Team: Unit Team

CS 485 – Human Centered Computing

October 15, 2019

Team Project Sequence: Needs and Requirements

I. Introduction

The following document will spell out, at a high level, what features must be incorporated into the design of *Zombie Fit!* The document will also help identity the problem space that the design will cover and adhere to, as well as answer questions about what, how, and why. This will be accomplished by using gathered data on potential users and research of existing designs to provide a set of needs and requirements that will help us identify the tasks to be performed by users. It is important to note that this document will not provide designs but rather justifications for them later.

II. The What, How, and Why

The following three potential and specific users will be kept in mind during the design of *Zombie Fit!*: video game players, exercise enthusiasts, and unmotivated individuals. More specifically, video game players are individuals who regularly play video games during their free time, exercise enthusiasts are individuals who regularly do exercise or have a weekly exercise routine, and unmotivated individuals are those who do not exercise regularly due to a lack of motivation. In essence, this document tries to understand as much as possible about these potential users, including their activities and how the system being developed can "support them in achieving their goal" (Preece, Rogers, & Sharp, 2015).

In order to establish needs and requirements, *Unit Team* employed their data gathering plan that was approved by Dr. Hamilton. This data gathering plan resulted in more than 20 questionnaires and 15 interviews from different participants. After the raw data was collected and compiled, each individual team member analyzed it and looked for potential patterns. It is important to use these patterns and other significant characteristics of potential users to establish needs and requirements. That is, if data is not gathered and used to support essential features, *Unit Team* might waste time implementing unnecessary functionalities that lie outside the scope of the problem.

III. Analysis of Existing Designs

For this particular project, an analysis on *Wii Fit U* (see Figure 1) will be incorporated into the design since both systems have a similar goal: allowing users to exercise at home using hand-held controllers and video games. It is worth noting that some participants did mentioned, while being interviewed, that there already exists a video game in the market that allows them to do exercise at home (i.e. the *Wii Fit*). Because of these responses, it is only logical to perform an analysis on the *Wii Fit U* in order to better define our problem space.

Figure 1 – [*Wii Fit U* in action. As the figure illustrates, the system allows users to exercise, while playing a video game, by using hand-held controllers.] Retrieved from https://www.trustedreviews.com/reviews/wii-fit-u

While researching the functionalities that are provided by *Wii Fit U*, several important and applicable ones were documented for future use. The following list provides relevant information that was gathered while analyzing *Wii Fit U*, an existing system that is designed to incorporate video games and exercising techniques.

- *Calorie Meter* – A calorie counter is provided by the system. This calorie counter keeps track of how many calories have been burned by a particular user. The calories burned are calculated by using Metabolic Equivalent Tasks (METs), which indicate "the intensity of an activity" ("Manual Wii Fit U", 2013). This is of great importance for exercise enthusiasts since they might want to keep track of how many calories they burned during each exercise session.

- *Step Counter* – A step counter is provided by the system. This step counter "records the number of steps you take in a day" while using the system ("Manual Wii Fit U", 2013). Allowing users to measure how many steps they take while using the system is of great advantage since it allows them to incorporate this number into the total steps they take on a given day (e.g. half of the recommended daily steps might have been taken outside in nature while the other half during *Wii Fit U* gameplay).

- *Progress Graphs* – A series of progress graphs are provided by the system. These graphs allow users to check progress in certain areas such as BMI and calories burned ("Manual Wii Fit U", 2013). Graphs, if done correctly, are a great way to visually represent data since it allows users to see patterns, as well as long-term exercise behaviors.

- *Active Minutes* – The system provides the total number of minutes played by each user. Displaying the total number of usage minutes might allow users to determine if they are underusing or overusing the system, which can lead to them to adjust their exercise routines accordingly.

- *Personal Trainer* – A virtual personal trainer is provided by the system. This virtual trainer will "view routines tailored to your choice of exercise time or calories burned …[and] choose [one] or you!" ("Manual Wii Fit U", 2013). This might be a good feature to include in a system since it guides users in choosing appropriate exercise routines.

