

## 3D BASED GAME DESIGN ENTITLED THE ADVENTURE OF CHANDRAMAWA

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**Abstract:** This research uses a 'through design' modus, where researchers conduct the design process to find a design solution to produce the design. The main research problem is to examining game that contains education value that overcoming the behavior of children aged 8 years and older. The research objective is to developing a game as a communication media to educate 8 years and older children about respecting parents. The next objective is to preserve the folklore that is rarely told. Methodology used is qualitative research with black box evaluation models. The Game design starts from the exploration of the idea of the story, determine the format of the game, collecting data in the form of visual, audio, and dialogue, gameplay design, designing models, testing and re-evaluating. This game implemented using Unity 3D game engine. The game designed with the following steps: designing the main character, the main camera settings, hierarchy design, HUD design, NPC design, enemy design, map design, and publishing. The final result is a 3-dimensional game entitled 'Chandramawa'. It conceived with background story that convey a message about respecting parents. Benefits to be gained from this game is the availability of media that allow children to play while getting to know the folklore that contains a message respecting parents.

**Keywords:** *Chandramawa, folktale, 3D based game, game design, unity 3D*

### 1. Introduction

Children in Indonesia—at this research subject is in Bali, have a limitless freedom to access and play games that vary and some of them inappropriate for children. From the research predecessors, —by unstructured interview with 30 of elementary school student, at the Denpasar Children Centre's in Panjer, Denpasar, Bali—reveals that they mostly play popular games that contains lack of education value. Balinese People rare to realize that there are lot of Balinese folklore that contain education value. Folklore in Bali, in general, grown by oral, verbal ways, from a region for generations. From all the folktales in Bali, there is a story entitled Chandramawa. This Chandramawa story rare to be told, but have wondrous value about father and son relationship. It tells the story of a cat teenager, named Chandramawa, who is looking for his genuine identity. He is a magical teenage cat. He is very powerful, in contrast to his father figure. His father name was Kucing Gering. He looks very thin, sickly and fragile. Because of his father figure, Chandramawa do not want to admit him as his biological father. He feels like he is different, and eager to find his true figure as his real father. So then he start a journey. At the end of his journey, he revealed that he should be grateful by the fact that his own

father is the best father he'd ever had. The essence of the background story is the grace of the loveliest and most perfect is what we have today. It also deliver message to gamer to always be grateful for what we get, because it is the best present.

This research, actually is the development from Yusa's research [1] that presented Chandramawa's story into mobile based motion comic with three language. Different from Yusa's, the game on this research presented into 3D based, and technically, only runs on personal computers (PC). The game is intended for ages 8 years and older. The scope of the systems used include: Level design, character design, UI design, gameplay programmer. From this background, the authors decided to design a 3D game called The Adventure of Chandramawa. It presented in the form of 3D gaming by giving consideration broad arena for players to explore the world of fantasy as a genre of games and appropriate setting for the type of adventure game.

## **2. Research Question**

This research will reveal how to develop 3D based game, and creating assets that can deliver the message to appreciate and respect our parents, no matter what their figure like, based on Chandramawa background story.

## **3. Research Objectives**

The research objective is to design and build three-dimensional game as a communication media to reintroduce the forgotten folklore that contains educational value about respecting parents, intended for ages 8 years and older. It will be presented by model of RPG games that are played in the Personal Computer (PC).

## **4. Theoretical Background**

### **4.1 The History of Computer Game**

According to Sibero (2009, 10-17) [2] The history of computer game begins by Thomas T. Goldsmith Jr. and Estle Ray Mann with his discovery Cathode-Ray, which is a vacuum tube used as a medium to create a simulation of the shot velocity and direction of the shot a rocket, In February 1951, Christopher Strachey start development towards programming that began to use the memory where the application is applied to the needs of pilots. New discoveries continue to be developed until 1959. After that, the era of development of game consoles began to flourish.

