**, which runs on Android 5.1 (Pictured on right. The KingWatch KW88 can be purchased here: https://www.amazon.com/Bluetooth-Android-Camera-Monitor-Tarnish/dp/B076CWGC45/)

Smartwatch Android OS Settings

There are some settings to change to get the Hamster Watch software operational on the smartwatches. Perform the following steps to get the Watch software at best operating capacity:
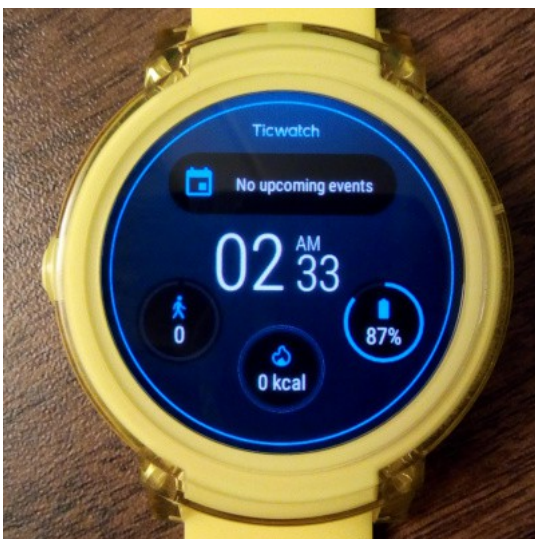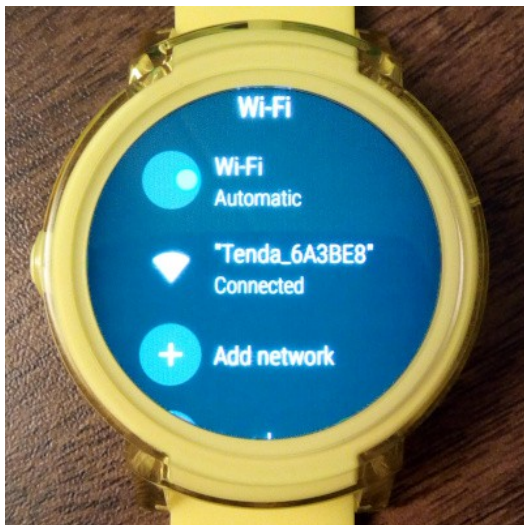

1. Note the smartwatch face. It is highly recommended to use a face that displays battery life.
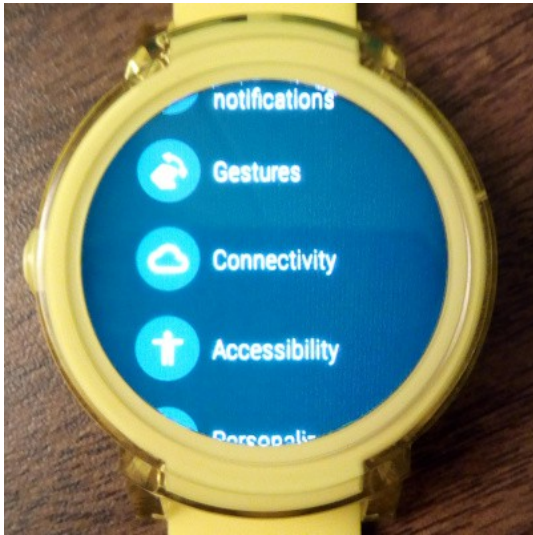
2. In the Settings tab, find the Connectivity settings.

3. Turn off Bluetooth: it is not needed in the Hamster Watch software.

4. Turn on WiFi, and connect it to the LAN Router. It may complain that internet is not detected.

5. Go back to Settings and find Developer Options. If Developer Options are not enabled, follow the instructions here to enable them: https://www.androidexplained.com/android-wear-developer-mode/

6. In Developer Options, disable Cellular Battery Saver.

7. Now, go ahead and run the Hamster Controller software!

Hamster Watch Software

The Hamster Watch software allows for some kid-friendly customization with cute looking hamsters and automatic notification systems for breaks and buzzers. There are 5 panels, each with different functionality. Swipe left to switch panels. Swipe right to enter the main Wear or Android OS menu.
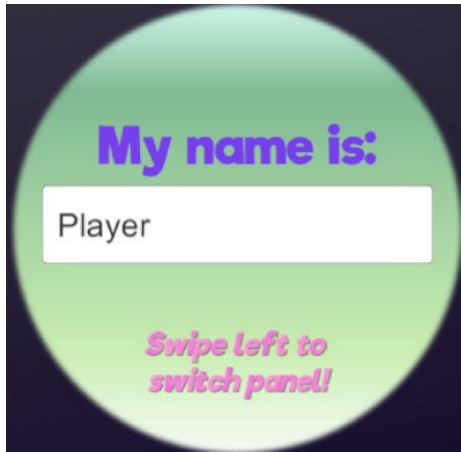

The main homescreen of the Hamster Watch software allows you to set a custom user name. This information is saved locally and transmitted to the Hamster World software.