- *Goals* – The system allows users to set their own goals, such as how many calories to burn or how many steps to take each week. If these goals are met, then "trophies [are] added to the main menu" ("Manual Wii Fit U", 2013). Allowing users to set their own personal goals and rewarding them (even with non-monitory things such as a virtual trophy) might make them feel more accomplished about their exercise routines.

- *Multiple Users / Profiles* – The system allows multiple users and saves relevant data for each and every one of them. This is extremely important since it allows different users to track their own individual exercise progress.

It is worth noting that not all of these functionalities will be implemented. Nevertheless, they do provide relevant underlying ideas that can serve as a basis for future research.

IV. Essential Features / Set of Needs and Requirements Backed by Data

A requirement is defined as a "statement about an intended product that specifies what it should do or how it should perform" (Preece, Rogers, & Sharp, 2015). Requirements should not only be specific, but also unambiguous and clear. The following list of requirements were derived from the data gathered and lie inside the project's scope.

System Functional Requirements

The system should:

Requirement	Supporting Data	Comment / Description
Promote Healthy Lifestyles ***(essential feature)***	Many participants stated in their interviews and questionnaires that they do desire to live a healthy lifestyle.	Promoting a healthy lifestyle is the main purpose of the system and should be implemented when designed.
Display a Progress Indicator ***(essential feature)***	The *Wii Fit U* allows users to view their exercise progress.	Allowing users to view their exercise progress is important since it allows them to see patterns and long-term exercise behaviors.
Motivate People to Exercise ***(essential feature)***	Many participants stated in their interviews and questionnaires that they	The game should motivate users to exercise more (see *Be Fun / Interesting* requirement).

	sometimes fail to find motivation to exercise.	
Resemble Role Playing Games (RPG)	Many participants disclosed that their favorite video game type is RPG.	Original brainstorming designs of *Zombie Fit!* emphasized that the system should allow users to control the actions of a game character.
Provide Virtual Rewards	Most participants stated in their interviews and questionnaires that they like to exercise to feel "accomplished."	Rewarding users with virtual rewards (such as virtual trophies) after they achieve their goals might make them feel more accomplished about their exercise routines.
Be Fun / Interesting	A lot of participants stated in their interviews and questionnaires that they do not like to exercise since they consider the activity as "boring" or "unfun."	The system must be fun and interesting to use. More pleasurable experiences might directly correlate to more usage of the system, and thus more motivation to exercise.
Challenge Users Physically	Some participants stated that they like to exercise since it challenges them physically.	The system should challenge users physically during gameplay.
Be Time Efficient	Many participants stated in their interviews and questionnaires that they sometimes do not have enough time to exercise.	The system should use the time of individuals who are always busy or on the go efficiently.

System Non-Functional Requirements

The system should:

Requirement	Supporting Data	Comment / Description
Be Convenient to Use ***(essential feature)***	Many participants stated in their interviews and questionnaires that they sometimes find it inconvenient to go to the gym.	The system should be easy to use and straightforward.
Be Safe ***(essential feature)***	Accidents can occur if users use a virtual reality headset to play a game.	The system should, from time to time, allow users to "recalibrate" with the real world.

Not Be Too Distracting	A few participants stated during their interviews that they do not like to exercise at home since there are too many distractions.	The main objective of the game is to exercise while having fun; not vice-versa. Displaying too many things on the virtual reality headset can lead to distractions.
Not Be Too Stressful	Some participants stated during their interviews that they find exercising at the gym too stressful.	The system should not stress users (i.e. see the *Be Convenient to Use* requirement).
Allow For Privacy	A lot of participants stated in their interviews that they do not like to exercise in gyms since they always feel "judged."	The user should not require any assistance from other "outside" individuals while using the system.

