Conceptual Framework Puzzle Game with High Replayability

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Abstract. Replay value is a method that focuses on developing game which characterizes the system developers how the characteristics should be owned in game especially for maze puzzle. Replayability is an important asset in game. The importance of appropriate methods in maze game is needed to reduce the failure in development itself. The aim of this thesis is to develop a puzzle game by applying principles high replayability. The method development process involved maze puzzle game as a case study of research by conducting design process, and even identifying problems and issues while implementing replayability.

Index Terms: Game, Maze, Puzzle, Replayability, Replay Value.

1. Introduction
The main issues that puzzle game have is first the desire to replay leaves once the player know how to solve it (not replay able), the problem that (Yeoman, 2014) find with traditional puzzle game is that they designed to have only solution. Because of that, there have a solution to make the puzzle game more have replay able with implementing replayability or replay value. Replayability of the video game has become an investigated area for many years, in principle, any game should be repayable. There are many things that can make game replay able, from the story to gameplay. For example the simple thing is fun core gameplay that take some skill to master. A critical component of an engaging game is delivering content to player with incrementally increasing the challenge (Koster, 2013) especially for the maze game, self-imposed challenges can a fun way to replay a maze puzzle game like trying to find the way out the maze. Implementing replayability can provide strategic advantages for the video games due to making the puzzle game more interesting to play.

2. Research Background
(Kim and Crafis, 2015), define a level design for perfect maze based on the structure, components, for generating a perfect maze design. The maze can define as a perfect maze if follows six items component such as cell or node, Start point for the player, End point (finish), Solution path, Decision cell between junction and cross road, dead end to set passages have no exit. The structure of a perfect
maze can be thought of as a spanning tree (grid is a connected without cycles possible to reach one node to other node. So the start and end point can place everywhere).
They also found best solution path field of 2D maze with implement Solution path(end point where the player finish or exit the maze) on half of a maze and forward dead-ends (provides the illusion it is progress toward the exit way)on the rest.

(Kirginas and Gouscos, 2017) develop a different version of the maze game. First is structure one with very limited freedom of movement an equally limited freeform gameplay and second is freeform one with much higher freeform of movement and equally higher freeform gameplay. In the other hand this research concern about capability of the player on the game. The researcher found that the children like the most and choose to play again freeform game which have higher level on freeform gameplay because the children can free to explore the game world.

According from (Willkerson et al, 2010) that created a maze game called The Dark Labyrinth for blind children with simple aim, to navigate successfully from point A to point B with two navigation system. First is using a surround sound speaker setup that indicates the appropriate direction in the maze by the direction. Second is implement auditory sonar system that gave the player the ability to give a signal in certain direction by pressing a button on the joystick console. Both a system has a great impact for the children that tester the game. The vital thing about this game is how capability of game instrument can pay as much attention to the player.

(Pedersen & Kasper, 2012) Replayability power will gained if the interface interaction, object and gameplay if generate with replayability. The technology screen also can being another part of the game can make great replayability because no matter which player chosen the path of game will get a unique items every time they played such as the earlier before the mission started players normally deciding which armour, speed, and missile we should choose.

According from (Frattessi et al, 2011) journal, they face off a relationship amongst the successes of a game development with implemented replayability. To implemented replay ability in difficulties of the game will be the easiest way for making game more interesting. The designer usually always made three category of playing mode such as easy, medium, and hard to determine their games are worth a certain time comparison for the consumer. Randomization of the game like the spawn of enemy, the trap and many more in content game also can increase amount of replayability to a game.

Replayability is an experience where players get another impression with the same content differently; the basic action such as interaction, movement command skill and so on should reduce to increase replayability. (Thygesen, 2014) Player frequently decided to quit the game while they get what they want or reach all of the achievement. Therefore, the game replayability came from the duration in terms of how long spent for one game session. Artificial intelligent of the computer will increased replayability of entertaining the player and make the player more motivate to play the same game again because they challenged to defeated or win against artificial intelligence (Lent et al, 2005).

(Outersterp, 2012) A number of the player can be a best choice to get high replayability, a little example for game that has high replay ability is a board game because they require multiple people to play the game. Also another way can be used to get better replayability is make an chapter story in which are the player can choose different paths were suitable for the player. For example like Warcraft frozen throne games, where as if we choose different character will change the storyline following which hero we pick. The most replayability where every game has is achievement for player like if you finished a game you will get a medal or percentage of the win.

Interactive story telling can be implemented with puzzle game. (Shen and Mazalek, 2010) The storytelling Puzzle called puzzle tale is an interactive story novel based which puzzle you combined and solve. The different story will come up if you solve the other puzzle it depending which puzzle you pick and play. Every puzzle you pick will have different story and make the game more interesting.
3. Review the previous game related to research
A sub There is a game called Medival Angel 4 – My uprising- (Part2) from Vasantl 2018. The first condition is there have a chicken where moving in the map, the character should make the enemy movement stop use a barrel and if the enemy can’t move automatically made the chicken fall asleep. The aim of all the level is to go inside the door to meet and defeat the boss without be discovered by enemies. After the character hit the barrel will make a trap for the enemies that can made the limited move. So the character can pass the door without know or discovered by enemies. To made barrel move the player need to press enter or Z on the barrel.
Next game is The company of myself from 2Darray 2017, The aim of this game is to move the character and jump to avoid the brink of cliff into the green destination point that can goes into the next level.
Pic Road by Piepal 2018 is a game that have a goal to rotate the pieces to create a path and discovering a pixel art with a message it can be a music instrument, animal, food, and science.
Apple Worm by Gibton 2017, the aim of this game is to bend the worm into the finish point (black hole) and get the apple.