The next screen allows you to customize your own personalized hamster avatar, with 6 custom body skins and 6 different facial expressions. Your personalized hamster will be shown upon connecting your watch to the Hamster World Software.
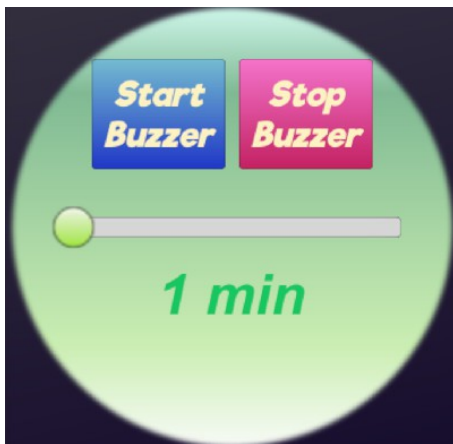
This next screen allows the user to create an automatic timer that creates a buzz notification on the watch every x number of minutes (x ranging from 1-5 minutes). This will help kids self-regulate their own behaviours with a consistent timed repeating notification.
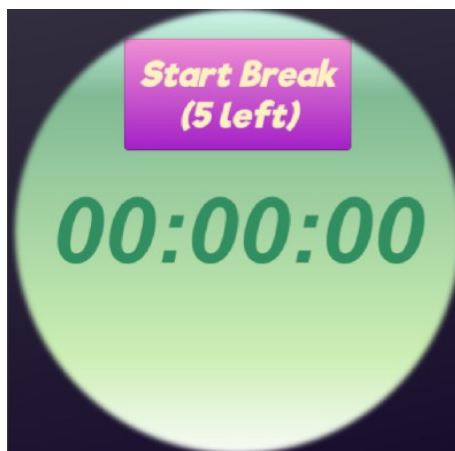

This next screen allows the user to start a timer that creates a buzz notification on the watch within 5 minutes of pressing the Start Break button. This allows a student self monitor the frequency and duration of their breaks during class. The watch allows for students to use a maximum of 5 breaks per day.

This final screen is a simple controller panel that controls the hamster in-game when connected to the Hamster World Server software. The D-pad controls the direction in which your hamster moves, the green triangle makes your hamster jump, and the orange X button uses the item you hamster is equipped with.
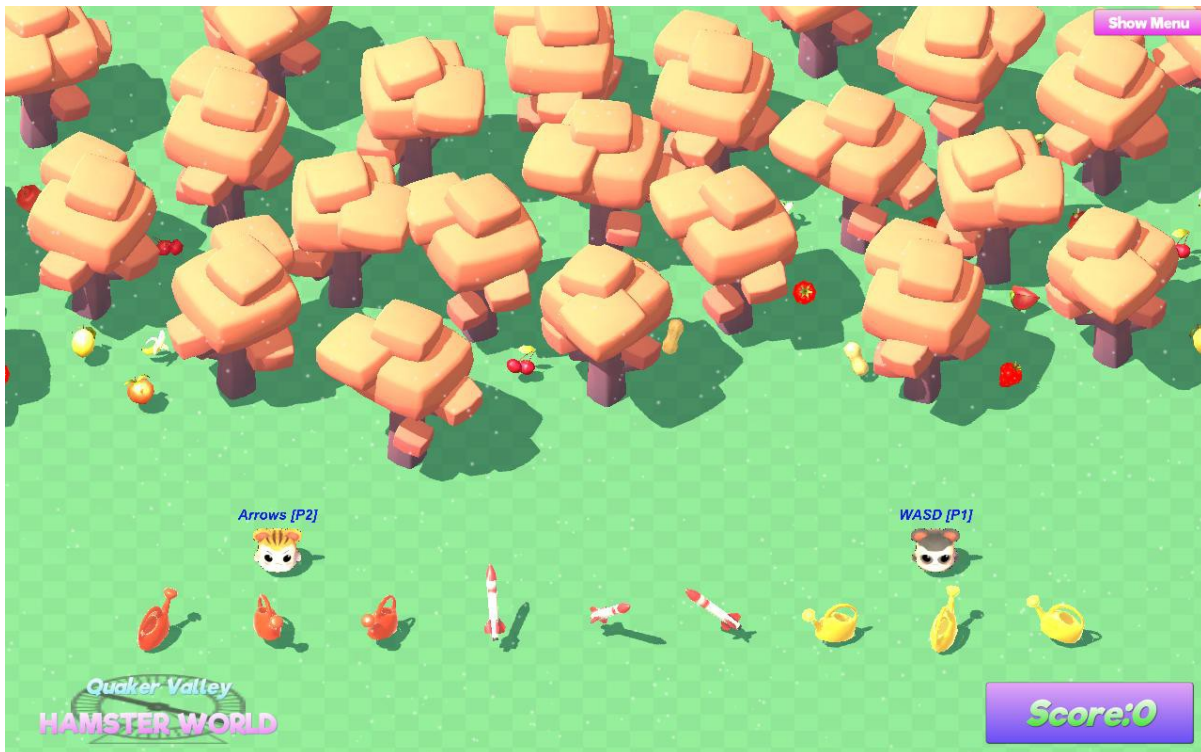
Hamster World Software

