Lab 1 – War of Brawns Product Description

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1. Introduction

War of Brawns is a mobile game application that is designed to help gaming addicts become healthy and active. War of Brawns tracks the gamers exercise and diet which affects the progression of gameplay. Gamers progress through the game using data from tracking exercise and diet.

In 2018, the World Health Organization officially claimed that gaming disorder was a disease (Ivanova, 2019). The percentage of gamers in the U.S. population is 64 percent and that means it is possible that 64 percent could be or are affected by this disorder ("Gaming Addiction Statistics", 2019). Statistics of gaming disorder among adolescents in Figure 1 suggest that this disorder is common or will be in the future.

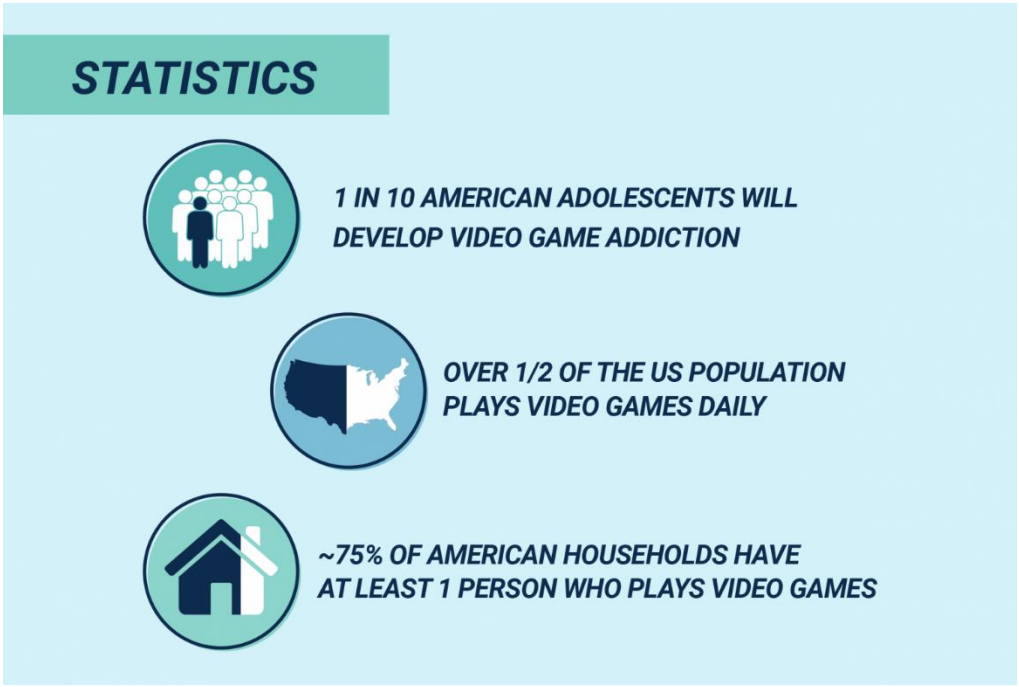

Figure 1: Statistics of Gaming Disorder among adolescents

The negative effects of gaming disorder do not just affect the gamers work or education, but the body as well. These effects can be health issues or a decrease in mental performance among other negative effects (Video Game Addiction Treatment for Teens, n.d.). Gamers are also not the only ones affected by this disorder. Parents, spouses or loved ones of the gamer are affected and the relationship between both parties become strained.

Gaming disorder disrupts the gamers normal life and causes important activities such as work or education to be neglected. This also leads to health concerns such as weight gain, poor posture, and an increased risk of type 2 diabetes (Video Game Addiction Treatment for Teens, n.d.). Combating weight gain is done through either diet or exercise, however gamers do not find these activities enjoyable because of a lack of instant gratification. Gamers also find commitment difficult and tend to not practice good dietary habits (Video Game Addiction Treatment for Teens, n.d.)**.** Whenever the gamer does want to exercise or make diet changes, they go through a process of different factors such as self-consciousness, unsatisfaction, and lack of motivation. If the gamer feels these factors then most likely they will not make the healthy lifestyle change. However, if the gamer does not feel these factors then they will become healthy and active.

War of Brawns engages gamers in a fantasy role-playing game (RPG) that motivates the gamer to engage in physical activity. War of Brawns uses the gameplay to motivate the gamer to incorporate healthy diet and exercise habits by using instant gratification in the gameplay. War of Brawns also offers interactive, addictive, and enjoyable gameplay for the gamer to become committed.

