

DEVELOPMENT OF VIRTUAL APPLICATIONS LATIN PERCUSSION INSTRUMENT BASED ON ANDROID

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ABSTRACT

Percussion instruments are often also called percussion instruments or percussion instruments are instruments that produce sound by being struck, beaten, rocked, rubbed with other objects that can produce sounds. United States of Bandung Percussion (USBP) is a community that works in the field of percussion, in the basic training process, members do not fully know how to play Latin percussion instruments, placement of Latin percussion sounds and also the name of each sound produced by the percussion instrument. The existence of members who are outside the city not being able to make a concept game performance. The absence of one of the members was due to the distance, and as a result the process of making the concept could not be continued. Then developed a virtual application of Latin percussion instrument, with the aim to facilitate the training on USBP, be individual training or group training to perform. The method used in the development of this application is the Luther-Sutopo Life Cycle Development and uses the Object-Oriented Programming (OOP) system modeling. In this development Google Play Games Service is used as an API, where later Google Play Games Service will provide Realtime Multiplayer which will be used to support multiplayer features.

Keywords: Percussion, Latin, Latin Percussion, Object-Oriented Programming, Luther Sutopo, Multimedia Development Life Cycle, Google Play Games Service.

1. INTRODUCTION

1.1. Background

Percussion instrument is a musical instrument that produces sound by beating, beating, rocking, rubbing, or by other means that make objects vibrate or emit other sounds either by being hit using a tool, with a stick, bare hands, in a shake, or mixed with other objects that can produce sound.

United States of Bandung Percussion (USBP) is a forum for the percussionists, especially in

bandung in order to be able to pour ideas, creativity, works in the field of percussion. This community was founded in March 2012. USBP itself is engaged in percussion and now has 4 divisions namely djimbe, drum, drum and latin divisions. In this study will be focused on the Latin division, where in the Latin division itself there are 3 kinds of its main instruments. Consisting of conga, bongo and timbales. In the basic training process, members do not fully know how to play Latin percussion instruments, such as the placement of Latin percussion sounds and also the name of each sound produced by the percussion instrument. Based on the appendix A questionnaire taken 29 (twenty nine people), it was found that 17 people were still unfamiliar with Latin percussion placement.

USBP often appears in events, from small events to even large events. The existence of members who are outside the city resulted in not being able to do exercises to make a concept game performance. The absence of one of the members was due to the distance, and as a result the process of making the concept could not be continued. Based on the questionnaire in appendix A taken 150 (one hundred fifty) people, the results obtained were 90 (ninety) people who had training distance problems.

In a study conducted by Muhammad Ilham and Galih (Muhammad Ilham Rizqyawan and Galih Hermawan, 2015) said that "The result is that the game can provide an increase in theoretical test scores by 79.22% and 19.23% relative to the tone test". In addition, in research using gamelan instruments, conducted by Ida (Ida, 2018) said that "Android-based Balinese gamelan Virtual Applications can be used as a means to play Balinese gamelan, and be able to assist users in playing and practicing Balinese gamelan". In addition there are also studies that use multiplayer, conducted by Jodi Pratama, Oka Sudana and Nyoman Piarsa (Jodi Pratama, Oka Sudana and

Nyoman Piarsa, 2015) said that "Design and Development of Android-Based Spirit Card Games with Multiplayer Online Features that can use multiplayer features can handle role playing games from the Spirit Card Game." From the three studies it can be concluded that virtual applications or games can be better understood by others, and also with multiplayer it will help practice in groups according to each person's role.

Based on the above problems, the researcher will conduct a debug research on the title of Android-based Latin percussion app development, which helps and overcomes these problems, namely by making virtual application development of Latin-based Latin percussion music instruments.

1.2. Purpose and objectives

he aims and objectives of this research are:

1. The purpose of this research is to build a virtual application android-based Latin percussion.
2. Purpose:
 - a. Helped introduce how to play and voice placement for new members latin percussion instruments with virtual applications as a means of introduction of the Latin percussion.
 - b. Helps practice performing conceptualization while away from each other by applying realtime multiplayer.

1.3. Research methodology

This type of research is the Research and Development (R&D) approach with a quantitative case study, while the data collection methods used are observation, interviews and questionnaires.

a. Observation

Observations are made by observing and reviewing the training process that runs on USBP.

b. Interview

Interviews were conducted with a question and answer directly to the board and chairman of the USBP

c. Questionnaire

The questionnaire is carried out by asking questions related to research, which aims to obtain data that will serve as a foundation and test results of the system being built.

