

Android-Based Traditional Games

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Abstract – The traditional Bentengan game is one of Indonesia's popular cultural heritages from the 1980s to the 1990s. Aside from being a cultural heritage, this game has benefits including for sports, training for concentration, or just for public entertainment. However, in the present where technology has become widespread, this game has begun to be almost forgotten and replaced by digital games. Therefore, we need a way to keep the game sustainable by utilizing the existence of technology, namely by changing the concept of traditional to modern. In this research the transformation process from traditional to modern games will be carried out using the ATUMICS method. The results of the transformation were developed into a 3D android game with additional online multiplayer features. Alpha test results using a black box showed that most of the application functions were running as expected, and the beta testing showed satisfactory results with an average overall rating of respondents saying 82% of digital games had the value of "VERY GOOD" and was enough to describe the actual Bentengan game.

Keywords – Traditional Game, Game, Android, Bentengan.

I. INTRODUCTION

Traditional games are one form of Indonesian cultural diversity that often colors the children's daily life when playing, which has been passed down from generation to generation by ancestors. According to Mohamad Zaini Alif as a researcher of traditional games, revealed that in Indonesia there are at least 2,600 types of traditional games [1]. Some of them are quite well known in various regions, such as sodor gobak, congklak, shootout, and bentengan. Traditional games, Bentengan is a fairly popular game played by Indonesian children. This game originates from the West Java region and is commonly referred to by the name "Rerebonan". In practice, this game will be formed into two groups, with the number of each group must be the same, usually 4-8 people. The aim of this game is to take the opponent's castle or succeed in capturing all the opposing players. But unfortunately this traditional game is very rarely played by young people of the current generation, even though this game must be preserved and introduced to the next generation because in addition to being one of Indonesia's cultural heritage, this game also has benefits including training concentration and honing strategic skills for the players. According to [2] in ancient times traditional games other than as a medium of entertainment can also increase a sense of brotherhood. Based on these problems, there needs to be an effort to package traditional Bentengan games so that they can be introduced and accepted by the young generation today. Given the closeness of today's young generation with technology (smartphones and the internet), it is expected to be easier to introduce traditional games in the form of digital games. Digital games or video games are games that use interaction with the user interface through images generated by multimedia-based electronic media [3]. Another problem arises when a conventional game is packaged into a game. In practice, conventional games will inevitably have many differences with digital games both in terms of rules, players, arena and game time itself

because they are played in different dimensions. Thus, it is necessary to use a method of transformation from traditional to modern forms so that the transition from traditional games to digital games can be done without eliminating the cultural values that exist in these traditional games..

In this study, the problem will be resolved about how to carry out the process of transformation from the concept of traditional games into digital form without losing the cultural value of the traditional game. Then the results of the transformation will be implemented into a handheld game in digital form. Implementation will be carried out on the Android platform, with 3D concepts and additional online multiplayer features.

II. LITERATURE REVIEW

A. *Bentengan Traditional Game*

According to [4] a traditional game is a game that is carried out by holding fast to the norms and customs that have been passed down through generations and can provide satisfaction or pleasure for the offender. One popular traditional game is Bentengan which is an original product of Indonesian culture originating from West Java known as "Rerebonan". This game has spread widely throughout the archipelago with a different name, although it has a different name in each region, in essence the purpose of this game remains the same, namely seizing the opponent's fortress. Bentengan game had become the most popular game played around the 1980s to the 1990s [5].

B. *Game*

Game is an activity that aims to entertain or just fill in spare time, in the game there are rules to limit the behavior of players and determine the flow of the game. This is in line with the opinion [6] which states that the game is a system where players are involved in artificial conflicts, determined by the rules, which produce measurable results.