War of Brawns utilizes instant gratification by offering in-game rewards and character progression. Tracking of the gamers workouts and diet is done through a log and diet journal feature which is then stored in the War of Brawns(WoB) managed database. The diet journal has

multiple features such as a calculated daily caloric intake, keyword search of food items with nutritional information, and the tracking of the daily intake of the gamer. The weight progression of the gamer is a feature that is displayed as a line graph throughout the period they use the application. Workout tutorials are also available for the gamer to understand proper form.

2. War of Brawns Product Description

War of Brawns is a mobile RPG application that helps gaming addicts become healthy and active through exercise and diet tracking. The goal of this application is for the gamer to become healthy and active while establishing an alternative lifestyle around the gamer's addiction. Objectives such as tracking exercise, diet, and establishing addictive gameplay helps the gamer become active with a healthy lifestyle. Administrators will also use this application to access the database directly to fix issues such as mismatched database values.

2.1. Key Product Features and Capabilities

War of Brawns uses a client graphical user interface(GUI) for the user interface. Gamers can input data such as workout, diet, and player information. War of Brawns maintains a diet journal feature that uses the gamers body measurements, activity level, and goal weight to calculate the suggested daily caloric intake which is displayed inside the diet journal feature. Gamers can see the display of weight progression in a line graph and historical data such as completed workout challenges in logs. Workouts are tracked in the workout challenges feature through the usage of a smartwatch electrocardiogram (ECG) and the smartphone global positioning system (GPS). Completion of workout challenges increases the total amount of experience for individual attributes of the gamer profile such as strength or vitality. Each attribute establishes a certain amount of experience points required to increase that attribute. Completion of different workout

challenges will reward experience points towards those attributes. Blacklisting of gamers can be done if cheating or improper usage occurs.

Gameplay features include towers, store, and blacksmith. The towers are areas where gamers can use their avatar to fight monsters and receive in-game rewards such as currency. The store is where gamers can buy and sell in-game goods such as armor and weapons. The blacksmith allows the gamer to forge new weapons using material they find. Sound and music are also integrated into the application.

The concept of gameplay based on exercise and diet is what sets War of Brawns apart from other fitness mobile RPG applications. This concept helps the gamer achieve their goal of pursuing an alternative healthy and active lifestyle using addictive gameplay. The gameplay approach motivates the gamer by forcing the gamer to complete workout challenges to progress through the gameplay.

2.2. Major Components (Hardware/Software)

The hardware necessary for the application is a smartphone and an optional smartwatch. The smartwatch is used to take the ECG or heart rate of the gamer to ensure that physical activity is being done. The relationship between the major functional components of War of Brawns is displayed in Figure 2.

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The software used to development the game includes Unity, Eclipse, and Visual Studios. The smartphone is going to run either iOS or Android as the operating system. The application is using different application programming interfaces(API's) to connect to the smartwatch, Google maps, and different databases. The application will be developed using C Sharp (C#) for its capability with Unity and portability.