User Characteristics – The majority of users will probably be video game players, exercise enthusiasts, and unmotivated individuals who are looking for alternative ways to exercise (see introduction section).

Usability Goals – The product should be easy to use and learn.

Environment – We assume that users will use the system inside their homes only. It is worth noting that there are far more dangers to control if a user decides to use a virtual reality headset outdoors.

Project Drivers – The purpose of the product is to motivate people to exercise more.

Project Constrains – Low and high-fidelity prototypes should be constructed before the Fall 2019 semester ends.

V. Volere Shell

The following two Volere Shells describe two design requirements:

Requirement #: 01 *Requirement Type:* Functional Requirement *Event / Use case #:* 1

Description: The product shall be able to read user movements/motion.

Rationale: Body movements are essential to exercise. Without the movements being detected, the player will not be able to interact with the game.

Source: Unit Team

Fit criterion: The system will successfully be able to detect players' hand movements.

Customer Satisfaction: 5 *Customer Dissatisfaction:* 5

Dependencies: All requirements requiring movement detection. *Conflicts:* None

Supporting Materials: Terms and definitions in section III, Unit Team Concept Presentation

History: Created October 2019

Requirement #: 02 *Requirement Type:* Functional Requirements *Event / Use case #:* 1

Description: The system will read certain movements that the user does and will map them to specific interactions with the game.

Rationale: Specific movements need to get mapped to certain actions in the game. This will allow users to interact with the game instead of just observing the virtual environment.

Source: Unit Team

Fit criterion: The system will successfully perform an action when a specific movement is done. For example, the system will map a user physically "punching the air" to "punching a zombie" in the virtual environment.

Customer Satisfaction: 5 *Customer Dissatisfaction:* 5

Dependencies: None *Conflicts:* None

Supporting Materials: Terms and definitions in section III, Unit Team Concept Presentation

History: Created October 2019

VI. Task Descriptions

This section of the document will identify the tasks that need to be performed by potential users of our system. This will be accomplished by producing the following two scenarios and essential use case:

- *Scenario One – I am a student that has attempted to get a gym membership and just can't seem to stay a member for more than a week at a time. I would rather be at home where I can enjoy hours of video games, even though I know this a factor of my weight gain and lack of motivation. I wish there was an alternative approach to exercise that incorporates exercise and video games.*

- *Scenario Two – I am a parent with an active gym membership. I spend an hour at the gym every day. I run in the morning. I try to stay active as much as possible and try to set an example for my children. However, my drive to workout has lessened. I am not as interested in my routine because it has become just that, a routine. I wish I could work out at home and change the difficultly of my exercise routine. I also wish I could incorporate my workout routine with my children and have fun at the same time.*

- *Essential Use Case One*

User Intention	System Responsibility
Unmotivated by traditional workouts	Tries *Zombie Fit!*
Adjusts gear for comfort	System calibrates
Agrees to risks	Tutorial
Looks down a hall	System "walks" user through halls
Runs in place	System "runs" game character through halls
Squats	System "ducks" game character from zombies
Punches air	System makes game character "hit" zombies
Reaches for something	System "grabs" item accordingly
User finishes level	System informs user to take his or her gear off and "recalibrate" with real world

VII. Conclusion

Gathering data and analyzing it for specific patterns and themes has allowed *Unit Team* to have a better grasp on what features must be incorporated into the design. These needs and requirements were also established thanks to research on *Wii Fit U*, which a system currently in the market that incorporates video games and exercise. Ultimately, this document allowed *Unit Team* to identify the problem space that the design will cover and provides justifications for future design choices.

VIII. References

Manual Wii Fit U. (2013). Retrieved October 14, 2019, from https://www.nintendo.com/consumer/downloads/manual-WiiU-Wii_Fit_U.pdf.

Preece, J., Rogers, Y., & Sharp, H. (2015). *Interaction Design: Beyond Human-Computer Interaction*. Chichester, West Sussex: John Wiley & Sons Ltd.