The Hamster World Software is a centralized server that allows smartwatches running the Hamster Watch Controller software on the same network to connect automatically, transmit break usage data, and allow users to interact in an engaging multiplayer experience in a variety of levels.
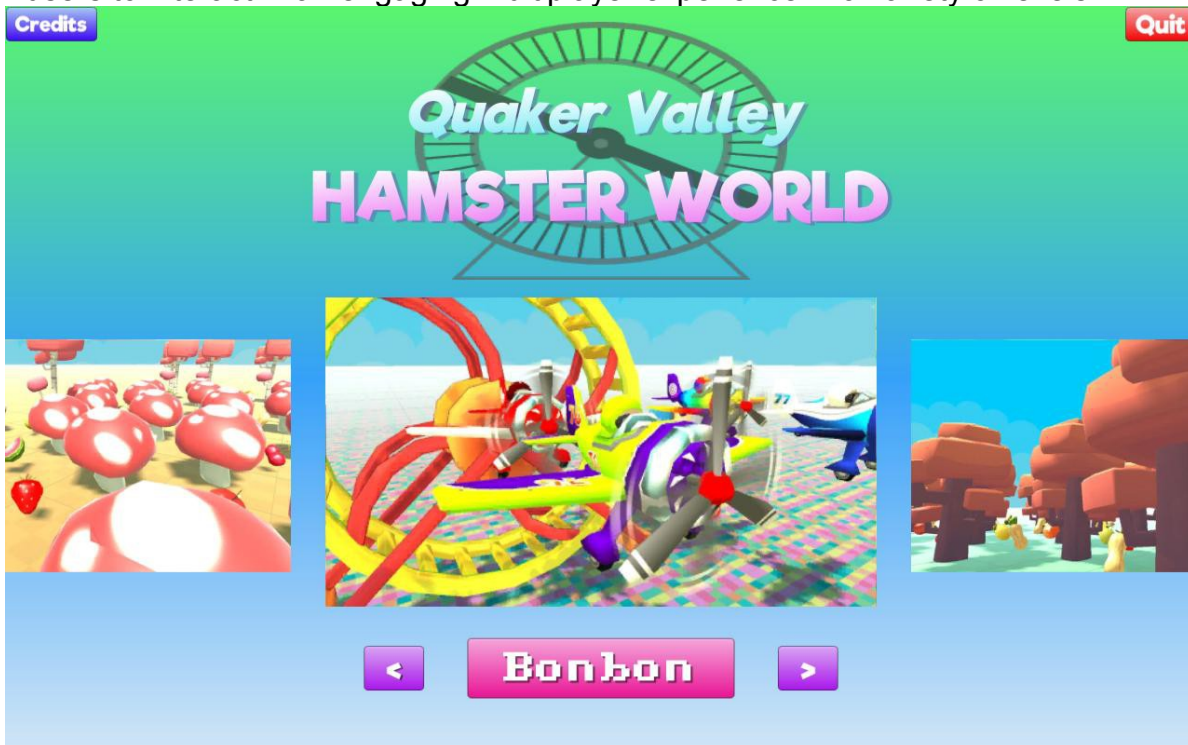
This is the title screen. You can press the Credits button to see the credits, and there are 7 colorful themed levels to choose from. Press either the left and right buttons on your keyboard or on the screen to choose the level, and press Enter or the Level name to load the level.

Use the Credits screen to learn the names of the lovely people who put this project together and the organizations that made it possible.

This is a sample level of the Hamster World Software. Each level can have up to 6 smartwatch hamsters connected to the server simultaneously. Each level also has 2 keyboard-controlled hamsters, one controlled with the buttons **WASD/Space/LeftCtrl** and the other controlled with the **ArrowKeys/RightCtrl/RightShift**.

Clicking on the **Show Menu button** will show a graph visualizing all the breaks used by each connected Hamster Watch software (this data is saved in *"Hamster World\Hamster World_Data\StreamingAssets\BreakData.csv"* in the same directory as the Hamster World Software).

