**Detailed Evaluation Plan**

The power-related app community in the Google Play Store and the Apple app store is practically nonexistent and contains only a handful of applications. The apps that were the most similar to “The Source” in terms of having the user build his or her own power plants were city simulations such as “City Island 2”[1], “Moon Base”[2] and “Megapolis”[3]. In these apps there was no educational view as to how the power was generated, but often apps like the ones listed covered pros and cons of the types of power that were available. From an educational direction there were very few apps that explained how power plants worked, and the ones that did explain only focused on one type of power. The types of power usually covered by these types of apps were nuclear and solar as those are the more interesting of all the types. As of a searches performed prior to March 2nd 2015, there were no apps in either store that directly focused on energy as a whole and providing an understanding to the user as to how multiple power sources work.

Not surprisingly, the Internet had a more plentiful market of educational energy-based games. These games covered multiple energy sources and gave detailed descriptions, animations, and data on how these power sources operate. A good example of such a game would be “Save the World”[4]. Although not all games have a goal of being educational, there were a few like “Save the World”[4] and “Energyville”[5] that clearly had educational objectives. In comparison to all of the other games that were reviewed, the overall goals of these games were the same as those of “The Source”, although they differed in how the user accomplishes tasks, in design, and in the variety of power plants that were covered.

In summary “The Source” differs from any energy based app in the Google Play and Apple app store in the variety of power sources that are covered, educational focus, and unique design. “The Source” is also unique in comparison to these other apps because of its educational focus which does not exist in most games. In comparison to educational web based applications “The Source” only differs in the content that it covers. This is important because it means that new content is being covered and shown in a different manner than what other people are doing.

In order for “The Source” to be successful it must be evaluated in two ways. The first way “The Source” must be evaluated is in terms of usability and it must meet the following two criteria. The application must be engaging to the user and provide an overall pleasant playing experience. The application must also help the user to comprehend general facts about where power comes from and how power is generated. If the source is successful in these two ways then it will also be successful in being different from all other content in its market. The second way “The Source” must be evaluated is in terms of numeric stability and consistency. In order to discover if the game is successful in meeting these criteria, it will be tested on a group of test subjects discussed below.

**The Guinea Pigs**

The Source is primarily targeted at high school students, but due to time constraints and a lack of high school students the game will be tested on about 20 university students. Students that are tested will not have played the game before but way have played the tutorial. Each student will fill out two questionnaires, one dedicated to evaluating the numeric stability of the game and one dedicated to discovering if the users have learned anything while playing the game. If both questionnaires return with significant results then it will be indicative of the participants having had an enjoyable and educational experience.

**The Testing Process**

The whole testing period should last no longer than an hour. Each questionnaire will be taken online using google forms. Once a user has completed the first questionnaire, the pre knowledge test, which should take about 5 – 10 minutes he/she will be presented with the application on a personal tablet. The first thing the user will be instructed to do will to be to go through the tutorial which should take 5 – 10 minutes. After completion, the user will play the game for the first time. This will be a trial run for the user to get used to the mechanics of the system and for them explore what can be done in the app. The instructor (me) will be present to answer questions by the user. The only questions that can not be answered are those on the topic of how the energy source operates. The user can go through as many 'trial' runs as he/she wants (at least one though) but the final time should be a real attempt at trying to survive as long as possible in the game. Since the user can repeat this as many times as he/she wants it's a little hard to estimate the time but the trial period should roughly be another 5 - 10 minutes, possibly less. The final time should be about 15 – 20 minutes. If it lasts past 30 minutes the trial will be cut off. At any time the user can pause the game to use the restroom or whatnot. This time combined with the users trial time will be enough to determine if the user has learnt anything. Once the user has finished playing a game he/she will complete a questionnaire. This should take another 15 – 20 minutes in theory coming up to total sum of roughly an hour.

**Data to be monitored by the system**

Every five years the system will automatically record the following information and a random number ID will be generated for each time the game is played (If the user presses the reset button, a new ID is generated). In order to remove the test runs from the actual trial. The Internet connection will be turned off. When the user is ready to play for real, the connection will be turned on allowing the data to be sent to parse. Information that the system will record are

* current amount of money
* how many times each advertisement was activated
* how many times each public service was activated
* how many times was the fast forward button used
* number of fossil fueled power plants built
* number of windmill and solar panels built
* number of dams built
* number of occurred blackouts
* number of tiles mined
* amount of each resource the user currently has
* power demanded and supplied
* the current year

Gathering this data will help reveal potential flaws. For example, the user should not have $1000 five minutes into the game because then the game would pose no challenge as the user could purchase anything.

Knowing how which ads and public services are used will reveal any numerical flaws with each perk. Flaws could include the perk costing to much or not being powerful enough to use, making the perk useless.

Knowing how many times the fast forward button is used will help give a sense if the user thinks the game pace is too slow. Generally a comfortable pace helps a game be enjoyable. This question is also reflected in the questionnaire to help get an understanding of the user's thoughts

Similar to the ads and public services, knowing how often each power source is used will help reveal any flaws that may exist. Power sources that are not build may not be strong enough or may be too expensive. If only a few power sources are built then those few could be too powerful.

