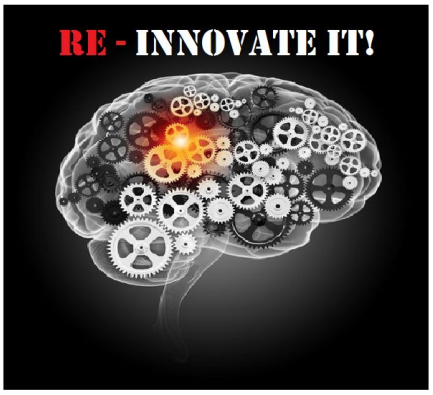
Life Skills 2 Design Report : A Minigame To Promote Nutrition for Children

Date: 01/29/2017

Team: Re-Innovate It!



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University of California, San Diego

ENG 100D | Brandon Reynante | Winter 2017

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1. Project Management

1.1 Background

Life Skills 2 will design a mini game that is educational and engaging for children from ages 5-10 years old. The Life Skills client is Angela Brannon-Baptiste. The founder and president of the non-profit organization *It's All About the Kids* Foundation. The mission of the foundation is to create innovative programs underserved communities of children in San Diego, in order to meaningfully improve the lives of less fortunate families and children.

1.2 Goal and Objective

For this project we will work along with Angela, to improve an existing web application created by past UC San Diego students. We will work to educate and promote essential life skills necessary for children from ages five and up in the form of a game app. The end result will be a functional mini game that encourages and educates players about nutrition.

Given the foundation from previous work done by other groups, our task capitalizes on previous mistakes and find new alternatives to make the game more engaging for children. By conducting more interviews and research, we hope to develop a game that promotes healthy eating habits which is an essential life skill that should be learned early on in life. We hope the game app allows players to learn the value of healthy food choices so that in real life they could apply those same decisions. In order to accomplish this task, we will incorporate a gameplay schema based on a dilemma many children encounter in their everyday lives which is, opting for a healthy or an unhealthy food choice. Also, we will work to make the game a fun experience where children can be educated, but at the same time interested in learning more about healthy food choices. We do not want to force a child to learn the information, but prefer that they learn as they enjoy the game. The constant gameplay will enhance the child's knowledge on nutrition and ability to distinguish which foods are best for them. In all, we hope that through this modern method we can reduce child obesity and improve child development in the future by employing a design that educates players about nutritional.

1.3 Approach

The goal of this project is to improve the concept of the *Food Runner* mini game from last year's life skills group, so it is essential to contact the previous team and check which desired features they have worked on and which features need improvement. Also, as we work on the project, our client liaison will contact Angela to better understand what kind of product she wanted and what other features should be added to this project. This will be accomplished by weekly email correspondence that will convey progress in design and implementation, and seek

feedback from the client. Ultimately the finished product will be integrated into the game by a previous team leader. Since the previous teams used the Unity game engine to develop the project, we will research Unity online, via mediums such as Coursera and a Unity workshop that is hosted by the UCSD VR Club. As we implement new features to the game, we will keep testing the game and asking for feedback from the end users of the project, so we can produce a final product that not only meets the needs of the present end users but also meets the needs of the future end users.

1.4 Schedule

We divide the whole project into detailed steps and assign key deadline to these steps. Some steps must start from week 2 and need to be done early such as team bonding since every team member needs to trust, believe, become familiar with each other. Also, establishing meeting times, role assignments and drafting project management needs to be completed before Week 4 in order to clarify individual and team responsibilities and expectations.

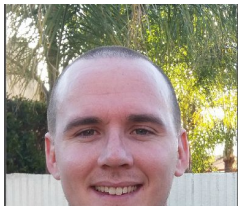
Starting Week 3, we need to keep in touch with our client throughout the quarter to provide updates in new ideas, propose improvements, and to give general progress reports as well as to communicate any concerns. In the following weeks, we will work on interviews, research our topic, brainstorm ideas, implement improvements and finish our problem definition. This research will help to define what we need to do and how can we achieve the goal. Following this, we can improve the *Food Runner* mini game by create new objects and additional features according the findings of our research and interview results.

Moreover, the notebook and the takeaways will be worked on during team meetings, lectures, and during other team discussions about the project. Presentations will be made during class which is a good opportunity to get more feedback and improvement.

Table 1.1 Gnatt Chart, *See Appendix*

1.5 Human Resources

Ariel Rodriguez Team Leader | acr012@ucsd.edu
Senior in Cognitive and Behavioral Neuroscience, with a minor in Computer Science at the University of California, San Diego. The team lead is responsible for managing project deadlines, as well as facilitating a collaborative and innovative group culture. Also plays on UCSD Women's Rugby, works as an OASIS Peer Mentor in support of underrepresented student populations at UCSD, and is passionate about food and travel.



Robert Bates Presentation Master | rbates@ucsd.edu

3rd year transfer student majoring in Computer Science at University of California, San Diego. As the presentation master he is responsible for organizing and presenting our pitch and product. Enjoys helping others and is passionate about software programming. Enjoys sports of all kinds, outdoors and video games.

Fengqi(Nicole) Yang Researcher | fey002@ucsd.edu
Senior in Management Science, minor Computer Science in University of California, San Diego.
Researcher in the team and responsible for provide all resources that the team as well as the project need. Passionate about data analysis and education. Yoga lover and tea lover.

Jihoon You Report Manager | jiy043@ucsd.edu
3rd in Computer Science major at University of California, San Diego.
Report Manager in the team. Responsible for managing the report.
Passionate about programming and software development.

Phillip Zhou Client Liaison | phzhou@ucsd.edu

4th year Computer Science major, Business minor student at UC San Diego. Responsible for keeping communications with the client and for general project design tasks. Passionate about software development and digital art.

Justin Cai Researcher | Justin.cai101@gmail.com
2nd year Computer Engineering major. Responsible for researching ideas and information necessary to improve and produce a useful final product. Able to contribute to software development and project support. Enjoys longboarding, badminton, and video games.

Anthony Ayon Designer | aiayon@ucsd.edu
3rd year Cognitive Science major with specialization in Human Computer Interaction. Responsible for the design of the project and developing prototypes to facilitate the navigation of the web game. I am

passionate about finding new methods or approaches to solve problems present in our current world. Also I enjoy traveling to new places and learning about distinct cultures.

1.6 Stakeholder Analysis

Brandon Reynante (Ally)

As the person that teaches and guides the teams for ENG 100D, Professor Reynante has a strong interest in maintaining strict standards in the work and results that each ENG 100D team gives, as he is ultimately responsible for fulfilling the needs of the clients that each team has been assigned to. In addition to the client, Brandon is also responsible for assigning task deadlines to each team, ensuring that the end product is shipped out on time. However, Brandon gives each team a lot of freedom in terms of the direction that they want to take in pushing the end product out, so we can conclude that Brandon is a low-influence, high-interest stakeholder, and should be continually informed on the progress of the project.

Angela Brannon (Ally)

Angela Brannon is our client for ENG 100D. She is also the founder and president of the *It's All About the Kids* non-profit organization. As our client, she helps the members of our team pick the right direction to head in. She can do this through constant communication and feedback between us and her. In addition to her influence on our team, she has great interest in the results of our project, as the game that we develop will be used by members in her organization. We can then conclude that Angela is both a high-influence, high-interest stakeholder, and should be managed closely.

Re-Innovate It! Team (Ally)

Our ENG 100D team are stakeholders in this project as well. Since we are responsible for developing and pushing the end product out to the client, we have great influence over the project. In addition, our grades and the client both depend on the performance of the team, so we also have great interest in performing well on this project. As a result, our team should manage itself closely, as we are both high-influence and high-interest.

Connor Smith (Ally)

Connor Smith is an experienced game developer that primarily developed that Like Skills Game on a previous team. Connor is a low influence but high interest stakeholders that is a resource for guidance about the direction of the game design as well as the technical implementation of unity game programming, he should be kept informed about aspects of the game that the Life Skills 2 game implementation .

Competitors (Opponents)

Competitors can be broadly classified as other games (nutritional/educational or recreational) that would compete for the attention of children. These games may distract children and decrease their playtime, which would negatively impact the educational

effectiveness of the game. Also, other miscellaneous opponents that should be considered ae advertisements and store designs that promote unhealthy eating habits.