## **4.2 Game Theory Relating To The Benefits of Education**

Games fulfill a number of educational purposes. Some games may be explicitly designed with education in mind, while others may have incidental or secondary educational value. All types of games, including board, card, and video games, may be used in an educational environment. Educational games are designed to teach people about certain subjects, expand concepts, reinforce development, understand an historical event or culture, or assist them in learning a skill as they play. According to Paraskeva (2010), at least 68% of American households play video games. Many recent research articles postulate education and gaming can be joined to provide academic benefits [3].

## **4.3 Game Development**

According to Mark Mancher on Kusuma (2009) [4] Game Development is an activity to design and develop the game. Game development is done by a developer, can be done individually or as a great big industry. In general, large-scale commercial game, created by the development team in a specialized company engaged in designing games for computers and consoles. Video game development is normally financed by a publisher.

## **4.4 Game Design Format**

According to Sloper (2009) [4], the design of the game in general has a format such as:(1). Title Game; (2).Platform Game ; (3). Copyright ; (4). General Information ; (5). Description of the game in detail

## **4.5 Game Genre**

Game genre is term that classified any game type. It can be classified based on the players interaction in game. Visualization is also a measure of this genre classification. But for some cases, the development of the game makes the compilation between different genres. Of course, variations of more game format. (Sibero, 2009, 18) [2].

## **4.6 Game Engine**

Game Engine is a software designed for creating and developing video games. Unity3D is a new piece of technology that strives to make life better and easier for game developers. Unity is a game machine or fabricate a tool that allows creative game developers to build a video game. By using Unity, game developers can build video games quicker and easily than ever before. (Creighton, 2011) [6]

## **4.7 C# (C Sharp)**

According to Nugroho (2009, 6) [7] programming language C # (Read: C Sharp) is a combination of family kecangihan C language (C, C ++, Objective-C, Java, etc.) with the ease of Visual Basic programming language. In this case the C # programming language specification was originally written by Anders Hejlsberg and Scott wiltamuth of Microsoft corp. C# used in Unity game engine.

#### **4.8 Java Script**

Javascript is a language that serves to create scripts that can be recognized and the program executed by the web browser with the aim to make web pages more interactive. Although many features adopted by javascript java, but Javascript is developed separately and independently. Javascript and Java are two things that have a different concept, even though there are similarities in the writing syntax. Javascript is developed by Netspace and an open language, so everyone can use it for free. (Raharjo, 2011) [8]

### **5. Research Methods**

First step in this research is to reveal research predecessors by Yusa, specially about the Chandramawa background story [1]. Authors used unstructured interview to collect responds about favorite game from elementary school student as research subject. The same research subject will evaluate the final game. Before evaluation by elementary school student, the game evaluation done by black box testing to reveal bugs or other error in games. The theoretical background collected by literature studies.

### **6. Discussion : Game Design Concept**

Game Design Concept consist of how will it portray the 'respecting parent' message within the game. Three-dimensional game entitled the adventure of Chandramawa will deliver the story in the form of RPG with a camera shot using a third party in the storyline follows the Chandramawa storyline. The next discussion will be presented on a variety of things such as: the background story, game design method, and game design scheme as follow:

#### **6.1 Chandramawa Background Story**

This game tells the story of a cat teenager, named Chandramawa, who is looking for his genuine identity. He is a magical teenage cat. He is very powerful, in contrast to his father figure. His father name was Kucing Gering. He looks very thin, sickly and fragile. Because of his father figure, Chandramawa do not want to admit him as his biological father. He feels like he is different, and eager to find his true figure as his real father. So then he start a journey. First he met with the Sun that he thought to be the greatest among all because of his light power. The Sun denying of his greatness that he might be not suited to Chandramawa's vision of an ideal figure of a father. Same with the Clouds, The Wind, The Mountain, and the Mouse. At the end of his journey, he revealed that he should be grateful by the fact that his own father is the best father he'd ever had. The essence of the background story is the grace of the loveliest and most perfect is what we have today. It also deliver message to gamer to always be grateful for what we get, because it is the best present.