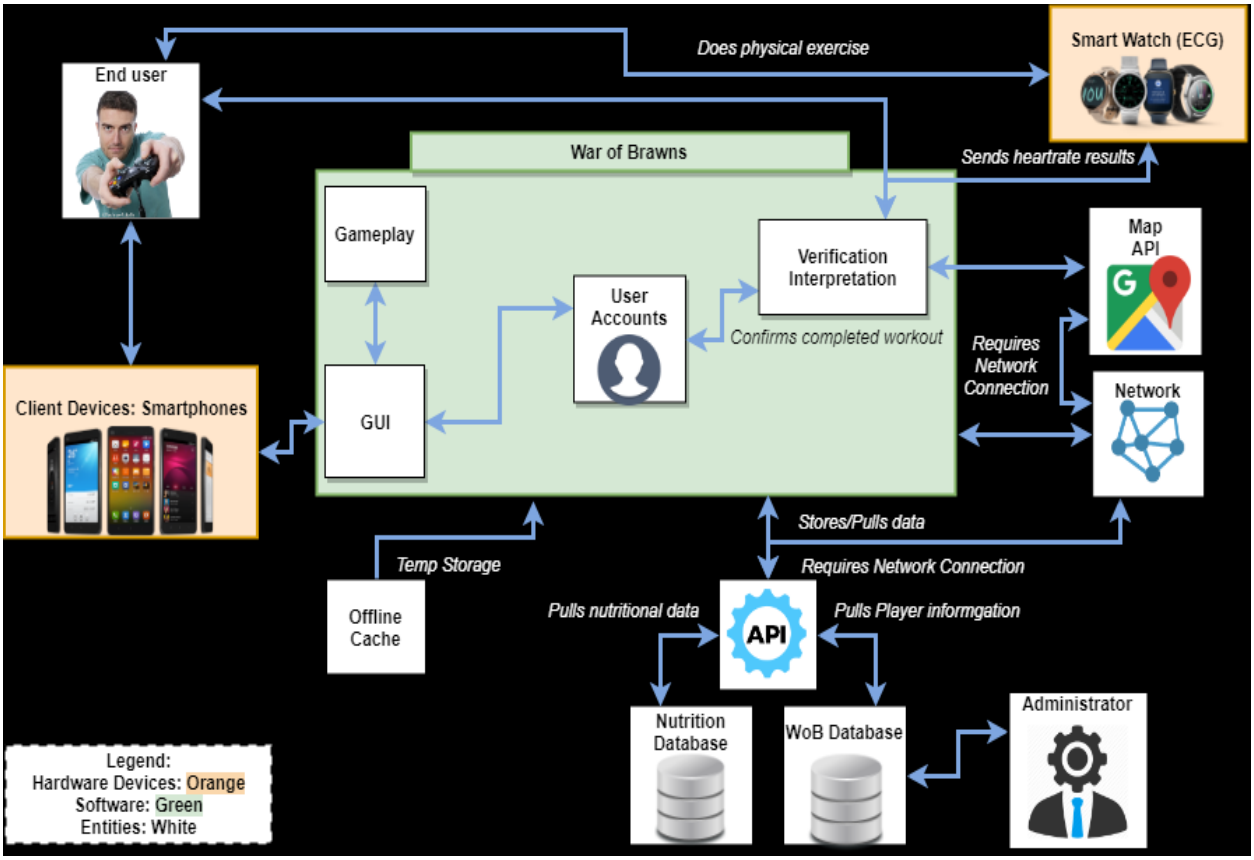

Figure 2: War of Brawns Major Functional Components Diagram

Two types of databases are used for the War of Brawns application. The first is the nutritional database which is used to access the nutritional information of items to be recorded in the gamers diet journal. The second is the WoB managed database through the usage of Cloud Storage for Firebase. The WoB managed database holds data relevant to the gamer and the application itself. Data relevant to the gamer includes gamer profile attributes, in-game items,

personal information and settings. Data stored on the database for the application includes gameplay items with attributes. supported equipment and workouts challenges.

3. Identification of Case Study

The real-world product(RWP) helps gamers to pursue their goal of an alternative healthy lifestyle around their game addiction. This application assists gamers in structuring their diet and motivating themselves to complete workout challenges. An example would be that gamers can use this application just for the gameplay because they are addicted, however they will become active as a result.

The functionality of key features of the RWP will be demonstrated in the prototype, but some features will be limited. The prototype will demonstrate proof of concept and that the RWP can be achieved. Developers of the prototype will demonstrate this application to instructors and industry.

4. War of Brawns Prototype Description

The War of Brawns prototype will be similar to the real-world product, but with key differences. Account creation will not be functional and will only display the feature. Avatar creation will only include the default avatar to demonstrate the prototype. The options feature will be displayed but will not have active buttons except for the input of player information. The workout challenges feature will only offer selected compiled workouts instead of a database of different workouts. Creation of custom workout challenges will not be functional. Tracking of player information will be functional, but preset data is stored already using a preset gamer profile. The diet journal feature will be functional, but only with the use of nutritional data from the WoB database instead of the nutritional database. The ECG data from the smartwatch will be simulated instead of being inputted in from an actual smartwatch. Workout tutorials will not be

functional. The verification interpretation will only use the simulated ECG data and not GPS. Blacklisting of gamers and the blacksmith will not be functional for the prototype because it is not needed to demonstrate the prototype. Gaming HUD, In-game Menu, Store, Tower, Enemy AI, character inventory and equipment will be functional, but limited in items and capabilities.

4.1. Prototype Architecture (Hardware/Software)

The structure of the prototype will be similar to the actual product. The capabilities of the product are either reduced or simulated in the prototype but will not affect the structure of the prototype. The gamer will use their smartphone to access the application in Figure 3 and it will show the GUI being accessed first. The GUI will allow gamers to access components of the application inside the War of Brawns box in Figure 3 which includes gameplay, user accounts, and verification interpretation.