End Users (Indifferent)

The end users of our project consist of people that will play the game that we develop and those that might promote its use, (i.e. players: children, promoters: teachers and parents). They will not have a lot of influence on the development of the product, but they may have some interest in the product. The best way interact with the end users is to implement a design that keeps user engaged while maintaining a strong education element to gameplay.

Figure 1.2, See Appendix: Stakeholder Analysis Graph, Analysis matrix of users and persons invested in the game

2. Problem Definition

2.1 Problem Statement

Children need a way to be educated about what foods are unhealthy and healthy so that they do not suffer long-term effects on health and choose the immediate gratification unhealthy food provides.

2.2 History

The issue with unhealthy foods, which typically range from fast foods found at burger joints to snacks found in at supermarkets, is the purposely addictive chemical makeup as well as the convenience they provide. According to Heather Miller, a writer for Prevention, sugar is a large part of why unhealthy foods can be addictive to consumers. Sugar, and more specifically fructose, can generate dopamine within the consumer's brain. Too much of it, and the brain will start to develop a resistance to the sugar, which means that the consumer will require more and more sugar to achieve the same amount of dopamine, thus leading to addiction. In addition to psychological addiction to fast food, the sugars within them can also cause the liver to accumulate fat, which causes insulin to have a reduced effect on it. This can lead to higher blood pressure, diabetes, and further fat buildup within the body.

Because of the impact sugars within unhealthy foods can have on the consumer's body, the appeal of unhealthy foods is directly related to broader issues such as obesity, addiction, and a lack of proper education. Within addiction, sugar draws parallels with commonly abused drugs such as cocaine and heroin in terms of how the brain treats these chemicals. Limiting the amount of sugar that one consumes on a daily basis would help prevent excessive damage to the dopamine receptors within their brain.

However, the restricted consumption of these unhealthy foods cannot happen without the proper knowledge of their impacts in the first place. It is important to educate people on the possible side-effects that prolonged consumption of fast foods and snacks have on their body. Describing their impacts through numbers typically does not allow people to see their real

impact. However, visually showing the impact of unhealthy foods, such as through a game, can have a much stronger impact on the people seeing it. For that reason, a visual medium like a game can be very effective in teaching people on the disadvantages of unhealthy eating habits.

We will be working on the Life Skills game, specifically the Food Runner minigame. The Life Skills game is a project that has been worked on by past ENG 100D teams. They had the same goal as us-to teach children, specifically underprivileged children, skills that would help them go further in life even if they were not getting the proper education now. One of the past students who had worked on the Life Skills game was Conner Smith. As he was heavily involved in its development, we looked to him as a resource. He had coded much of the Food Runner game, which did not really have a functioning AI and which still had many gameplay quirks. Connor essentially passed the baton to our team to continue developing this educational minigame.

2.3 User Profile(s)

It's All About the Kids target population for the Food Runner mini game are defined as children from ages five to ten years old. At this age, children are typically in Kindergarten through the fifth grade (CDE, source 6). During which time they are developing critical life habits that will affect them throughout their primary education, and may even carry into their adult life. Nutrition is one of the most import factors when it comes to an individual's health. At ages five to ten years old, these children are still mostly dependent on their parents and their school dietary options. As of February 3rd, 2017 about 85.1% of children are recorded as having breakfast provided by their school nationally during 2016 (USDA, source 1). From this information one could conclude that much of our population relies to some extent on nutritional standards from their local school's lunch program. Given the need for improved nutritional education (see next section (2.4) for obesity statistics), this invaluable life skill could greatly benefit by 'gameifying' nutritional education in a manner that is both informative and enjoyable.

Since children from ages five to ten are still learning about nutrition and dietary effects, it's important to clarify the topics that they need to be educated on. In an interview, a teacher stated they believe children need to be taught how to select healthy foods, avoid unhealthy foods, and learn the impact of choosing unhealthy foods (Teacher Interview by Nicole, source 4). During interviews and observations it became clear that children in the age range previously stated are able to point out which foods are healthy versus unhealthy. However, they struggled when it came time for them to integrate this factual knowledge into practical use. While playing the Food Runner mini game one child repeatedly had her character eat the unhealthy foods, even after acknowledging that she understood those were the unhealthy choices and would not help her win (Child Interview by Ariel, source 3). Through this testing, we saw how the connection between unhealthy foods and how they affected people was unclear, and that the current Food Runner game did not adequately show this connection.

Example Persona:

-Child, age 6
-Lives in America, but is not from a high-income family
-Has some knowledge about which foods are good and bad.
-Enjoys playing video games
-Often does not make the healthy choice

When the interviewed children were asked for types of foods that they enjoy some of the options given were:	
Breakfast	egg, chorizo, muffin
Snacks	apple, yogurt, cheese, peanut butter
Lunch	pizza, tamales, chocolate milk
Dinner	hard boiled eggs, mac n cheese, pasta with butter and parmesan, peas

(Child Interviews/Observation by Ariel, Anthony, Phillip and Bo, sources 3, 7-10)

2.4 Context

Today, obesity is at a nationwide and worldwide high. The United States, in particular, has seen child obesity rates more than triple since the 70's (FRYAR). The age of processed foods mean that people are eating foods with unnaturally dense concentrations of sugars and fats. Fast foods and processed foods have been engineered this way in order to appeal to our natural preference for sweets and fats. This is because we, like many mammals, naturally seek out calorie dense foods, an adaptive trait useful for species survival, but less relevant in the modern day of food abundance. Our bodies are not equipped to handle such large intakes of singular nutrients; consequently, the extra calories are stored as fat. Such an unprecedented rise of our population's weight and obesity levels leads to many health risks.

Worldwide obesity rates have more than doubled after 1980. The 2014 year saw 1.9 billion overweight, and 600 million obese people around the globe. In addition America is one of the leading nations in terms of obesity levels. Nationally, over two thirds of adults of either

overweight or obese (NHANES). This problem affects all of our population and spans ethnicities. This is especially problematic among children. Overweight youths often keep their habits into adulthood. Today, one third of American children and teens are obese or overweight (American Heart Association). This upward trend of weight gain is present in youth and adults nationwide.

This weight gain can be attributed to many factors. People in developed countries like America are living more sedentary lifestyles. Many of the jobs and occupations nowadays are done behind a desk, burning very few calories. Modern marketing techniques from the food industry get us to buy bigger portions, and more products (Pollan). Many food establishments, especially fast food places offer huge "supersized" portions for a slightly higher price. Furthermore, processed and unhealthy foods comprised heavily of sugars and fats have become very inexpensive. When someone could go buy a whole day's worth of calories for mere dollars, buying healthy ingredients and cooking them yourself becomes a less appealing option. This heavily affects the people on the bottom of the socio-economic ladder. When funds are limited, getting the highest amount of calorie per dollar is a necessary action, even if those calories are not balance and are unhealthy (Pollan). America has created a food environment where becoming overweight and obese is to be expected, bringing the consequences of poor food choices along with it.

Being overweight is dangerous because it increases the likelihood of getting many diseases. Coronary heart disease, high blood pressure, strokes, type 2 diabetes and many other conditions can stem from being overweight. These conditions can lead to a premature death, lower quality of life, and many other effects (NHLBI).

To fight this problem, education is the most powerful combatant. When people make educated food choices, they can change their health situation. The food environment can only change when the population makes better choices for themselves.

We plan to implement our solution to be playable on any computer. This is a good technology choice because most families already have a computer so no other purchases need to be made. In addition, if a family does not have a computer, they might go to say, a public library to use one. This allows our game to be easily accessible.

Fig 2.1 See Appendix: Show upward trend of overweight children/adolescents in America

Fig 2.2 See Appendix
Overweight and Obesity in Adults 20 and older, USA, 2009-2010

Fig 2.3, See Appendix
Overweight and Obesity in Adults age 20 and older, USA, 2009-2010, Estimated Percentage by Race/Ethnicity

2.5 Objectives & Constraints

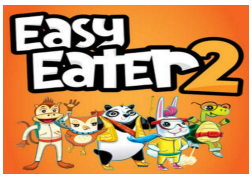
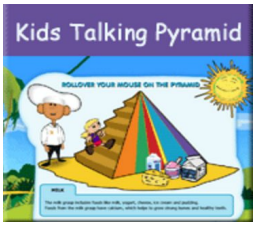
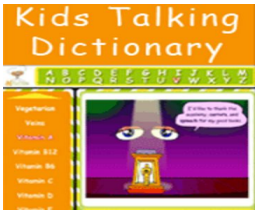
In creating our final product, we have end goals as well as constraints. We have desires of what we want our final game to look and act like, but also much consider we have limited resources (time, skill, etc).