## 6.2 Game Design Method

Game design process starts from exploration story ideas, determining the format of the game, collecting material in the form of visual data, audio, text, design gameplay, asset creation, development of gaming systems, compose and integrate asset with gameplay systems, testing or trial run game, until it be re-evaluated.

## 6.3 Game Design Scheme

The scheme design of the 3 Dimensional Game Design entitled The Adventures of Chandramawa can be delivered as a problem to be solved by the author are contained in the title is lifted, so that the required data related to the cases. Data are collected either through observation, literature and others. From the analysis that has been done will be to produce any information required in the design concept of this game. After the design process will be carried out using the Unity 3D game design, where design should be equated with the existing design concept. Furthermore, the evaluation process in the manufacturing of health systems, damage, dialogue, Quest, Mini Games, and more aiming for the game to run properly.

## 7. Analysis

The Game design starts from the exploration of the idea of the story, determine the format of the game, collecting data in the form of visual, audio, and dialogue, gameplay design, designing models, testing and re-evaluating. This game implemented using Unity 3D game engine. The game designed with the following steps: designing the main character, the main camera settings, hierarchy design, HUD design, NPC design, enemy design, map design, and publishing.

## 8. Result

### 8.1 Game Design Instruments

Proper software and hardware very important on this research. It is available on <https://unity3d.com/unity/system-requirements> that reveals two things which are System requirements, and Additional platform development. System requirements for development are divided into two aspect which are OS (Operating System) and GPU (Graphic Processor Unit). the analysis of OS that can be used are: Windows XP SP2+, 7 SP1+, 8; Mac OS X 10.8+. Windows Vista is not supported; and server versions of Windows & OS X are not tested. About GPU, Graphics card with DX9 (shader model 2.0) capabilities is recommended. Anything made since 2004 should work. The rest mostly depends on the complexity of the projects. Additional platform development requirements are:

1. iOS: Mac computer running minimum OS X 10.9.4 version and Xcode 6.x.
2. Android: Android SDK and Java Development Kit (JDK).
3. Windows 8/8.1 Store Apps / Windows Phone 8/8.1: 64 bit Windows 8.1 Pro and Visual Studio 2013 Update 2+.
4. Blackberry: 32 bit Java Runtime (JRE).

5. WebGL: Mac OS X 10.8+ or Windows 7 SP1+ (64-bit editor only)

Generally content developed with Unity can run pretty much everywhere. How well it runs is dependent on the complexity of our project. More detailed requirements for running Unity games are:

1. Desktop:
  - a. OS: Windows XP+, Mac OS X 10.7+, Ubuntu 12.04+, SteamOS+
  - b. Graphics card: DX9 (shader model 2.0) capabilities; generally everything made since 2004 should work.
  - c. CPU: SSE2 instruction set support.
  - d. Web player supports IE, Chrome, Firefox, Safari and others.
2. iOS: requires iOS 6.0 or later.
3. Android: OS 2.3.1 or later; ARMv7 (Cortex) CPU or Atom CPU; OpenGL ES 2.0 or later.
4. Blackberry: OS 10 or later.
5. WebGL: Desktop version of Firefox, Chrome or Safari

## 8.2 Character Development

The design of the characters starting from modeling the Chandramawa character, then continued making animated tails, and installation of all stages texture using Blender application used in the manufacture of 3-dimensional design. Player will be paired component that complements the character of the system. This activity is carried out in Unity3D. An important component in the movement of the character is animated Mecanim and player system. It can reveal on figure 1.



**Figure 1.** Chandramawa character development

### 8.3 Main Camera Setting

Main Camera is a view that can be seen from the perspective of the player. In the adventure game Chandramawa use 3rd person angle or view of a third party, other than as a play view camera in adventure games.

### 8.4 Hierarchy Designing

The function of the '1.Kunci' on figure 2 is a barrier that limits the player so as not to come out of the storyline. Chandramawa is the main character in this game. Collider Control serves to regulate '1.kunci', 'Main Camera' is the main camera use in game view. 'Stage 0' is the enemy or enemies scattered around the map. 'Stage 1 to 7' is a more detailed flow of the game and discussed at the map and level design, the terrain is a system folder and day night cycle.