For software development using the MDLC method where the stages can be seen in Figure 1.

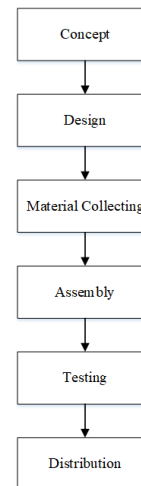


Figure 1 Software Development Method MDLC

a. Concept

Concept stage is the stage to determine the concept of the application to be built, the objectives and characteristics of the user later. Starting from analyzing procedures that run on USBP, analyzing existing similar applications, analyzing the concept of a cobotim system to be built.

b. Design

The design phase is the stage for making detailed specifications of the application architecture, and the material requirements for building applications. Starting from planning the appearance of the interface on the application, tool design, button design.

c. Material Collecting

This stage is the stage for collecting materials such as images, objects from Latin Percussion (Conga, Bongo, and Timbalis), sounds, etc. obtained from internal or external sources. This stage can be done together with the next step, which is assembly.

d. Assembly

This stage is the stage where the application is made, based on the design that has been done before. All objects ranging from sound, images, button designs are combined into an application called cobotim.

e. Testing

This stage is the whole application testing phase. The application will be tested using the blackbox method.

f. Distribution

This stage is the stage where applications that have been made, stored in a storage media or published can be through Playstore or directly to USBP.

2. RESEARCH CONTENTS

2.1 USBP

According to Teguh Kusuma USBP is:

United State of Bandung Percussion (USBP) is a community from the city of Bandung that accommodates percussion lovers, especially in the city of Bandung. USBP was founded by 9 founders, and

was inaugurated on March 22, 2012. Aside from being a community and holding regular training activities in addition to USBP and student trainers / students in schools / campuses in Bandung.

Common concepts taught in Latin Percussion are conga using tumbao patterns, bongo using Martillo and timbales using Cascara (Teguh Kusuma, 2018)

The United States Bandung Perkussion (USBP) logo is shown in Figure 2.



Figure 2 logo United States of Bandung Percussion (USBP)

2.2 Percussion

According to Nurgiyanti, percussion instruments are:

Percussion instruments are often also called percussion instruments or percussion instruments that produce sounds by being hit, beating, rocking, rubbing, or by other means that make objects vibrate or emit other sounds either by being hit using a tool, by sticks (sticks), or with your bare hands, shaken, or mixed with other objects that can produce sounds, percussion instruments commonly used on objects that are used as accompanists in a musical game that is played together or often referred to as percussion instrument playing ensemble. The percussion instrument is also called the percussion instrument. The word percussion is derived from percussio (which means to hit) and percussus (noun meaning "to hit"). Types of music included in the category of percussion instruments include: drum set, marimba, tambourine, etc. (Nurgiyanti, 2013).

2.2.1 Conga

According to Tri Atmaja about conga musical instruments:

Conga is a designation for traditional drums from Cuba originating from Africa, having a single round head that is tall and slender down. This instrument comes from the African congolese region. Someone who plays conga is called "conguero". At first the conga came from Africa and was made of perforated wood, but in Cuba itself the conga was made of several

boards which were bound together like barrels. (Tri Atmaja, 2016).

Image of a conga musical instrument as shown in Figure 2.



Figure 2 Conga Musical Instrument

(Sumber : <https://www.topsimages.com>)

2.2.2 Bongo

According to Salloum about the bongo musical instrument:

Bongos, as we know it today, were first used in Cuban music called anak (pronounced sone). Some evolved around 1900 from the province of Oriente in eastern Cuba. Early rural styles included vocals, guitar (tres), bass (botija or marimbula), and percussion. Then the son migrated to urban centers and a trumpet or cornet was added. By the 1920s his son had become the most popular dance favorite in Havana and soon spread to the United States.

When music evolves so does the drum itself. Initially, the head was attached to the bark and tightened by the heat of the sun or on fire. However, the natural skin head presents a problem of tension with changes in humidity so the drummer constantly needs to adjust the drum. During the 1930s metal spear rods were used to avoid the discomfort of heating the head. The development of the original bongos to this day has been preserved with an extensive bongo collection at the National Museum of Music in Havana, Cuba. (Salloum, 1997).