Category	Specification
Functions and Use	Game must be easy to navigate and understand for children. They should be able to find all parts of the game in our UI without having to ask for help. The gameplay should be intuitive.
Culture	Kids may or may not be used to eating healthy foods. We need to account for this by making our game clear on what are good and bad foods.
Maintenance	Game must be easy to update and add features to. We must have good knowledge of the code base to take care of bugs.
Simplicity	Game objectives must challenge users by being simultaneously fun and education. We want to challenge kids' views on what are good and bad foods, and show them they need to avoid the bad ones.
Socio-economic	Appeal must be to all household economic status. We must take into account that often, poorer families are forced to buy cheaper, unhealthier food
Appeal	Design must be attractive to children
Technical	Gameplay must be free of bugs that intervene with gameplay, and our team must have a good understanding of the code in order to improve it.
Educational	Content must educate users on healthy food choices.

2.6 Existing Solutions Analysis

In order to have a general idea of what games about food already existed, and what flaws and successes they have, we looked at existing solution on the app store.

Solution	Solution Description	Pros	Cons
1.Easy Eater 2 APP	Kids are responsible for naming and keeping a pet healthy and happy by feeding it the same foods they eat.	1.Healthy choices earn "grub bucks" to buy app accessories and real world prizes which make them enjoyed 2.Teaching kids what is	1.Feeding pets is different feeding human ourselves, so some food maybe misleading 2.Not directly teach kids that which food are

		healthy food also teach them about nutrition in the food	healthy for human
2.Healthy Heroes APP 	Kids are responsible for saving the city from Hungry Monsters. Kids fend off the Hungry Monsters with healthy foods (fruits and vegetables). Junk foods anger the monsters and prevent advancement.	1.36+ levels in the game, which make kids more engaged in playing the game. 2.Kids learn to recognize healthy foods and eating habits throughout the game. 3.Directly show kids that there are bad results when choosing unhealthy food.	1.Kids know there is bad result when choosing health food but do not know the reason behind 2. Nutrition fact was not provided, better to let kids know why should they choose health food versus unhealthy one
3.Track and Field Game 	Kids play track and field game online while answer the question related to nutrition, you game over when choosing the wrong answer and win when choosing the right	1.Have fun while learning about low-fat milk, fruits and vegetables, and whole-grain foods. 2.Easy to understand the game rule	1.Questions was too hard , too many text to read which was more abstract than other games` 2.html game online, can not play through phones
4.The Food Pyramid 	A website game reviews the food groups and oils and the importance of daily activity. By clicking on the food pyramid, the chef will tell you the nutrition information	1.Very detailed and useful nutrition information regarding different kinds of food 2.Easy to play, just click the mouse and scroll down the picture	1.Not fun to play since not so much game element 2.Too many nutrition text to read, hard to remember and hard to engage
5. Nutrition Dictionary 	A more nutrition information provider and searching website for both parents and kids. Detailed nutrition fact of different food could be found on the website	1.Cover most food nutrition information, just like a dictionary 2. Can self search the food information by letters (A-Z) 3.Easy to manipulate, not too much rules	1.Too abstract education for kids. 2.Not fun for kids to play 3.Hard for them to remember

3. Concepts Draft

The ideas that team came up with focused both on building off of the existing game schema and creating new ideas that branch away from the current game. Designers emphasized creating prototypes that would promote learning in a highly intuitive manner and on creating a game concept that would be engaging. The team selected the Focus on Feedback prototype based on the Pugh chart scores for ease of use, visual appeal, feasibility, and functionality.

3.1 Concept Generation

3.1(a) **Focus on Feedback**

Tag Line:A game user interface that uses colors and other highly salient visual cues (i.e. emoji) to intuitively provide players with feedback and in-game corrections, prompting them to choose healthier food items in the game with the intention that this will teach players about the long and short-term effects of dietary decisions.

Gameplay: Focus on Feedback emphasizes short versus long-term effects of foods, while providing a variety of visual cues about the players progress in the game, and the nutritional impact of the items being collected.

Needs: This prototypes provides a high volume of visually intuitive cues that guide players toward making healthier dietary choices while interactively demonstrating the pros/cons of healthy/unhealthy foods in a challenging and engaging manner.

Unique Features: The scoring system and speed of the game changes depending on the food items collected. For example, when the player collects a healthy item the neutral items would increase in value and the speed shifts toward a more manageable speed. However unhealthy items would cause the value of the neutral items to detract from the player's score for a certain amount of time. The items are queued in a list so that the player can visually see which items are currently affecting the game and character emojis, and comments react to the items in play. As well as a progress marker that shows the player how far they are from the finish line.

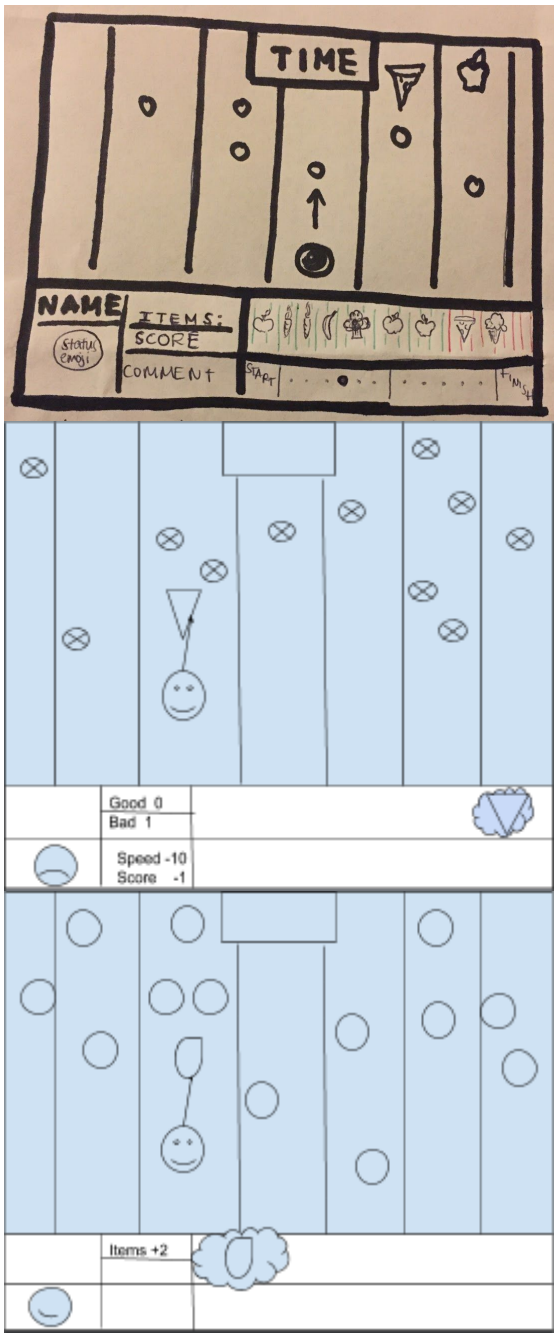


Fig 1. Focus on Feedback

3.1 (b) **Good or Bad**

Tagline: Eat healthy and win the race.

Game Play: At the start of the game, the players will see which types of food are good and which are bad. When the race starts the players will see the screen “Pic2”. The players will be given a choice to label the food as “good” or “bad” by clicking either the Bad or Good button. The avatar will either eat the food or throw it away respectively. At the top of the screen, there is a progress bar that shows how far each player has gotten. Correctly categorizing the food items will fill the progress bar faster. At the end of the race, a medal is given to each player based on who filled the progress bar first

Needs: Good or Bad is designed for young children that need nutritional education. It teaches them to recognize which types of food are good and bad. It is important for children to differentiate between types of healthy and unhealthy food at a young age to establish healthy eating habits.