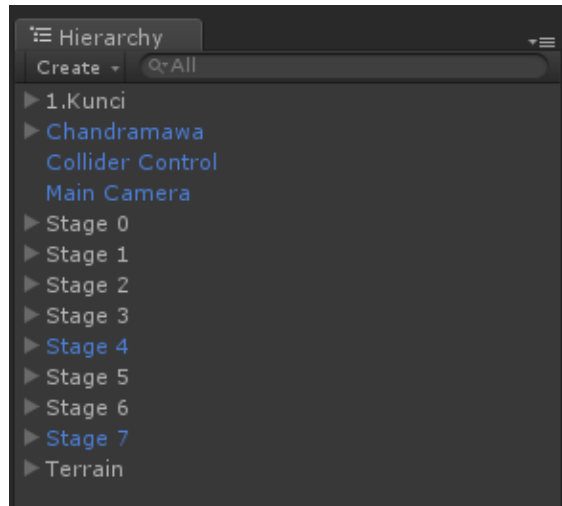


Figure 2. Hierarchy on Unity 3D

### 8.5 HUD Design

We can see the HUD interface on Figure 3. It is a HUD display in the form of an indicator. It is seen by the player. The viewpoint created views does not interfere with the game, for example indicators heal in form of 'health bar' notify the amount of player's health. The health bar notify that players must be more careful and not die because it can cause the game ends





**Figure 3.** HUD Design in Chandramawa Game

## 8.6 Game Mission Design



**Figure 4.** Game Mission Design

Figure 4 shows the game mission design. At the 'a' is Non Playable Character (NPC). If Character very close to the NPC, there will be an notification that read 'Tekan [E] Untuk Bertanya'. It means that we have to push 'E' character on our keyboard to start the conversation with the NPC.

## 8.7 In Game Interface

Figure 5 reveals the overall view of the interface story (1), the main menu (2), gallery (3), when the player lost menu (4), and ending (5).



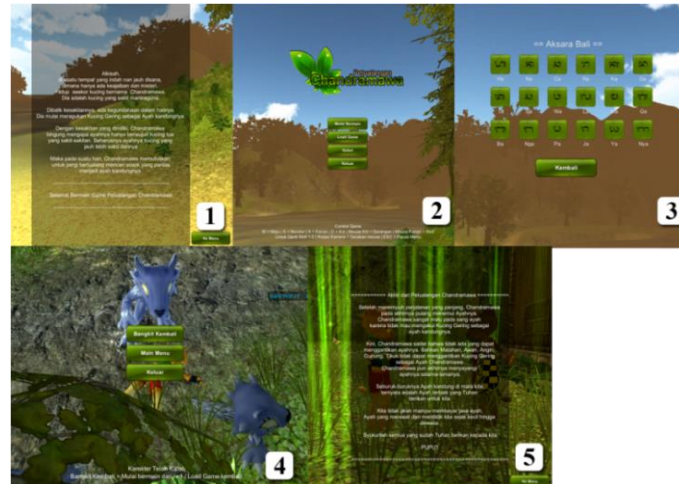


Figure 5. In Game Interface

### 8.8 Non Playable Character Design

NPC is another character in the game world that we can't control. It can be a merchant, blacksmith, assignor, and others. In the adventure of Chandramawa game, NPC is the character of the storyline that provide task (quest) to be completed by the player.

### 8.9 Enemy Character Design

There are twelve (12) models and uses the same system, differing only on the value of the parameters used, such as animation, enemy name, status, aggressive or not, the distance patrols, items are dropped, exp enemy, and the type of attack. The level of enemy forces grouped by the color of its name.

### 8.10 Map and Level Design

#### a. Map or Terrain Design Process

In the process of making the binder comprises into three processes, first determine the size of the map area, next step is to form a surface binder, third binder decorate with grass, trees, rivers, beaches.