Image bongo musical instrument as shown in figure 3.



Figure 3 Bongo Musical Instrument

(Sumber : <https://www.topsimages.com>)

2.2.3 Timbales

According to Banoe about musical instruments timbales:

Timbales is a Latin percussion instrument, in the form of a single head metal body drum, used in pairs and supported by legged poles, equipped with cowbell and woodblock pairs. (Banoe, 2003).

According to Silverman & Quintana about musical instruments timbales:

Cuban percussionists develop different play styles first tympani then cubanas pailitas or timbales. Cubans use their hands and fingers to produce sound, a technique called "manoseo del cuero." Also, as a cascara pioneer, Cuban drummers will play in the shell or cascara tympani. They are also more often played on the edge or "border" tympani. The left hand saves time in the hembra, the greater of the two tympanists. This sound is used during certain parts of the song, a pioneer for modern timbales, when, for example, cascara is usually used for verses. Baqueteo sounds were also first developed on tympani where simultaneous beats are produced by a stick on the head or cascara while the fingers produce another sound, filling where one hand does not play. (Silverman & Quintana, 1998). Draw a timbales as shown in figure 4.



Figure 4 Timbales Musical Instrument
(Sumber : <https://www.topsimages.com>)

2.3 Android

According to Abdul Azij, Android is:

Android is a Linux-based operating system designed for touch screen mobile devices such as smartphones and tablet computers. Android was originally developed by Android, Inc., with financial support from Google, which later bought it in 2005. The operating system was officially released in 2007, in conjunction with the establishment of the Open Handset Alliance, a consortium of hardware, software, and telecommunications that aim to advance the open standards of cellular devices. The following versions have been released by Android:Alpha

1. Beta
2. Cupcake
3. Donut
4. Éclair
5. Froyo
6. Gingerbread
7. Honeycomb
8. Ice Cream Sandwich
9. Jelly Bean
10. Kitkat
11. Lollipop
12. Marshmallow
13. Nougat
14. Oreo

2.4 Goggle Play Games Service

According to Erdiawan, Google Play Games Service is:

Google Play Games is a social feature for mobile games developed by Google for Android users. Users can see the achievements or achievements of the games they play, play multiplayer in realtime, the progress of the game will be stored in the cloud and see the highest score that users get from the game. (Erdiawan, 2016) Image of the Google Play games logo as shown in Figure 5.



Figure 5 Google Play Games Logo (Sumber : <https://play.google.com/>)

2.4 System Architecture

Cobotim has three main features can be seen in Figure 6

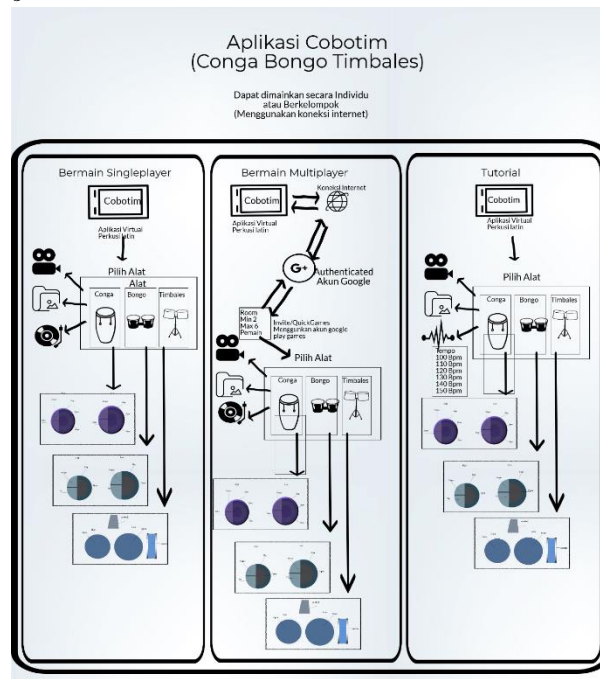


Figure 6 Three main features

In Figure 6 there is an overview of the main features consisting of singleplayer play, multiplayer play and tutorials. Cobotim itself will use the C # programming language, and the application used is to use unity. Assets or materials from this cobotim are made using a blender for modeling, photoshop for button & background design, and also Fruity Loops studio for the sound of the instrument.

1. Singleplayer

Players are provided with 3 Latin percussion instruments, among others, the conga bongo and timbales

a. Conga

Conga consists of a pair of tubular devices, which have different diameters, the first diameter is 10 inches commonly called high, and the second diameter 12 inches is usually called low. Placement of conga sound that is made into digital form like Figure 7.