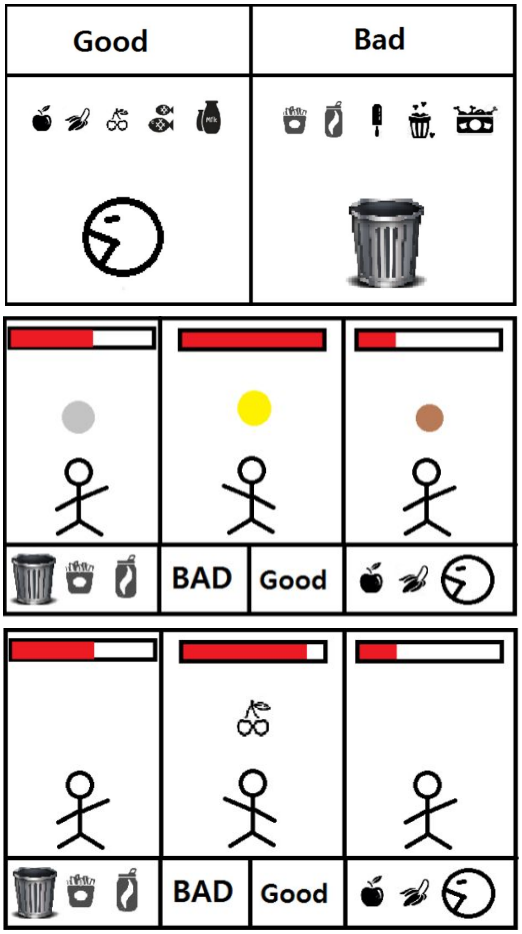
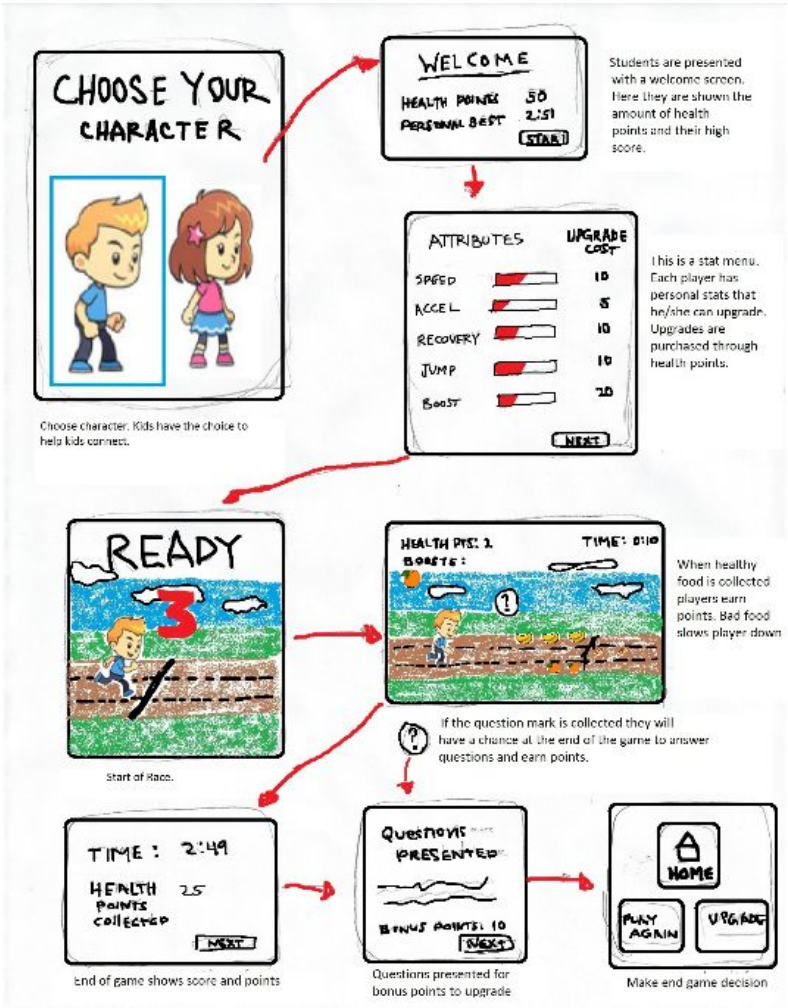


Fig 2. Good or Bad

Unique Features: Good or Bad motivates the player to correctly categorize healthy and unhealthy foods in competition with the other players. The prize(gold, silver, or bronze medal) at the end of game provides feedback on player performance. By implementing competition and a prize system based upon how well the player does, this game will teach children which types of food are healthy and unhealthy.

Fig 3.2. Health Builder



3.1 (c) **Health Builder**

Gameplay: When the user starts the game they are presented with a choice of characters. The player is then presented with a screen where they can choose to upgrade certains attributes, save Health Points (HP), and start the race. HP from previous games are used to upgrade attributes which have various effects

within the game. In game, the player must collect healthy food to earn HP. While racing, unhealthy foods slow the player down and bonus questions can be collected for a chance earn extra HP. Bonus questions are answered at the end of the race and award extra HP.
Needs - During testing, many kids found the game boring; this design addresses the need to create a more interactive and entertaining game. The kids are rewarded for collecting healthy foods while at the same time face consequences for choosing unhealthy ones subconsciously creating positive association with healthy foods. The game also enhances nutritional knowledge through in game questions.
Unique Features - Health Builder gameplay is switched to a side scroller version which capitalizes on the familiarity kids have playing current side scrolling games. Another key feature is a personalization/upgrade system which motivates the player to do well, adds an addictive nature and brings the kids back for multiple races. The bonus questions within the game also enhance in game mechanics while simultaneously teaching the children important nutritional facts.

3.2 Concept Evaluation

Criteria

Simplicity: This criteria is important because our clients are mainly children. It is important they are able to easily play the game without much assistance, so our product needs to be very user-friendly
Appeal: This criteria is important because we want our game to be appealing to children. Good visuals and design will engage our users and make them want to play the game.
Education: We want our game to be educational so that kids can make better choices and live healthier lives. Our game needs to promote those good choices
Efficiency: Our team has time and skill constraints. We need enough time to design, code, and test the game, so we cannot have a idea that will take too long to implement.

Prototype: "Focus On Feedback"

Simplicity:	**Appeal:**	**Education**	**Efficiency**
(+) Easy to follow game rules and concepts, with lots of visual representations.	(+) Images stand out and objectify their purpose. Items are attractive for users and there are a variety of them that can be collected. Also, the emoji function connects well with readers.	(+) Users taught to distinguish healthy and unhealthy foods, by demonstrating the effects of food items that users encounter in daily lives.	(+) Connects with previous game concepts, using similar features to build off of game. The simplicity of design structure facilitates programming.

(-) Bottom tools may cause loss of attention to gameplay. Fast food items effect may lead to confusion of young users.	(-) Change neutral items to something more attractive(figures) and have the character be an actual person.	(-) Shows the nutritional value of some foods and teach about healthy portion sizes.	(-) Increase/decrease speeds may cause game to glitch.
Questions:What is the average pace of the game? What is the purpose of the healthy/unhealthy bar?	Questions: How long will the game be?	Questions: Will there be any nutritional facts shown after the game? Is the user expected to know which are healthy foods? How much will neutral items be worth after healthy/unhealthy items?	Questions: Will it be necessary to restart the entire code of game? How do you plan to change emoji status? Will it be a normal human face?
Ideas: Move status emoji to top of screen, add more healthy/unhealthy items at a 5:1 neutral ratio.	Ideas: Color is an essential component of appeal to the game, use current emojis for the status, and offer rewards for the points obtained.	Ideas: Integrate non-typical unhealthy foods and increase the size of healthy foods with more nutritional value.	Ideas: Add simpler items in healthy/unhealthy bar, and since running screen will be smaller need to decrease speed of the game.

Prototype: "Good or Bad"

Simplicity:	**Appeal:**	**Education**	**Efficiency**
(+) Simple design - the players only need to sort foods by their	(+) Incredibly simple - simpler games are	(+) Image representations of the foods allows the	

general nutritional category.	easier to pick up and keep playing.	players to more easily associate them with healthy versus unhealthy categories.	
(-) The UI of the game is not incredibly intuitive in conveying the necessary information to the players, especially since this seems to be a game that utilizes multiplayer.	(-) Needs more incentives for the player to keep playing.	(-) List of good versus bad foods is not comprehensive - may need more foods than the ones listed.	
Questions: What if the players cannot remember which foods are good, and which foods are bad? What kind of information is the bottom section of the UI trying to convey to the player?	Questions: Are there any incentives that tell the players that they're doing well, besides the progress bar?	Questions: What if the player is from a different culture, where the foods that are common in that culture are not shown in the list that is given?	
Ideas: If the bottom segment of the UI is a list of good and bad foods, it may be better to move the list of foods to somewhere else in the UI. For example, have two bars, each bar containing good	Ideas: There should be some kind of win streak that allows the players to gain an additional multiplier if they have picked the good foods for a consecutive number of times.	Ideas: Include more foods, but also include the names of the foods as labels below the images.	

versus bad foods, at the top middle of the screen.			

