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## Android Musical Puzzle Game "Music Puzzle"

**Ewaldo Filbert\***, Jeanny Pragantha, Darius Andana Haris  
Informatics Engineering Department, Faculty of Information Technology  
Universitas Tarumanagara

\* ewaldociady@gmail.com, jeannyp@fti.untar.ac.id, dariush@fti.untar.ac.id

**Abstract.** *"Music Puzzle" is a musical puzzle game for Android. Player will try to arrange the puzzle piece by listening to the music in each puzzle and correct the order of the music. This game use classical music as the theme of the game. This game is developed by Unity game engine with C# as the programming language. Testing has been done with Black Box Testing, Alpha Testing by lecturer and Beta Testing by survey to 30 respondents. The results show that the "Music Puzzle" is an interesting game to play and encourage respondents to interest in classical music.*

### 1. Introduction

In this digital age, technology has been improved rapidly and many people already familiar with technology and technology itself can be found in various fields. Game is one of the technology that are not used only for fun but also can have positive effects such as strengthening short-term memory and practicing problem solving skills [1]. The game itself is an application that is programmed on a device that can be run offline or online. The game has the benefit as a means of entertainment that can reduce fatigue caused by daily routines, in addition to that, the game can also train the brain to solve the problems [2]. The title of this game has implied that it is a combination of puzzle and music genre. This game used classical music as a theme. Player can listen to a piece of music in a puzzle piece and then the player must arrange the puzzle piece so the music in each puzzle piece has a correct order. This game aims to introduce classical music to Indonesians. Game with a similar design that has been made is Rhythm Holic! by Justin Ng, student of Computer Science Department, Faculty of Information Technology Tarumanagara University. Player must follow the rhythm of the music to press notes or objects that appear on the screen. The game interface can be seen in Figure 1 [3].



**Figure 1** Rhythm Holic

### 2. Methodology

#### 2.1. Game Design

When make a game, a design stage is required so that the game is made as desired. The stages in making the game are divided into [3]:

##### 1. High Concept



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High Concept in “Music Puzzle” is a single player game with 2D display on Android platform, developed using Unity and C# as its programming language. “Music Puzzle” using English as its language.

## 2. Genre

The game "Music Puzzle" is a combination of Music and Puzzle genres. In this game, using a classical music as a song that will be cut to some pieces. To cut the song, this game will use some of classical music theory such as *musical form* to decide which part will be cut. There are some standard type of *form* such as Sonatina, Rondo, Theme and Variations, Etc. [4],[5],[6],[7],[8],[9].

## 3. Gameplay

Gameplay explains how the game is played and explain the rules or features in the game. The gameplay preparation stage is divided into the following stages:

### a. Control Design

Control Design in this game use touchscreen on mobile phone by tapping the puzzle piece to listen to the song and drag and drop to move the puzzle piece

### b. Object Design

This game has 2 objects:

I. Puzzle Piece

II. Puzzle Box

The objects of "Music Puzzle" can be seen in **Figure 1** and **2**.



**Figure 1** Puzzle Piece



**Figure 2** Puzzle Box

### c. Level Design

Level Design is very important in a game to provide a challenge to the players so that the game is always be fun to play. This stage explains the difficulty level design that will be used in the game in order to finish the game that will be created. This game has 3 difficulties, that are easy, medium and hard. Each difficulties level has 10 different musics.

### d. Sound Design

This game has 30 classical musics that are used as puzzles to be solved and 1 music that is used as background music.

### e. Score Design

This stage is also an important part of the "Music Puzzle" design. Score in the game is used as a target that can encourage player to play again and get a better score. This game using a score system with stars, the faster the puzzle is completed, the more stars are obtained.

## 4. Hardware

Barcomon is developed for Android-based smartphone.

## 5. Audience

Audience is the target user, to whom the game is shown. The goal of the game is usually determined by the contents of the game itself so that there are limits for who the game can be played. This game can be played for all ages.

## 6. Display Design

A good display is needed in order to make it easier for players to interact with the game to be played. To make an attractive appearance a design is needed. The display in this game contains an overview of the user interface (UI) display which includes main menu, song selection, gameplay and final result.