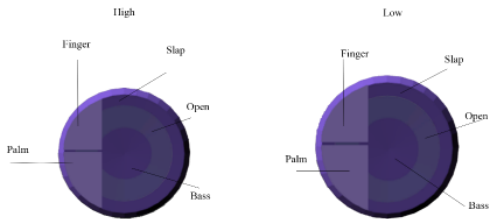


Figure 7 Conga sound placement

b. Bongo

Bongo consists of a pair of tubes connected by beams on both sides, the first diameter of 6.5 inches is called high, and the second diameter of 7.5 inches is called low. Bongo sound placement that is made into a digital form like figure 8.

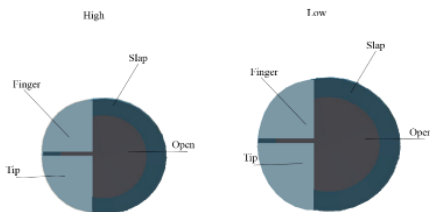


Figure 8 Placement bongo sound

c. Timbales

Timbales consist of two tubes and also a cowbell, the first diameter of 13 inches is called high, and the second diameter of 14 inches is called low. Placement of timbales that are turned into digital form like Figure 9.

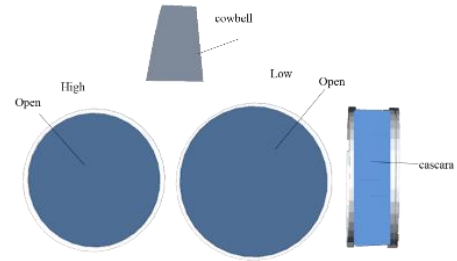


Figure 9 Placement of timbales

The placement of the instrument and also the sound based on how to play the original instrument, the player only needs to hit, pressing part of each sound.

Players can also play the tool while playing an audio playlist that has been provided.

In the singleplayer recorder is also provided, the recorder itself will later record the game screen in order that the player can evaluate the game itself that has been played. Recordings can be seen through the gallery feature that will directly access the storage media on the handphone.

2. Multiplayer

First the player must log in with a google play account, where the google account that has logged in the google play games on the mobile will be authenticated with the system. After logging in the player will choose a game mode, the game mode will be divided into 2, i.e. play randomly where players will be chosen randomly in 1 game, and second play by inviting friends.

Data transmission is done by converting data into bytes, this aims to make the data easily identified when receiving data.

The audio player can only be played by one player, if other players want to play audio, then the audio that has been played must be turned off first.

Players can also record the game by using a screen recorder that has been provided by Google Play Games. Google Play Games provides a screen recorder that can be raised or removed from the game screen, the recorder itself can record the mobile screen and can also record from the front camera as well as to record player's face. Recordings can be directly accessed via mobile phones through the gallery features provided.

When the game has started, the player can still leave the game, but there will be no new players who will replace the position, in other words new players will not be able to enter the game that was started first. The game is declared finished if all players are disconnected or leave the game, if the last player exits the game then the room will be considered closed.

3. Tutorial

Tutorial mode where the player will be given a guide to play conga, bongo and timbales, each tool will

be given instructions ranging from the sound produced to the basic concepts of each musical instrument. Players will then follow the directions of the system which will be tutored or directed to do the basic concepts of each tool chosen. The selection of tools itself is divided into 3, conga, bongo, timbales. The basic concept of conga is "tumbao", the basic concept of bongo is "bacacata" and the basic concept of timbales is "cascara". To select the desired instrument we only need to select or press the continue button of the musical instrument that we want, then the screen will go directly to the musical instrument scene that will be played.

2.5 Menu Structure

Menu structure in cobotim can be seen in Figure 10.

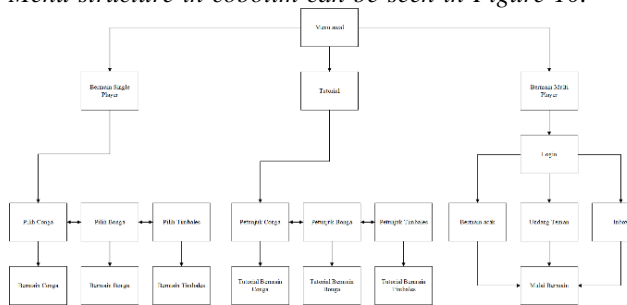


Figure 10 Menu Structure

2.6 Hardware Requirements Analysis

Analysis of hardware requirements in the application, which illustrates the minimum specifications that must be had to play this game, is shown in table 1.