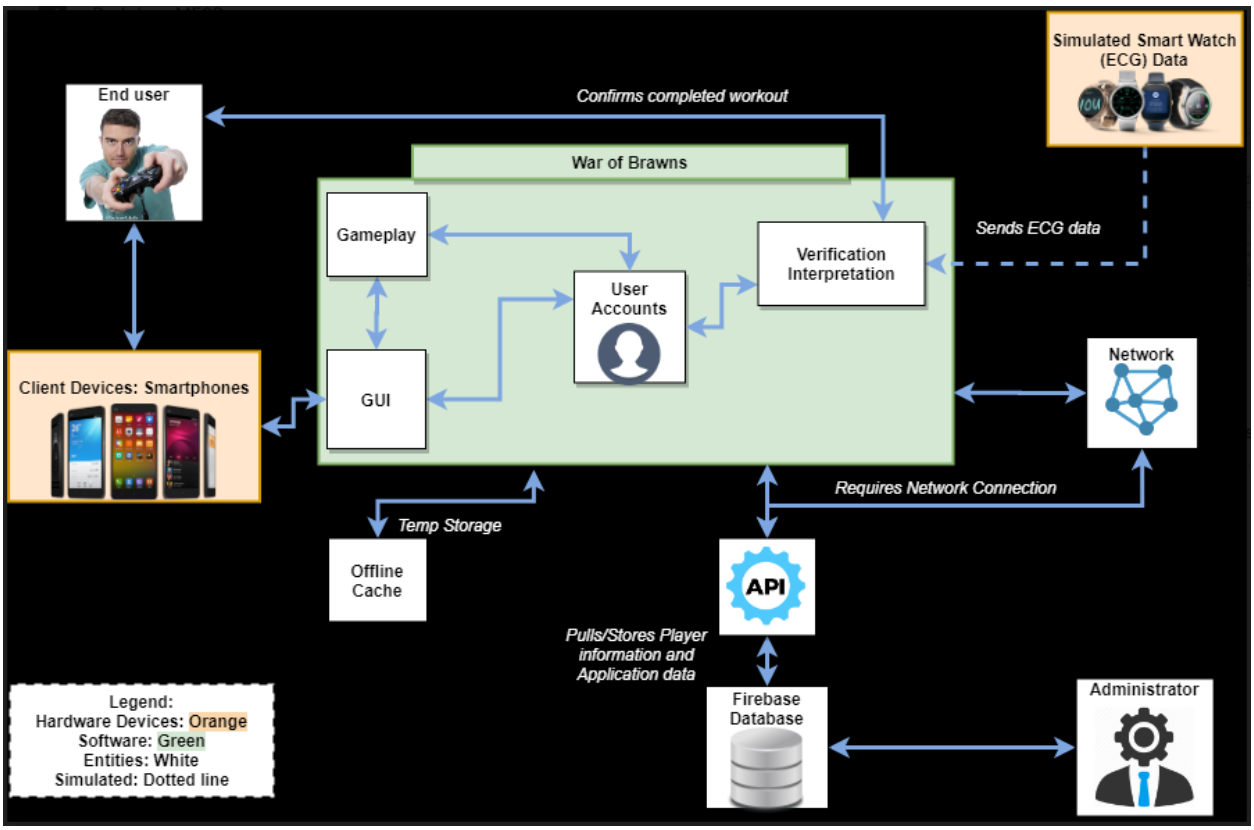

Figure 3: War of Brawns Prototype Major Functional Components Diagram

The verification interpretation will take in data from the simulated smartwatch ECG. The algorithm that uses the ECG data will check and verify that actual physical activity is being done. War of Brawns will use an API to connect to the WoB managed database. The application will pull information about food items with their nutritional values such as calories, and vitamins from the WoB database when the gamer records their daily meals. The WoB managed database will pull and store data regarding the gamers personal information and information relevant to the application such as gameplay items. The administrator will have direct access to the WoB managed database through an administrator account to edit and fix issues.

The software used to develop the prototype will be Unity, Eclipse, and Visual Studios. The prototype will also use a Firebase API to connect to the WoB managed database. The WoB managed database for the prototype will be developed using the Cloud Storage for Firebase.

The primary languages used to develop the prototype will be C# and JavaScript. These languages will be used to develop the GUI and app features of War of Brawns. Android will be the target for our prototype deployment platform.

4.2. Prototype Features and Capabilities

The prototype will demonstrates the proof of concept that gamers can use this application to start an alternative healthy lifestyle around their gaming addiction. The proof of concept is significant because it means that it will be possible for gaming addicts to become healthier using this application. Functional goals and objectives of the War of Brawns prototype compared to the RWP are summarized in Table 1.