## 7. Testing

After the game is finished, it is necessary to do the testing phase to see whether the final result is in accordance with the concept and whether there are still things that need to be repaired or errors founded in the game.

## 3. Testing and discussion

This game is developed by Unity Game engine and C# as its programming language. The testing of "Music Puzzle" was using 3 different testing methods. The methods are blackbox testing method, alpha testing method, and beta testing method.

### 3.1 Blackbox Testing

Blackbox Testing is done to check the modules contained in the game "Music Puzzle" by trying all the buttons on the module whether it is running well or not. After being checked, all the button on the Main Menu, Level Selection, Music Selection already worked properly. All activities in In Game already worked properly. Some of the gameplay interface that has been checked can be seen in **Figure 3**



**Figure 3** Gameplay Interface

### 3.2 Alpha Testing

Alpha testing is done internally by people who can act as representatives of the game players. Representatives who served as alpha testers were thesis supervisors and Anastasia Aurelia, Tarumanagara University student who had a grade 7 ABRSM piano. The following are the result of Alpha testing:

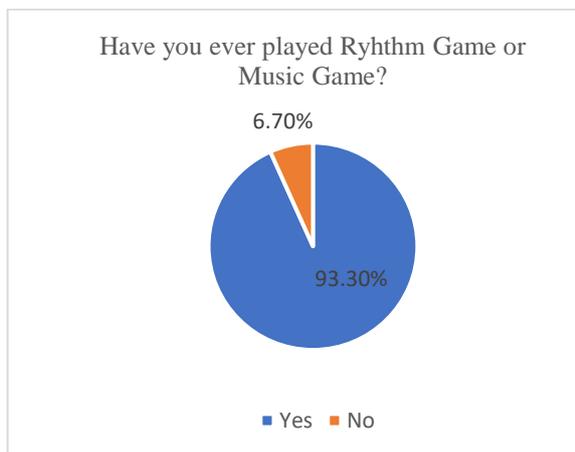
1. In the help module, do not use scroll down to proceed to the next instruction but it should be using the "next" button to proceed to the next instructions.

2. In the music selection module, don't use numbers 1 to 10, but it should display composer's name and the title of the song.
3. The display on the main menu is too plain and will look better after adding a background image such as a musical note.
4. There are a few note in puzzle piece missed in the cutted song. Cut using *phrases*, *sentences* and *period* in music theory to avoid missed note.

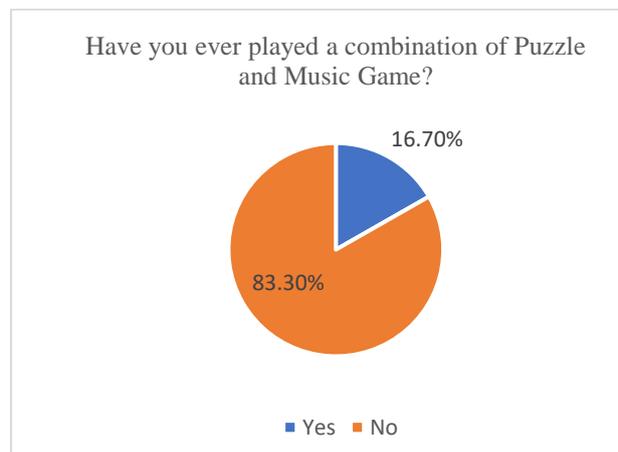
All the above deficiencies have been fixed so that the game is free from deficiencies.