Prototype: "Health Builder"

Simplicity:	**Appeal:**	**Education**	**Efficiency**
(+) Easy to understand the rules of the game, award health points when choosing healthy food and get punished when not.	(+) It is entertaining while playing the game and more attractive when adding the points. different character etc.	(+) Users can gain useful information when playing the game and can detailed education when answering the question.	(+) Based on the main function of previous version of game, and the general frame do not need to be changed.
(-) Difficult for the kids to understand the difference in character	(-) Need some rewards at the end when sum up to certain points?	(-) Questions showed up may disrupt the player when they just "running" in the game.	(-) Need spend efforts in building up different character and made different questions.
Questions:What is the main difference in choosing different character in the game except for the features like speed etc? What other key differences in these characters such as information gained?	Questions: Is there any different difficulty level?	Questions: what is the difficulty range of the questions?	

Ideas: Add more difference in choosing different character such as when choose "girl player", the question presented may includes any nutrition educational information related to girl's daily life.	Ideas: Divide the game into several difficulty level and set up different rewards for them.		

3.3 Concept Selection

Pugh Chart for Evaluation of Best Food Runner Concept

Criteria	**Weight**	**Prototype 1** ***(Baseline - Food Runner)***	**Prototype 2** ***Focus on Feedback***	**Prototype 3** ***Good or Bad***	**Prototype 4** ***Health Builder***
Simplicity	4	0	+1	+1	+1
Appeal	5	0	+1	-1	+2
Functionality/ Education	6	0	+1	+1	+1
Efficiency	7	0	+1	+1	-1
	Total	0	4 + 5 + 7 + 6	4 - 5 + 7 + 6	4 + 5(2) - 7 + 6
	Weighted Total	0	+22	+12	+13

Because **Focus on Feedback** had the highest points based on our weighting, it is our chosen concept!

4. Analysis and Testing

4.1 Desirability & Usability

People Tested

To test out new design concept for the web game "Food Runner," we developed a paper prototype that demonstrated the main functions of the game. In order to test our new design, we had three children ages 8-10 years old, one parent and one college student play with the game's paper prototype. The three children will serve as our targeted users where their feedback will be an essential to the development of the game design and functions. The purpose of testing both a parent and college student is to reduce the likelihood of receiving bias answers from the children tested. Both adults would provide constructive feedback on whether the game is appropriate for children or not.

Tested	Age
Child 1: Alan	9 yrs
Child 2: Brian	8 1/2 yrs
Child 3: Christopher	10 yrs

Tested	Age
Parent: Mary	48 yrs
College Student: Sergio	21 yrs

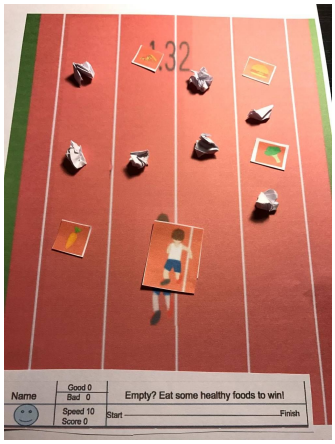
***Mary is a mother of 2 children ages 9 and 5 years old*

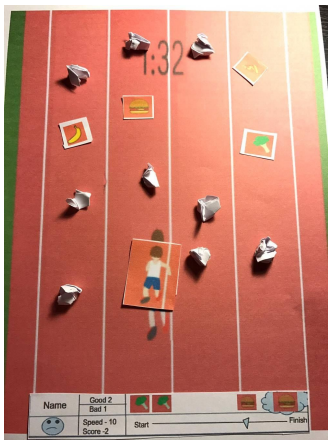
***Sergio is a computer science major and experienced gamer*

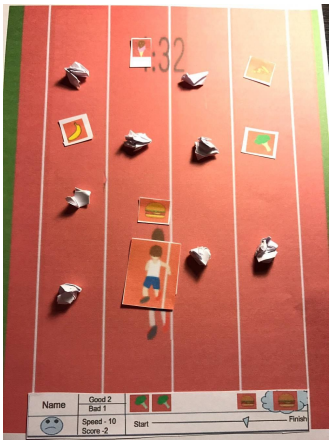
Prototype

Since we used a paper based prototype on a game that plans to have different speeds, we developed several cut outs that would demonstrate the progress of the game as the user moved the character. In other words, objects such as vegetables, fast food and neutral items were placed around the track and the user had to move the character to acquire them. Then we manually removed them and placed another random item as the user progressed through the field track. In general, this system provides the user with the main concept of the game and mechanics required to obtain maximum points. The user also had a limited time gap of two minutes to obtain as much points as possible. To prevent the user from getting items faster than what we could manually change in the track, movements were constrained to one lane change per item captured. By the end of the game trial, the tester would count the total points accumulated from that run. One important fact to mention was that, if the user caught a fast food item, he was only given one-fourth of points for each item obtained in the next five seconds as a form to simulate the actual game

concept.







***These are a couple images of the paper prototype used for testing*

"Focus on Feedback" (average of all feedback)

Positive (+)	Need to Improve(-)	Questions	Ideas
Concept easy to understand and visually more attractive, good method of getting points, emojis are a good way to know how I am doing, "[neutral items] are easier to get than other stuff"	Prototype was going at slow pace, to many things to do at once, could not see the purpose of bottom table	Why is the character running faster when getting fast food? Can I keep my points after game is over? What happens if I can't get vegetables while playing? What if I(or child) already knows which ones are good and bad? What did I get if I get top points?	Play against other players, have the character jump over some fast foods, have a bigger selection of food items

Limitations:

Some of the limitations we encountered involved catching up with the actual speed desired in the web game. Due to constant changes and movements of items, the speed of the game was drastically reduced. In many occasions, losing the focus of many participants while playing. Also another setback was the inability to demonstrate users how many points they had accumulated while they were playing. Points had to be added up at the end of the game after a full count was done of items obtained. Since the prototype was put on a regular size paper, space was very limited to the user who had to wait or either go back if he moved to far up. As a result, movement could not be accurately represented through the use of this prototype. The cut outs of items would also get displaced while the game was in progress causing delays and in some cases confusion.

Desirability

Based on the reactions and feedback obtained after the prototype runs, the users enjoyed the overall design and found it to be both interesting and unique. Even though some had already been exposed to more sophisticated games with better graphics, the majority stated their desire to keep playing and improving their point scores. The parent in particular seemed optimistic that this game would encourage her children to opt for the healthy choices, especially at their schools. Overall they agreed that even though the game functions were simple, they could easily take turns playing with friends and comparing points. One of the statements Sergio made was that it reminded him of the old arcade games that had simple features, but kept any child hooked for multiple hours. It may have its limitations to education, but to any five to ten year old who is constantly faced with various food options, exposure to these healthy choices may lead to greater impacts in his overall health in the future. One of the aspects of the game not clear at first, was the purpose of the neutral items. In the other hand, after a first attempt at the game, the user easily visualized the main objective of the game and its task.
As mentioned above, much of the items that can be improved involve the user interface of the game and making sure there are no interferences while playing. Meaning, the table of at the bottom should give an accurate representation of the gameplay and character moving at a steady pace. In all, they involve bug errors that may appear in different scenarios of the game such as when capturing or laying out all the objects.

4.2 Feasibility

In order to implement “Focus on Feedback” it will require the ability to integrate structural and algorithmic changes to the UI/UX, the speed, the scoring system, and the items generated as well as other adaptations. These modifications will require programmers that are able to understand and build off of the current state of the “Food Runner” mini game, which additionally warrants the developers ability to program using Unity and C#. All changes to the game ultimately need to be implemented with the approval of the client, in order to prevent misunderstanding in the implementation of the design versus the vision of the client.

Focus on the Feedback:

A conceptual advantage of “Focus on the Feedback” is that it directly builds off of the “Food Runner” game design from previous quarters. The new UI design intends to improve the user experience by providing players with more prompts and status markers to help guide players while playing the game in order to prevent breakdown in game understanding. These new designs have been tested using paper prototypes to simulate the flow of the game. The complex and highly dynamic nature of the design proved difficult to test in the manner that was chosen. Further testing and design modifications may be necessary to better understand the efficacy of the current design which will increase the time spent on design and implementation. UI modifications are predicted to have a high feasibility as many of these features have already been implemented, but are in need of being presented in a more salient manner.