Table 1 Hardware Requirements

No	Perangkat Keras	Spesifikasi
1	Free Space	300 mb
2	Screen Size	5 inch
3	Processor	1.2 Ghz

2.7 Software Requirement Analysis

Analysis of software requirements in applications that explain the minimum specifications that must be owned by developers in building this system, explained in table 2

Table 2 Software Requirements

No	Software	Specification
1	OS	Android 4.0 Ice Cream Sandwich
2	support	Google Play Games

2.8 Black Box Testing

Blackbox testing was conducted to test whether the system has been running a functional system. In the Virtual Application Latin Percussion Application a front end test is performed, with a scenario as shown in table 3.

Table 3 Testing Scenarios

No	Components tested	Testing Scenarios	Test Type

1	Playlist	Playlists play as selected	Black Box
2	Sounding voice	Take out the instrument from Latin percussion	Black Box
3	Record game screen	Recording was successful	Black Box
4	Open the Gallery	Successfully opened the handphone gallery	Black Box
5	Login using a google account / without a google account	Login successful Login failed	Black Box
6	Connection to Google Play Games Service	Successfully outputs to all players	Black Box
7	Invite a friend	Successfully invited friends	Black Box
8	Random play	Successfully playing with random players	Black Box
9	Inbox	Successfully accepted invitation	Black Box
10	Tutorial	Complete the instructions as directed	Black Box
11	Tempo	The tempo is played as selected	Black Box

2.9 User Testing

Testing using the User Acceptance Test method, testing itself aims to try the application and find out whether the application that has been built has achieved its objectives. The questionnaire was given to 106 respondents by asking 5 questions and calculated using a Likert scale, with a score of each answer described in table 4.

Table 4 Likert Scale

Skala	Skor
Strongly Agree	5
Agree	4
Enough	3
Disagree	2
Strongly Disagree	1

2.9.1 Questionnaire Testing Scenarios

Test scenarios for USBP members, explained in table 5.

Table 5 Questionnaire Testing Scenarios

No	Purpose	Statement
1	Helps introduce ways to play and place votes for new members on Latin percussion instruments	<ol style="list-style-type: none"> 1. Virtual Latin Percussion application helps you in individual training 2. Latin virtus percussion application must be further improved 3. Is How to deliver Latin percussion virtual application is easy to understand
2	Helps practice to make concepts when far apart	<ol style="list-style-type: none"> 4. Latin percussion virtual application helps you in group training 5. Latin percussion virtual application is easy to use

2.9.2 Calculation of the First Likert Scale

Based on the responses from respondents for the first purpose, the following results are obtained in table 6.

Table 6 Attitude categories

Category	Score limit
Very positive	$252 \leq x \leq 315$
Positif	$189 \leq x < 252$
Negatif	$126 \leq x < 189$
Very negative	$63 \leq x < 126$

2.9.3 Calculation of the Second Likert Scale

Based on responses from respondents for the second purpose, the following results are obtained in table 7.

Table 7 Attitude categories

Category	Score limit
Very positive	$680 \leq x \leq 850$
Positif	$510 \leq x < 680$
Negatif	$340 \leq x < 510$
Very negative	$170 \leq x < 340$

Based on the scores obtained from the questionnaire results to 21 respondents, for the first purpose a total score of 235 is obtained. Based on the

attitude category, it enters into a positive attitude because it helps new members to introduce and place votes. For the second goal, a score of 660 is obtained, based on the second positive attitude category, it is included in the positive attitude because it is successful.

3. CLOSING

3.1 Conclusions

After analysis, design and testing, the following conclusions can be obtained:

1. Application can help as a means of introducing how to play and the location of sound on Latin percussion instruments get a score of 235 which based on the attitude category table that is a positive attitude.
2. Applications can help performance training to make concepts when far apart get a score of 660 which based on the attitude category table is positive attitude.

3.2 Suggestions

Suggestions for developing a virtual percussion instrument application for the better future are as follows:

1. The sound button on the instrument is repaired so that no delay occurs.
2. The use of multiplayer servers is maximized again.
3. The tutorial feature is made to be more interactive.

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