#### b. Level Design Process Design

The process of making level design includes creating setting for each stage of the game. The adventure of Chandramawa project using seven stages, namely, stage one is 'Father', stage two 'Suns', stage three 'Clouds', stage four 'Winds', stage five 'Mountains', six 'Mice' and 'Parasala' stage, stage seven returned to father.

## 9. Final Game

### 9.1 Publishing

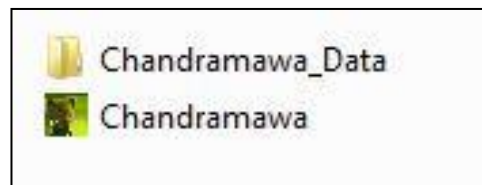
The final step in the making of this game is that the 'publish' process. Publishing objective is to make players successfully played this game. The process comprises publishing into two parts, namely:

#### 1. Build Game

The function of the build settings for building game that has been made and in the build platform into a format that we want so that games can be played without any unity program in the computer.

#### 2. Build exe file to Setup

After the game built on \*.exe format, there will be two data appear, the first is the folder containing the data outside the game and folders contained \*.exe file according to the name that was created earlier.



**Figure 6.** Folder created in Chandramawa game

To supplement the results to be a setup file and can be installed on any PC using software Inno Setup Compiler.

### 9.2 Game Parts

After the design process and make the process of publishing, the next is the end result Chandramawa adventure game, while the results are as follows: (1). Splash Screen and Loading bar; (2) Intro and Main Menu ; (3) Mission Stage ; (4) Ending

### 9.3 Evaluation

There are error, bugs, and problems found during the design process. By using Black box evaluation methods, it reveals that errors and problems in the game has been successfully repaired.

## 10. Conclusion

Based on the results of the implementation of three-dimensional design titled adventure game Chandramawa, it can be concluded as follows:

1. Game Chandramawa can be designed to use standard features that exist in Unity 3D software.
2. Game has successfully designed with the following steps:
  - a. Main Character design  
The design of the main character starts with designing a model with Blender software subsequently imported into Unity and paired with Component such as Animator, Capsule Collider, RigidBody, Audio Source, and six pieces of script that serves to control the movement, setting the mission, HUD, skill.
  - b. Main Camera Settings  
The main camera view is the point of view of third parties, have a component in the form of Audio Source and three scripts that control the direction of the camera, blur effect, and the pause menu.
3. Evaluation results  
Games that have been successfully designed discovered several errors and have successfully finished, as follows:
  - a. Error in the distance between the NPC and the player. Resolved by changing the distance of the current NPC player interaction.
  - b. Error on the animation and script that is not in line. Resolved by way of animation that calls the script.
  - c. Barrier that does not work when the load game. Resolved by adding a script that set a barrier in accordance with the mission status in the player.

Suggestions for the development of three-dimensional design titled adventure game Chandramawa :

1. In the Adventure Game Chandramawa not use the equipment inventory system required due to limited time, and the next expected improvement of the system in the form of a gaming system equipment, inventory, pet, skill, folder, save and load could be done. It aims to make the player more interested in play and increase the value of the game is made.
2. For now only use Chandramawa Adventure Game Platform PC, and is expected to be developed in the future capable mobile platform, online games and crossplatform, aims to increase the range of only reach users of PC and now on the expanded use of online networks and through the device to the system different operations.
3. In the Adventure Game Chandramawa, Mini Quest consists of collecting letters Balinese. Mini quest can still be developed, especially with regard to education in the game. Miniature quest or mini-game can be said Balinese, or alternatively, aims besides improving the quality of the game also remains balanced with maintaining morals of children who play.

#### Appendix

Script form used in the manufacture of the project and discussed in the report, as follows:

1. testcontrol.cs is a script motion player who is still in the stage of completion

2. playerproperties.cs is a script that is used for setting the status of the player
3. MouseLook.cs is the script used in the main camera to provide viewpoints and restrictions
4. Dialog.cs is a script used in player talks to the NPC while performing the mission and the script is placed in the model NPC
5. EnemyAI.cs there; ah scripts used to control the movement of the enemy to attack player

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