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Functional Element	RWP	Prototype
Account Creation page	Functional	Not functional - Only show display of page
Login page	Functional	Functional
Home Page	Functional	Functional
Options Page	Functional	Partially functional - options will be displayed, but not active. Will allow input of player info.
Avatar Creation	Functional	Not functional - Default avatar will only be displayed to demonstrate prototype
Challenges Page	Functional	Partially functional - will include compiled exercises, but not a whole database
Diet Journal Page	Functional	Functional
Weight Progression Page	Functional	Functional - Fake data will be used to display functionality
Gaming HUD	Functional	Functional - limited display
In Game Menu	Functional	Functional - limited options
Blacksmith	Functional	Not Functional
Store	Functional	Functional - limited items
Tower	Functional	Functional - limited (one dungeon)
Gaming Controls	Functional	Functional
Suggests daily caloric intake	Functional	Functional
Input of Gamer information into database	Functional	Functional - Fake data is stored already, but new data can be inputted through options page
Workout Tutorials	Functional	Not functional
Tracking in-game rewards(Ex. in-game currency) of gamer	Functional	Functional
Verification interpretation of accountability of gamer	Functional	Partially Functional - uses simulated data of the gamers heart rate, but won't use google maps api
Post-exercise XP distribution for gamer stats	Functional	Functional
Tracking of gamers diet journal data	Functional	Functional
Creation of custom meal entry	Functional	Functional
Creation of custom workout challenge	Functional	Not functional
Combat system	Functional	Functional
Character inventory and equipment	Functional	Functional - limited items and equipment
Enemy AI	Functional	Functional - limited
Usage of Nutritional database for food data in diet journal	Functional	Not functional - fake data will be used to display functionality
Stores body measurements	Functional	Functional - Fake data is stored already, but new data can be inputted through options page
Tracks weight progress	Functional	Functional - Fake data is stored already, but new data can be inputted through options page
Tracks calorie intake	Functional	Functional - limited with preset data
Stores player stats	Functional	Functional
Stores player inventory	Functional	Functional
Tracks player progression	Functional	Functional

Stores player credentials	Functional	Functional - limited using preset(one user) data
Administrator Account	Functional	Functional - will allow the administrator to change values of gamers in database
Blacklisting of gamers	Functional	Not functional
Usage of smartwatch ECG to track heart rate	Functional	Simulated - use simulated data of smartwatch ECG
Usage of smartphone Google maps API to track location	Functional	Not functional
Integration of sounds and music	Functional	Functional

Table 1: Real World Product vs Prototype Table Comparison

4.3. Prototype Development Challenges

There are some development challenges that the development team will need to take into account or exclude from the prototype. A challenge for the calibration of ECG interpretation is the resting heart rate for different individuals and negative exercise detection. Missing features include functional blacksmith, real ECG data, database of supported equipment, exercise tutorials, open world, and in-game items. These features are missing because of either inadequate time, resources, knowledge, and experience. Platforms or browsers that are unsupported are iOS and web applications.

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Glossary

Basal Metabolic Rate (BMR): The number of calories required to keep the body functioning at rest. Essentially, how many calories are burned in a day not including physical activity.

Electrocardiogram (ECG): A test that measures the electrical activity of the heartbeat. With each beat, an electrical impulse (or "wave") travels through the heart.

Experience Points (XP): A unit of measurement to quantify an avatar's progression through a game. Once a sufficient amount of experience points are accumulated, the player or a certain statistic "levels up". The higher the level, the stronger the avatar.

Game Artificial Intelligence (AI): Artificial intelligence is used to generate responsive, adaptive or intelligent behaviors primarily in non-player characters similar to human-like intelligence.

Game Avatar: A personalized graphical illustration that represents a computer user, or a character or alter ego that represents that user.

Gaming Disorder: Pattern of persistent or recurrent gaming behavior in which people lose control of their gaming behavior, give priority to gaming over other interests and activities, and continue gaming despite negative consequences, such as impairments in their family relationships, social lives, work duties or other areas.

Heads Up Display (HUD): The display area where players can see their character's vital statistics such as current health, bonus attributes, armor level, ammunition count, and more.

Mifflin-St Jeor Formula: Formula that calculates BMR from age, sex, height, and weight

Role-playing Game (RPG): Type of game in which players assume the roles of characters.

Total Daily Energy Expenditure (TDEE): The total amount of calories burned in a day including basic body functions and physical activity

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