Other key changes improve the educational aspects of the game by dynamically changing the speed of the game, and the value and appearance of the items in a manner that reflects the nutritional value of the food items being collected. However, these changes may be technically more difficult to integrate into the game and are expected to have a high cost of time.

No monetary cost is predicted, thus this does not impact the feasibility for the game developers. Overall, all modifications will be added incrementally in order to best integrate them into the system and the “Re-Innovate It!” team feels confident that they will be be able to significantly improve the saliency

of “Food Runners” feedback about player performance and the educational value of gameplay in a way that is more reliable and engaging.

4.3 Ecological Sustainability

The resources used to create this product, and the waste created in doing so are admittedly rather abstract. Electricity produced by fossil fuels is needed to run computers the team uses to code and work on the game. Fossil fuels are needed to commute to school and team meetings.

Creating the game to be used on existing platforms like computers reduces the need to create extra educational materials. Computers are readily available, so nothing besides the electricity to run them is needed to play and learn from the game.

In a broader and perhaps more hypothetical scope, educating people to choose healthier choices facilitates agricultural change and thus environmental change. Most of the processed, unhealthy foods that exist today are farmed using industrial agriculture methods supported by a corn monoculture. Corn is a crop that can be converted into hundreds of different substances that end up in processed foods like high fructose corn syrup. Practices such as chemical fertilizer and nitrogen production used to mass-grow corn heavily pollute the environment both in their production as well as when surplus chemicals are allowed to runoff into the surrounding environment. When people choose healthier foods that are less processed and rely on more responsible farming practices, the market can be shifted to reduce long term environmental impact.

The game could be optimized to use as little of the computing device’s resources as possible to save energy. This can be accomplished by using the app as a tool to gather children around one technological device and challenge one another through the point base system introduced in one of our plans. Adding more incentives to the game that would encourage playing in groups would optimize the use of one technological device rather than many.

4.4 Economic Sustainability

All cost to implement, use and maintain are affordable for the users, because all of our three concepts will be released on a Web application or a Mobile application game. As long as users have an access to a smartphone or a computer, the users will be able to download the applications for free. Not only that, since all teammates are computer science related majors, the cost to implement will also be free. The only cost will be associated with maintaining the game which account for about 15% of the original cost. Hence it will account for around $300 per year to maintain the app running and working.

Cost	Implement	Use	Maintain
	Considering this game was developed for class project purposes Cost will be free	The application will be available and free to download	Maintenance: 10% cost Data storage: 5% $2000 estimate of creation of game Total cost: $300 /year

***Chart demonstrating the cost implicated to maintain game running*

The main goal for all three concepts is teaching children what food is healthy and what food is unhealthy, and this goal will improve economic sustainability as well. As kids learn to eat healthy foods over unhealthy foods, they will grow stronger and boost their immune systems. By the following results, they will be less likely to spend their money on hospital visits relating to the flu or other health problems that are caused by eating unhealthy. Once the games are implemented and released on stores, economic sustainability does not need to be improved, because the team is publishing them for free and users only

need to download and use them.

All three concepts should not affect the financial security and self-sufficiency of the users differently, because all three solutions are open to everyone. Thus, much of the development and implementation of the game will run on the same platforms.

4.5 Socio-Cultural Sustainability (for all three concept)

All three our potential concept choices can help our target potential users, kids, to improve healthy diet habits. By playing the game, the players can have the chance to learn which food is healthy and which is not. The right nutrition education can help children learn how to live healthy as well as avoid becoming overweight and other related diseases, which is absolutely culturally appropriate. The technological mediums necessary for the game can be fairly accessible in the majority of primary schools. The game is planned to be compatible with both computer and mobile devices, which is are essential tools most U.S. schools already have. Also, smartphones capable of using the app have been more accessible over the years.

The first concept, *Focus on Feedback,* is focused on both education side and entertainment. This prototype provides a high volume of visually intuitive cues that guide players toward making healthier dietary choices. When they choose the right food (healthy), they will be shown positive feedback immediately. Aside from that the game meets both the parent's need and kid's need in a entertaining game environment.

The Second concept, *Good or Bad*, is more focused on the educational side.The players will be given a choice to label the food as "good" or "bad" by clicking either the Bad or Good button. The avatar will either eat the food or throw it away respectively. This version is intended to give kids more information and let the player recognize the right food in order to win. This also meets the need of providing more nutritional education.

The Third concept, *Health Builder*, is also focus on education and entertaining side. In previous game version, many kids found the game boring. This enhanced version addresses the need to create a more interactive and entertaining game. This also results in more involvement from players.

In the united states, many kids have poor eating habits such as eating an abundance of burgers, sugars and other fast foods. The appeal of unhealthy foods is directly related to broader societal issues such as obesity, addiction, and a lack of proper education. These are closely related to our culture and in order to fix them we need to educate and promote the healthy eating habits within the country and help those who maintain bad eating habits develop a healthy lifestyle. Our game solution can enforce the learning of the right culture and education. Regarding the sustainability, our goal is to help kids engage in playing so they can learn as much as they can. However, many kids may find the simplicity of the game boring and do not want to play it more than once. Consequently, we need to make the game more entertaining which entices them to play again and again. This will embed users with the knowledge of healthy foods as they transcend in their early lives.

Above all, all three solution address our target user's need and all culturally appropriate. Through the game, we promote the ideas of healthy diet habit and create an entertaining environment for them to learn. Kids can learn important information while and play a game at the same time. More entertaining elements means more involvement, which makes kids want to play. Based on other aspects and feasibility, *Focus on Feedback* satisfies these criterias and provide cultural approach toward more healthy eating.

5. Recommended Design

5.1 Overview

The “Focus on Feedback” design builds off of past designs, improving the quality of the in-game experience by implementing a user interface (UI) with more visual feedback about the player’s progress. Before the game begins players are presented with a panel that depicts good versus bad items side by side in order to show which items should be collected or avoided. The final design also enhances the educational aspects of “Food Runner” by dynamically changing gameplay to reflect the nutritional content of the items being collected during the race. The items begin with neutral items that add to the player’s score. Food items appear along the race track and can be collected to change the speed and the points of the game. Healthy items increase the value of points and keep the pace of the game at a steady and controllable pace. The entire game will have a two minute run where the user has to collect as much neutral items and healthy foods as possible. Unhealthy food items simulate the negative effects of unhealthy eating by slowing down or speeding up gameplay. For example, ice cream will uncontrollably speed up the player and then slow down to imitate a sugar rush and then a crash(low energy) that is typical of sugary snacks. Players can also collect question items that will allow them to obtain more points at the end of the game and before the final score is shown.

5.2 Detailed Design

The design provides a high volume of visually intuitive feedback that guide players toward making healthier dietary choices while interactively demonstrating the pros/cons of healthy/unhealthy foods in a challenging and engaging manner.

When the game user begin playing, there is time reminder, scoring system, speed system, items collected, progress bar etc. Most important, there are visual cues such as emoji to intuitively provide players with feedback and in-game corrections. The scoring system and speed of the game changes depending on the food items collected. For example, when the player collects a healthy item the neutral items would increase in value and the speed shifts toward a more manageable speed. However unhealthy items would cause the value of the neutral items to detract from the player’s score for a certain amount of time. As well as a progress marker that shows the player how far they are from the finish line.

The point system will add up points based on how much food and neutral items were collected in the time given. Healthy foods will be worth more points while unhealthy options will not be worth any. In additions to the points, players will be competing with a computer controlled player who will also try to get each item. As a result, creating a competitive aspect where the user can play to gain the most points possible. The game will now have the option to select a girl character in order to have a better demographic representation of users.

Fig 5.1, See Appendix: Gameplay of “Focus on Feedback” demonstrating the new AI and new character choice for user

This Design focus on simplicity, appealing,education and feasibility.

Simiplicity:

Easy to follow game rules and concepts, with lots of visual representations.
The user interface is easy to understand. The items are queued in a list so that the player can visually see which items are currently affecting the game and character emojis, and comments react to the items in play.The score system, speed system can directly give the player the information about different choice between health food and unhealthy one.

Appealing:

Images stand out and objectify their purpose. Items are attractive for users and there are a variety of them that can be collected. Also, the emoji function connects well with readers.