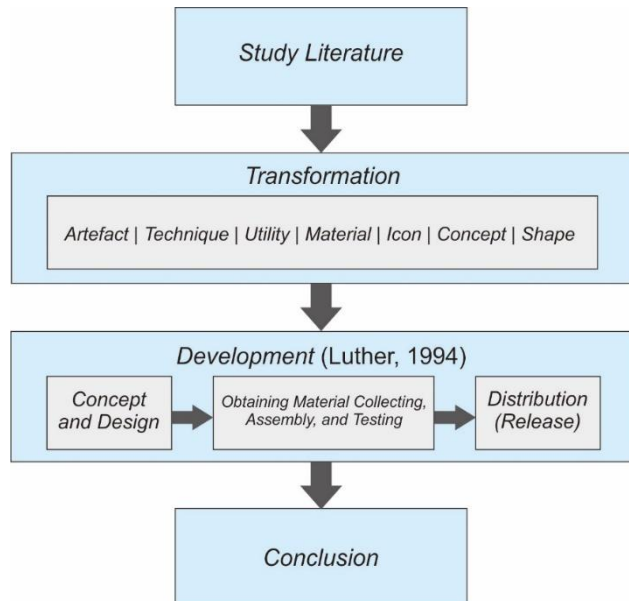
C. *ATUMICS Method*



ATUMICS is an abbreviation of Artefact, Technique, Utility, Material, Icon, Concept and Shape which is a method for transforming a traditional concept into a modern form [3]. The purpose of this concept is to map cultural elements without leaving the cultural essence of a cultural product. The mapping is described in macro level consisting of Artifact, Technique, Utility, Material, Icon, Concept, and Shape as well as micro level which contains motivation for game transformation.

III. RESEARCH METHODOLOGY

The stages of the research methodology in this study are shown in Picture 1:



Picture. 1 Research Method

A. Study Literature

At this stage, there will be a search for sources of literature that have been made before, such as journals, articles, news, books, and various other literature relating to the problem under study.

B. Transformation

At this stage the transformation of traditional games into modern (digital) forms will be carried out using the ATUMICS method. This transformation process aims to map cultural elements without leaving the core of the traditional game.

C. Development

This stage is the stage of development that will be carried out in multimedia product engineering. In this study the MDLC approach is used with the development method referring to the Luther method which consists of six stages, namely Concept, Design, Obtaining Material Collecting, Assembly, Testing, and Distribution [7].

D. Conclusion

At this stage conclusions will be drawn from the results of research that has been done, as well as providing input from the shortcomings of research that has been made for further researchers or developers.

IV. RESULTS AND DISCUSSION

A. Study Literature

Research that discusses the transformation of traditional games to digital has been done a lot, for example research conducted by [8] entitled Designing Flash-based Gobak Sodor Game Application in Local Network Scope that discusses the android-based sodor gobak game by applying the concept of multiplayer and can be played together at more than one device. The connection uses a LAN network, so it is still limited by space. The results of his research show that there are still many bugs found in the multiplayer feature, so that the implementation of this traditional game has not been maximized.

Another study was conducted by [9] with the title Traditional Android-Based Traditional Game Design Build, which mentions that traditional games are being replaced by modern games, so they need to be preserved by developing them on Android devices. In this study the concept of multiplayer is proposed so that the game can be played by more than one person, but its application is still in one device. The results of the survey by respondents who have played this game are 63% giving attractive values in the graphical aspect, 67% good in the RPL aspect, 63% good in the entertainment aspect, and 60% understood in the content aspect. Subsequent research carried out by [3] titled Game Android-Based Combat Muncang, in that study mentioned technological developments have changed the way of playing children who rely more on gadgets so that it needs a way so that traditional games remain sustainable without compromising technological development, and the way is transforming traditional games into digital form. The method used is to combine the ATUMICS model (acronym for Artifact, Technique, Utility, Material, Icon, Concept, and Shape) and Multimedia Development Life Cycle (MDLC) in the development of the game. From the test results obtained all functions run well, while feedback from users is 80% and is feasible to play. Based on previous studies regarding the transformation of traditional games into digital games, researchers have succeeded in implementing these transformations on an Android or desktop basis. From all of these studies, no one has transformed traditional bentengan games into digital form with android-based online multiplayer features.