Knowing how many blackouts have occurred in each time interval is important. In theory few blackouts should happen in the beginning and more should occur near then end when resources are fewer and demand has increased. If the data shows that multiple blackouts are frequently occurring early on then this means that it is too hard to keep up with the demand.

Knowing how much power the user is supplying, how much power is demanded, how many tiles have been mined and knowing how much of each resource the user currently has reveals no flaws but having the information available is good. This information is recorded just in case.

Keeping track of the year is just a reference to know when events are happening in the game and is required by other mentioned data points.

**Numeric Stability Questionnaire**

The questionnaire's purpose is to discover the user's tactics during the game, for example, why he or she made certain choices. Knowing this information will reveal numerical flaws in the game, such as if a power source is too strong or if an aid is too weak. This information is important to know because it reveals imbalances in the game that would need to be fixed.

Specific pieces of information that will need to be collected from this group include

**In order to access usefulness of certain items. The user will answer the following**

1) Why did you not build some of the power plants available? (see administrator)

2) Why did you not purchase some of the advertisements? (see administrator for specifics)

3) Why did you not purchase some of the public services? (see administrator for specifics)

4) Were there any pieces of information that were not displayed that should have been displayed

**In order to access the level of difficulty the user experienced he/she will answer the following**

5) How challenging was it to keep up with the power demanded?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Very Easy | Easy | Neutral | Difficult | Very Difficult |
| 1 | 2 | 3 | 4 | 5 |

6) Please rate how you felt the pace of the game was.

**I felt the game was..**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Too slow | A little slow | Just Right | A little Fast | Too Fast |
| 1 | 2 | 3 | 4 | 5 |

7a) Indicate to what extent you agree with the following statement: I found some items were too expensive or too cheap, thus, making the game too easy or too hard to play.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 |

7b) Please list the items you found to be too expensive (if any):

7c) Please list the items you found to be too cheap (if any):

**In order to access the users playing experience he/she will answer the following**

8) Choose the statement that best applies to you

a) I never got frustrated

b) I got frustrated a little

c) I got frustrated a lot

d) I was frustrated all the time

9) What would you rate your playing experience?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Very Poor | Poor | Neutral | Good | Excellent |
| 1 | 2 | 3 | 4 | 5 |

10) To what extent would you agree with the following statement: I learned about energy from playing this game.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 |

11) Please state the frequency to which you mis-clicked or got lost looking for specific content

|  |  |  |  |
| --- | --- | --- | --- |
| Never | Rarely | Sometimes | Always |
| 1 | 2 | 3 | 4 |

12) Please state how much you agree with the following statement. “After going through the tutorial. I felt that I understood the major aspects and mechanics of the game”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| 1 | 2 | 3 | 4 | 5 |

13) After playing the game how likely is it that you would go research power on your own time?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Definitely not | Probably not | maybe | Probably | Definitely |
| 1 | 2 | 3 | 4 | 5 |

14) Additional Comments

**The Educational Questionnaire**

This questionnaire's purpose is to discover if the user learned anything while playing the game. In theory the people who know nothing should learn a lot, the people who know a little should only learn a little as the game only covers power at a general level, and the people who are knowledgeable should learn almost nothing. In order to know if a user has learned anything he/she will be required to complete a short knowledge test before and after completion of the game. This way the pre and post answers will be compared to discover if the user has learned anything.

Specific things that this user group will have to do is to give a brief understanding of each kind of power, for example:

**Hydro:**

1) What is source of energy for a hydro-electric dam?

a) water b) tidal-waves c) chemical reaction with water d) rain

2) Explain how a hydro-electric damn uses the energy source to create power.

a) Water powered by gravity turns a turbine which in turn powers the generator which makes a current

b) Water is pumped past a turbine, causing it to rotate, which in turn powers the generator which makes a current

c) Chemical reactions inside the turbine create a pushing force cause the dam to rotate which in turn powers the generator which creates a current.

d) The force of the tides cause water to move past the turbine causing it to rotate. This powers the generator which creates a current

3) Which of the following would you consider an advantage for a hydro electric dam? Check all that apply.

a) //to be created

b) //to be created

c) //to be created

d) //to be created

e) other, please specify

4) Which of the following would you consider a disadvantage for a hydro electric dam? Check all that apply.

a) //to be created

b) //to be created

c) //to be created

d) //to be created

e) other, please specify

These same four questions will be repeated for each kind of power (with different multiple choice questions) and answers to each are within the game. A score will be generated for their answers before and after playing and by comparing the answers we will be able to see if the user has learned anything.

**Conclusion:**

With all of these questions answered it can be discovered if “The Source” was successful in meeting the criteria of numeric stability and usability. More specifically, it will be determined if “The Source” is successful at being a positive playing experience and teaching users general facts about where power comes from and how power is generated.

**References:**

[1] City Island 2, Created by a group known as Sparkling Society ™, unknown publication date.

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[4] Save the World, Created by Wonderville, Unknown publication date.

<http://www.wonderville.ca/asset/save-the-world>

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