Worlds

There are seven (7) worlds in the Hamster World server, each with unique characteristics:

Apollo

Gravity on the moon is 1/6 that of Earth. Try jumping with a jetpack and see if you can fly out of orbit!
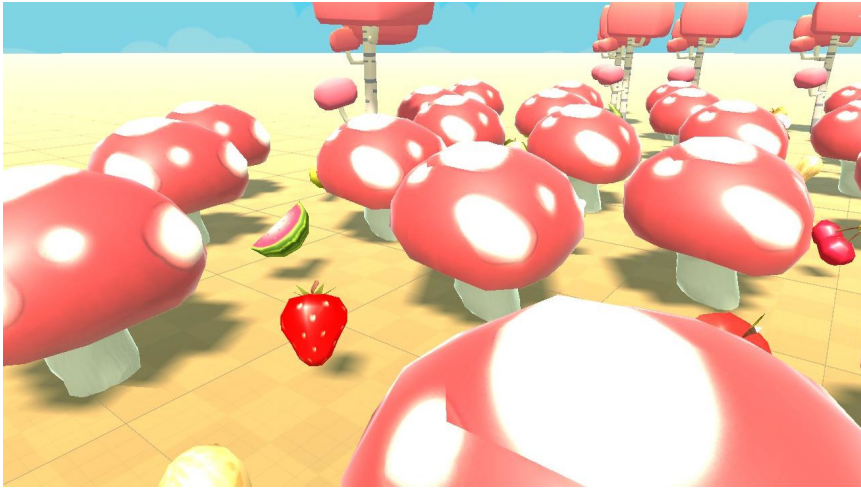

Biblio

Libraries are quiet, calming, and otherwise excellent place for reading, studying, and learning.
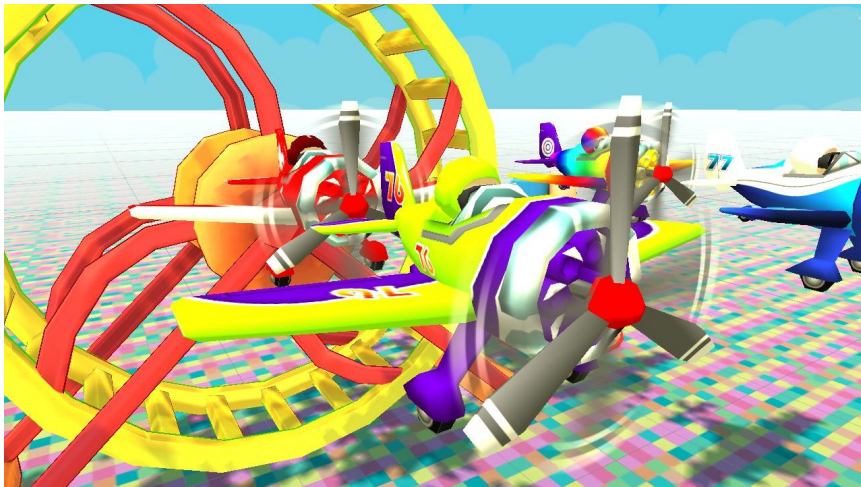
Bolete

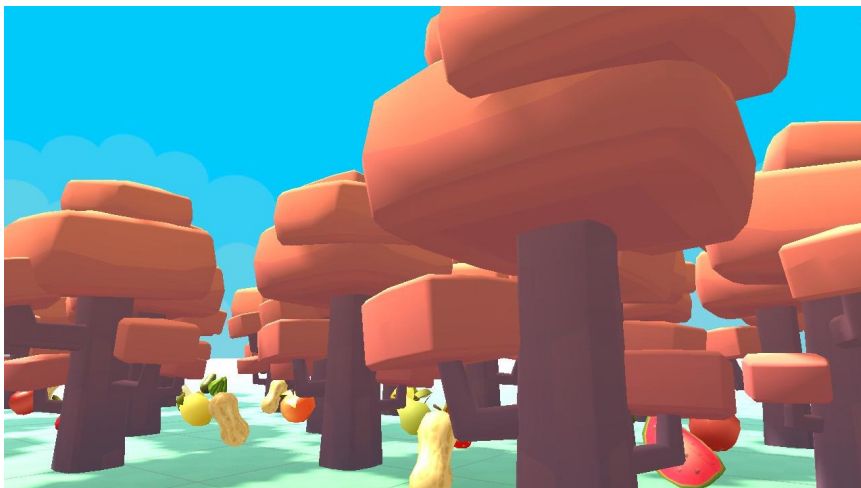Mushrooms! Mushrooms! Bouncy mushrooms everywhere!

Bonbon

A colorful wonderland of candy, color, and a giant hamster wheel.

Forest

The natural habitat of hamsters across the world.

Noelle

Snow, snowmen, presents, Christmas trees and more snow - Happy Holidays in the Hamster World!

Soccer

Football is a family of team sports that involve, to varying degrees, kicking a ball to score a goal.