### 3.3. Beta Testing

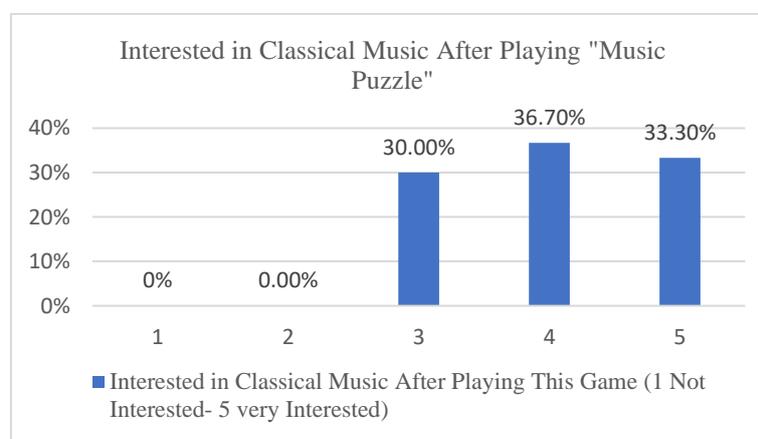
Beta testing had done online by sharing the game files via Google Drive on June 8, 2020 through June 14, 2020. Beta testing had done openly to anyone who wants to play "Music Puzzle". After the respondents played this game, they were given an online questionnaire through Google Form. There are 30 respondents who filled the questionnaire. Some of the beta testing results can be seen from **Figure 4** to **Figure 7**.



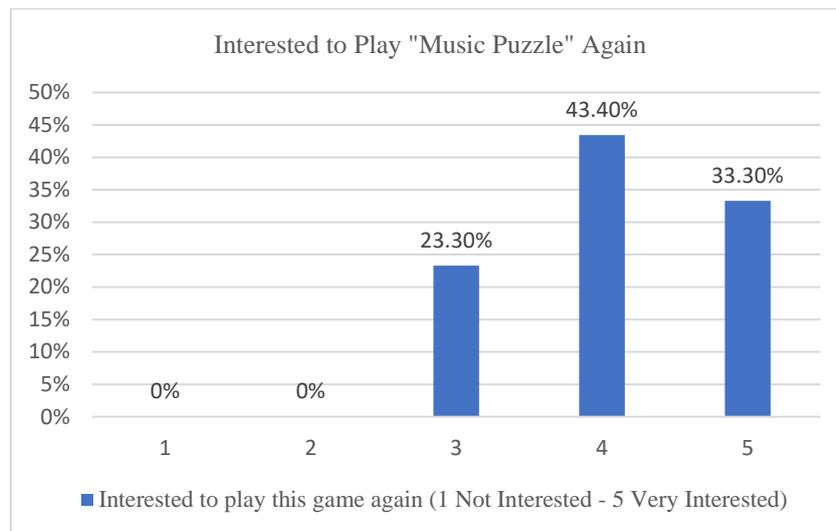
**Figure 4** Game with Music or Rythm Genre



**Figure 5** Game with Music and Puzzle Genre



**Figure 6** Level of Interest in Classical music



**Figure 6** Level of Interest to Play “Music Puzzle”

The following are the analysis of the questionnaires:

1. The game "Music Puzzle" can be played on the Android platform from version 6 (Marshmallow) to Android 10.
2. A total of 93.30% had played games with the genre of music or rhythm but only 5 respondents had played games with a combined genre of music and puzzle.
3. Respondents can be said like classical music because on average, respondents give a value 4 on a scale of 5.
4. From the level of expertise of playing a musical instrument, respondents can be said that they are not proficient in playing a musical instrument because on average, the overall value of the respondent is 2.
5. From the average difficulty level of 10 songs at easy level, there are 8 songs that can be said to be easy and there are 2 songs that can be said to be quite difficult
6. From the average difficulty level of 10 songs at medium level, all songs at medium level can be said to be quite difficult.
7. From the average difficulty level of 10 songs at hard level, all songs at hard level can be said to be difficult.
8. As many as 96.70% of respondents said that the Help in the game "Music Puzzle" helps players to understand how to play.
9. Most respondents 70% feel attracted to classical music after playing the game "Music Puzzle". From these respondents, there were 81% of respondents who were interested in playing the game "Music Puzzle" again.

#### 4. Conclusion

After completing testing of the game "Music Puzzle". The conclusions that can be drawn from the test results are as follows:

1. Games with a combination of music and puzzle genres are still rarely found.
2. The level of difficulty in the game "Music Puzzle" is in accordance with the predetermined level placement.

3. After playing the game "Music Puzzle", many players become more interested in classical music in accordance with the purpose of making this game that is introducing classical music.
4. Game "Music Puzzle" has a fairly high level of replayability because players are interested in playing the game "Music Puzzle" again.

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