Education:

By playing the game, the visual cues, speed system, score system can tell the player which are good choice (healthy food) and which are not. Kids can get direct information about how to choose food in the game and then apply the information they gained to the real world life. Kids can get a general idea about influence of unhealthy food. For example, healthy food could harm your heart (reduce your speed in the game), and also bring bad result (harm your score in the game).

Fig *5.2, See Appendix: Chart comparison based on testing done on old and new design model*

Feasibility:

The implementation of the game is based on the baseline version we have right now. We need to add more features to that such as speed system, more clear score system, and progress bar, visual cues etc.

Cost Analysis

	Estimated Unit Cost	**Total Unit**
Labor (Software Engineering, UI designer who have 1+ years experience in the APP or game design industry)	$50/hour (Based on Glassdoor search and estimate)	40 hours (30 hours to implement, 10 hours to test. Detailed implementation see section 5.3)
		$2000

Business Model

For this game, labor is the most cost. And based on the cost analysis, we need around $2,000 fundings to implement this game. There are two main source of the funding. Firstly, donation from the society, including non profit organizations, clubs, and companies that care about kids' nutrition education etc. Majority source of the funding may come from the advertisements put on our app when kids finish playing the game (avoids disruption of gameplay) and as such profit from the fee from those businesses. Businesses like kids bookstore, kids workshops may also be potential sponsors since they have the needs to promote among kids. The pie chart (image 5.3) demonstrates the percentage funding that is estimated to come from each source in order to develop and implement the game. The estimate was done after extensive research relating to the cost of other similar games already implemented.

Fig 5.3, See Appendix:
Depicts the percentage estimates from each funding source

5.3 Implementation

In order to improve the UI and overall player feel for Food Runner, an updated installation of Unity is required. Modifying the player's movement scripts using C# will allow the player to have more freedom in how they want to move in navigating into good foods and around bad foods. When the mouse input is taken in by the game, the movement scripts should allow the player sprite to change its y-axis value as well.

In addition, the AI competitor's scripts need to be modified such that they immediately start racing the player and move around more intelligently in response to the appearance of the foods. In other words, instead of making the AI a simple speed threshold that the player must stay above, change the AI into a separate entity that the player needs to race. In order to make the AI appear at the beginning of the race, the AI script needs to be modified such that instead of appearing when the player's speed hits 25%, it will appear when the player starts to move. Next, for the AI to move more intelligently, the script needs to be modified so that it is able to perceive its current location, along with its location relative to all good and bad foods on the track. Using a greedy algorithm that prioritizes the shortest distance to a good food, the AI can move from its current location to position that shrinks that distance. This is expected to take a much longer time than any other task in the project.

Lastly, the UI of Food Runner needs to be changed so that more relevant information is provided to the player. Various bits of information, such as the score, the player's speed, and the player's progress to the finish line, need to be added to the UI. This can be accomplished via Unity's UI library, UMG. Through UMG's library offerings, we can create and link the UI to the backend code to properly reflect the current collected information of the player. UMG also allows us to create a stylized UI that will not interfere with the player's experience. Compared to the AI, this segment of the project should take a much shorter time, due to the nature of UI/UX design and programming. By doing maintaining clean, well-documented code, we can ensure

that the client will be able to properly maintain it and pass it on to future teams to work on and further improve.

Because it is not likely that the final product has been completed by the time that this report is due, the Github repo can be found here.

Fig 5.4, See Appendix: Table showing estimations for the amount of time each task/subsection of the coding project will take

5.4 Assessment

Our final design has both strengths and weaknesses. Our design is by far the most feasible of the prototypes and ideas we brainstormed. It builds on existing work so we do not have to start from scratch. This allows us spend more time implementing interesting features that improve gameplay, instead of having to spend most of our time creating the basic gameplay and UI. In addition, the features we are adding will definitely make the game more interesting, replayable, and educational. Picking up healthy or unhealthy foods in the game will actually affect the gameplay in an intuitive way, benefiting the user or not, respectively. In this way, children can begin associating the real world health effects of eating good and bad foods. Furthermore, the implementation of the game as a runner game facilitates replayability because there is always the ability to try again and get a higher score. This differs from something such as a storyline-heavy game, which would only be played once or twice. However, our game may falter in some ways. In an effort to make the game more playable, we sacrifice some of the educational aspects. Though we attempted to make gameplay elements educational, it is always a tough call to make when balancing education versus engagement. Additionally, we do not have the expertise to create and render very high quality graphics for our game, which might turn some users away from playing it.

In the end, we think our game will definitely help contribute to educating children on healthier food choices. This is important because obesity and unhealthy eating are huge structural problems, especially in America. With education on what foods are good for them and bad, they will be better equipped to confront the supermarkets and cafeterias where they make their food choices, and fight against companies who try and sell them very unhealthy options.

Our game's impact on the ecological aspect of society is also difficult to measure. However, we believe that any benefit we see in education to our users will show parallels in the environment. This is because healthier food choices like fruits and vegetables are less destructive to our environment in their production. This is because typically huge areas of corn are produced to create unhealthy, processed foods since corn is easily converted into chemical substances like high fructose corn syrup. Growing a monoculture of corn uses a lot of fossil fuels to produce fertilizers, which pollutes the environment. In this way, our game may have some effect on the ecological sustainability of the planet.

On the social side of our game, making healthy choices affects how someone is viewed socially. Eating healthy means people are more fit and less fat. While our team members believe that people should not be shamed for being overweight or obese, that is simply how our

culture currently operates. Education on healthier choices could help remedy this for some of our users.

Finally, to actually measure if our game impact on these aspects is very hard to say. To test, we might observe children and their food choices before and after they play our game, over both a short and longer term period. If they did not change their food choices, we know our game wasn't effective in shifting their opinions. If they do, our game was effective and we can be somewhat confident that we did. More fundamental changes like change in society and environment may follow if this happens.

6. Conclusions and Recommendations

The "Food Runner" mini game for the Life Skill application design intends to improve on the implemented design by previous ENG 100 design teams. The game design process focused on creating an engaging game that would educate players about the nutritional content of common foods. This objective aligns with those of the *It's All About the Kids Foundation* which aims to improve the lives of impoverished families and children in San Diego.

The importance of having a game that educates children about nutrition stems from the unhealthy dietary choices that are apparent from increasing obesity rates in America (FRYAR and NHANES). The "Food Runner" mini game aims to combat the appeal of fatty and sugary foods by showing children the long-term effects of unhealthy versus healthy foods in a novel manner. Dynamic gameplay will teach children about the nutritional content of foods by slowing or increasing the speed of the game, as well as by altering the way that the players collect points. The "Focus on Feedback" design specifically implements these concepts while also improving the user interface of the game by including a more salient way to keep track of game progress by placing tracker bar at the bottom of the screen. Thus improving educational feedback about the nutrition of the foods being collected and improving gameplay feedback by placing all relevant information in one location instead of missing or scattered across the screen. Other novel features integrated from other design ideas are the addition of screen that labels food as being good or bad before the start of the game, an artificial player that stays on the screen and collects food, and the inclusion of a boy and a girl player. Overall the design improvements revolve around making the game more enjoyable to play, improving the educational impact of the game, and improving the player's ability to track their progress while playing the game.

Future design teams should focus on continuing the improve the user experience by making the game more engaging to play without taking away from the educational content of the game. Designs may want to improve the graphics of the game, perhaps making it on a horizontal perspective over aerial view, or by making it possible to play with multiple users, or an improved artificial player (AI) algorithm to make the game more competitive and potentially able to have different levels of difficulty.