4. Problem Statement
Maze Puzzle is a game where the concept between combination of path and collection of paths, typically from an entrance to a goal that can test person ingenuity or knowledge. Especially for Game mechanic in Maze puzzle the replayability of the game is too low. The need of proper guideline in form of a better game mechanic system in the development maze puzzle is a necessity that will facilitate developer in developing puzzle game. Now can be found in evaluating game mechanic systems that have available in development of game to be more fun and exciting in the aim to increase replayability of the game.

5. Aim and Objectives of the Research
Coming up from the existing problem and the game review, then the aim of this research is to develop a game with better game mechanic to increase the replayability that is typically use in the development of puzzle game. The study was conducted by selecting some of Maze Puzzle as a case study of this research. Based on the existing aim of research, so it can be formulated objectives of this research as follows:

1. To provide appropriate better game mechanic can be applied to the development of Maze Puzzle.
2. To review the capability process of the character and level on the game.
3. To provide a technology found in development of the replayability in maze puzzle game.

6. Research Question
To answer the aim and objectives of the study, five partial research questions are formulated:

1. What components are needed to develop a game with replayability?
2. Are there any specific sources in development of replayability in maze puzzle?
3. Is there an existing method that can be used as a reference to implementing high replayability?
4. What activities are carried out in the process of implementing high replay ability in Maze Puzzle.

7. Scope of the Research
In this research required scope of the research to set limitation of focus and area of research problem to solve. Scope of research in this study is focused developing a game to increasing the value of replayability of the game. This research involves Maze puzzle as a case study for implement
replayability system. In the implementation of this research, research will involves experts in the game development to contribute in this research to collect the information related to research in order to support the development of the game that can be useful later. The result of this study are expected to contribute in the field of academic for student and researchers with focus in the field of the game development and through this research can be used as a reference for anyone who want to carry out development and research in the field of replayability system to a big scope.

8. Research Methodology
Replayability method in game implementing
- The tutorial level:
The first time when computer games came they do a tutorial with only manual instructions. We tried to implement tutorial level to teach the player everything about the basic of the game before they started the real level such as how to move, how to use hint, how to pause, and etc.
- The learning curve:
We need to maintain the player interesting by keep the difficulty at the right level as they improved the game level by level. If the game so easy will affect the boring game and otherwise if the game is too hard make the player give up to solve the game.
- Keep the game always fun:
Mostly game if you lose at the stages and have to doing the same level again it make you stressed and became not enjoying the game. We can bring another change to play the same time without losing the point.
- Atmosphere:
   Creating a great atmosphere is a good choice to help the players sense of discovery, background sound will take a lot role in here to make the situation or the situation changed.

9. Expectation Result
Game Design Document (GDD) is a blueprint from which game to be built or guideline for the game developer to focus organizes the ideas such as the features that need to put inside the game and to set schedule to setting milestones for each item how long a task would take, where exactly the developer want the game to be in 1 month, 2 month and so on. Game design also can reveal missing feature and functions in the game.
- Game Name
  Escape From the Strange Area
- Game Overview
  a. Game concept
  The game concept is to make player can survive inside the maze and escape the safe zone. Basically this game is mixed between maze puzzle and RPG (Role Playing Game) that the character can upgrade the status by level up.
  b. Genre
  c. Target Audience
  Age rating for 7+
  d. Game Flow Summary
  The game flow is to escape from the maze without killed by the enemies
- Gameplay and Mechanic
  a. Gameplay
  Mission/ Challenge Structure.
  ▪ Leveling to gain an experience.
  ▪ Killed the enemies as much as player can
  ▪ Finding an item that can help the character
Objectives
▪ Find an exit door to escape from the maze.
▪ Levelling up the character

b. Game Option
▪ Setting sound
▪ Back to main menu
▪ Exit Game
▪ Save Game

• Story, Setting and character

Story and narrative
The story is a warrior trapped into the different world because the enemies sent to there. In the order to save the world, the warrior must find a way to escape from the different world and kill the boss to save the world.

Character
▪ There only have one character in the game.

Item
There have 5 items that can help the character survive inside the maze, which are HP restore, Map, Key, Weapon, Armor

Level
▪ There have 8 levels on the game include the tutorial level.
  a. Tutorial Level
There have tutorial level that can help the player to understanding the basic game mechanic such as how to move, kill the enemies, and how to use items.
  b. Level Two
Inside the maze there have one enemy and traps.
  c. Level three
Remaster the corridor or maze and adding more trap also introduced a new enemies.
  d. Level three
Remaster the maze; combine between level 1 enemy and level 2 enemies.
  e. Level four
Environment changed. Escape the maze with limited time. Inside the map there have time bonus, key for open the door, and traps. No enemy appears in this level.
  f. Level five
re-master maze, fake treasure shown up with new enemies.
  g. Level Six
Re-master maze, enemies percentages increase, item percentages lower with fake treasure and traps, mix between enemy level four and new enemies introduced.
  h. Level Seven
Re-master maze, enemies percentages increase, item percentages lower with fake treasure and traps, mix between enemy level four, five and six.
  i. Level eight
Last level with no items inside the maze, All enemies appears with the last boss.

• Artificial intelligence

Opponent
There have five enemies inside the game.

Support AI
  Support AI only on the tutorial level.
10. Conclusions
The conceptual framework for puzzle game with high replayability show every component on game mechanic play role that can increase the replayability of the game to ensure that the game can improved the previous game.

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