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Appendix

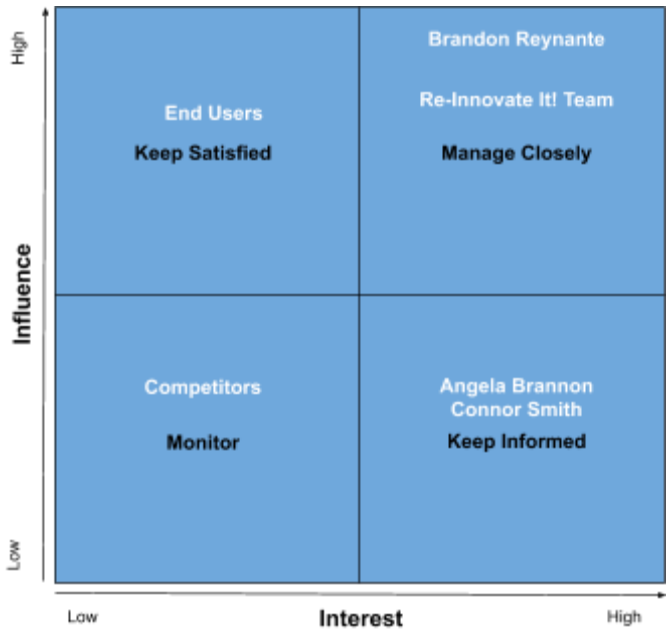
1. Project Management

a. *Table 1.1 Gnatt Chart* 3

Shows a visual timeline of the project assignments

	A	B	C	D	E	F	G	H	I	J	K
1		week 2	week 3	week 4	week 5	week 6	week 7	week 8	week 9	week 10	Finals
2	Team Bonding										
3	Establish Meeting Times										
4	Role Assignments										
5	Interviews										
6	Poject Management Draft										
7	Contact Client										
8	Problem Research										
9	Brainstorm ideas										
10	Problem Definition Draft										
11	Concepts Draft										
12	Analysis and Testing draft										
13	Preliminary Design Review Presentation										
14	Team Evaluations										
15	Converge and select ideas										
16	Design draft										
17	Takeaways										
18	Small design groups										
19	feedback										
20	Iterate Design										
21	Create New Objectives										
22	Split into Capture and Filter										
23	notebook check										
24	Evaluation Draft										
25	Critical Design Review Presentation										
26	FInal Prototype reviews										
27	Final Design Report										
28	Final Presentation										
29											
30											
31	note: assignments due on sunday counted as beginning of week			legend:							
32					Deadline						
33					Group work/discussion						
34					Research/communication						

Figure 1.2 Stakeholder Analysis Graph



2. Problem Definition

Fig 2.1 Graph showing upward trend of obese Children and Adolescents

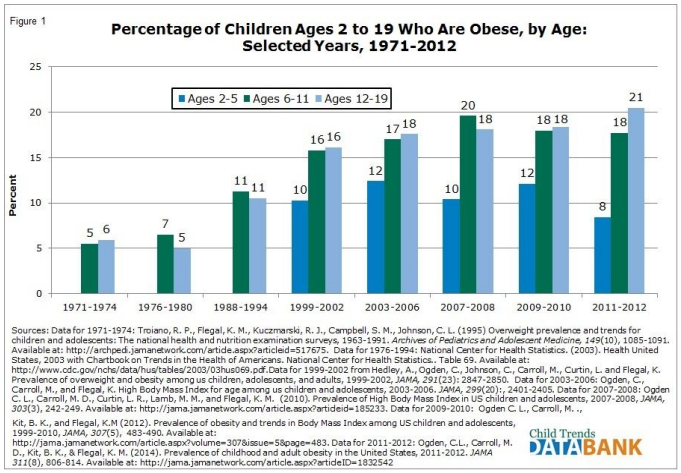


Fig 2.2: Overweight and obesity in adults 20 and older 2009-2010

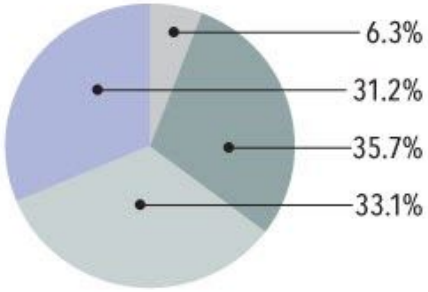
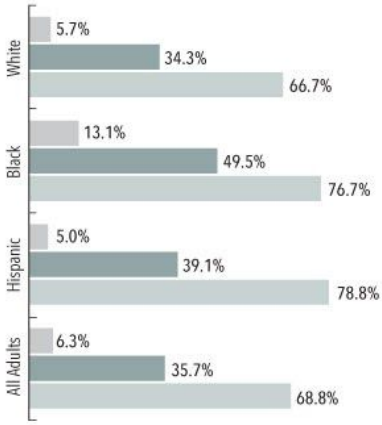


Fig 2.3: *Overweight and obesity in adults 20 and older 2009-2010 by Ethnicity*



5: Evaluation and Testing

Fig 5.1: Gameplay of Focus on Feedback concept with new AI, character choice

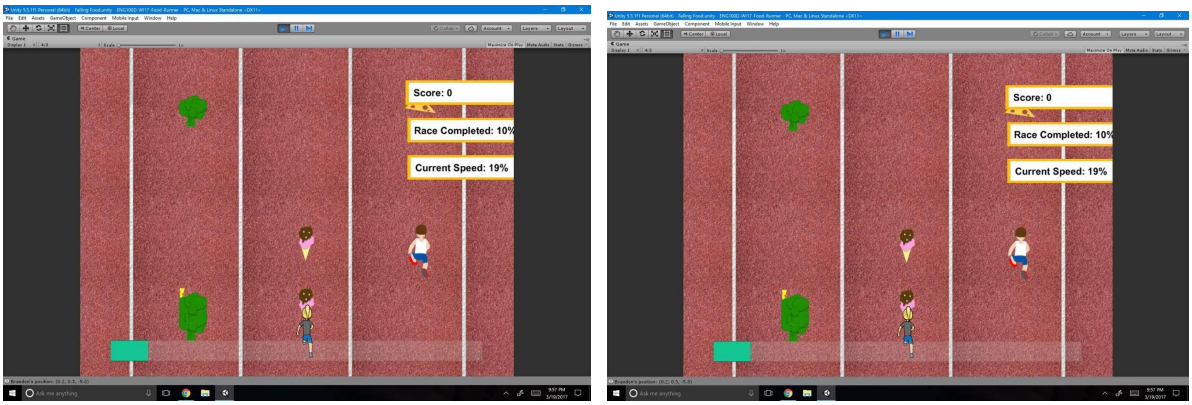


Fig 5.2: Chart comparison based on testing done on old and new model

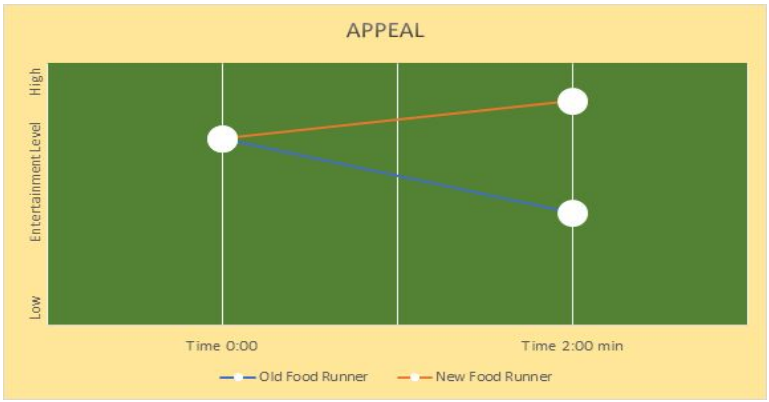


Fig 5.3: Percentage estimates for each funding source

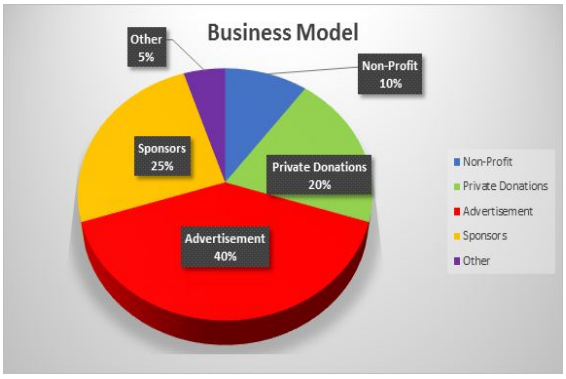


Fig 5.4: Table showing estimations for amount of time each task will take

Task	Estimated Time To Complete
Allow the player to freely move across the screen.	2 hours
Allow the AI competitor to appear at the start of the game.	1 hour
Allow the AI competitor to have increased freedom and intelligence.	10 hours
Implement the container for the UI.	1 hour
Implement the score functionality for the UI.	2 hours
Implement a counter for both good and bad foods picked up.	2 hours
Integrate the counters with the UI so that the player can see both the number of good and bad foods picked up.	3 hours
Implement a query that asks the player for their name.	3 hours
Implement a text box in the UI that shows the name of the player.	1 hour
Implement a speed display on the UI.	1 hour
Create a progress bar that shows the player how close they are to the finish line.	3 hours