B. Transformation

1. Level Mikro

a. Artefact

Artefact from the Bentengan Traditional Game can be explained as follows:

- 1) **Intent.** Bentengan game originated from West Java and is commonly referred to by the name "Rerebonan". Bentengan games can be played by children, adolescents and adults. Usually played to fill spare time or in certain events.
 - 2) **Purpose.** The aim of the game is to compete for the opponent's fortress or to capture all the opposing players.
- ##### b. Technique
- 1) **Playing Techniques.** Bentengan games are played by forming two groups, generally consisting of 4 to 8 people, but in practice, the number of group members is free and according to agreement. Then each group

chooses the pillar or pillar as the 'fort' and around the fort there is a safe area for the group that owns the pillar. Each group will then take turns to become a team of 'attackers' and 'defenders'. The game starts when one of the members leaves the fort, and the group whose members leave the castle first has the right to be an 'attacker'. The group of 'attackers' can chase and touch opposing players to make prisoners. The team that becomes a captive team can free the partner by touching it, meaning that the 'defending' team must run out of the castle and avoid the 'attacker' team, if when outside the fortress the 'defending' team returns to the castle and touches it, the team will turned into an 'attacking team'. In other words, the person who is the closest to touch the castle can be an 'attacker'. The winner of the game is a group that can touch the opponent's castle and shout the word fort or who can capture all members of the opponent.

- 2) **Expertise.** Bentengan players must have good running skills because there will be chases with opposing players. In addition, players must be good at strategy and have good concentration.
- 3) **Technology.** Bentengan games are played and controlled directly by the players, including in the selection of places where the game is free and relies on objects that are around.
- 4) **Equipment.** Equipment needed in the game is bent pillars or pillars, which can also be replaced with anything in the surrounding environment such as fences or trees. Also needed is a special place as a safe area and a place of captivity that is owned by the two teams that are playing, usually in the form of a free space that is given certain boundaries, or it can also be land drawn with a circle with branches.

c. Utility

- 1) **Function.** Bentengan game is played to fill in spare time, games, competitions, or certain events.
- 2) **Uses.** Bentengan games can be used as a means of entertainment, sports, training cooperation and concentration, can also strengthen the sense of community between people.
- 3) **Needs.** Bentengan games can meet the needs of entertainment for children or sports needs that are fun for school students and the community

d. Material

Material used in the game including two pillars, poles, trees or any large objects that are not easy to move that will function as a fortress, and four places that are given special restrictions, or can also be ground surface drawn with a circle using a branch as a safe place and the place of captivity of the opposing team.

e. Icon

Icon in the game bentengan is something that acts as a fortress that will be guarded as well as being sought after by the opposing team. When the fortress is successfully touched by the opposing team, the castle owner's team will lose.

f. Concept

Concept Bentengan games can be seen from:

- 1) **Visual,** that is a game that is played together with others as a form and result of the community's togetherness.
- 2) **Uses,** Bentengan games that have long been a place to

- play children, even adults at certain events.
- 3) **Gameplay,** this game rests on a fortress and its players protect the fortress. This game also has no time limit. The game ends when it's visually visible which team wins and loses. The winning team are those who succeed in capturing all the opposing players or successfully touching the opponent's castle and shouting the word 'benteng'.

g. Shape

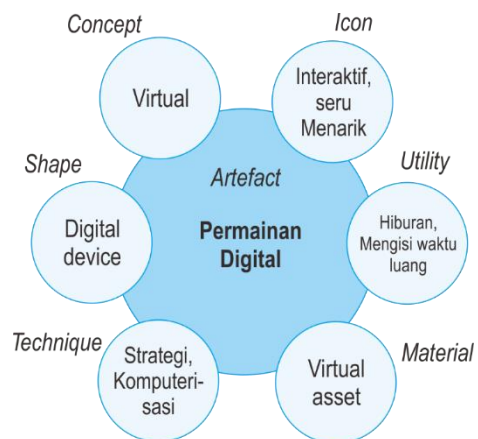
Shape in a bentengan game can be seen from the shape of the game arena in the form of a large area, where the area will be divided into two sides, each side occupied by two groups that will compete. On each side there will also be a 'fort' at the heart of the game.

The results of the analysis of the basic elements that exist in traditional Bentengan games can be summarized in Picture 2 below:



Picture. 2 The results of the analysis of cultural elements in traditional bentengan games

Then these results will be combined with existing elements in digital games in general. Picture 3 shows the elements that exist in digital games:

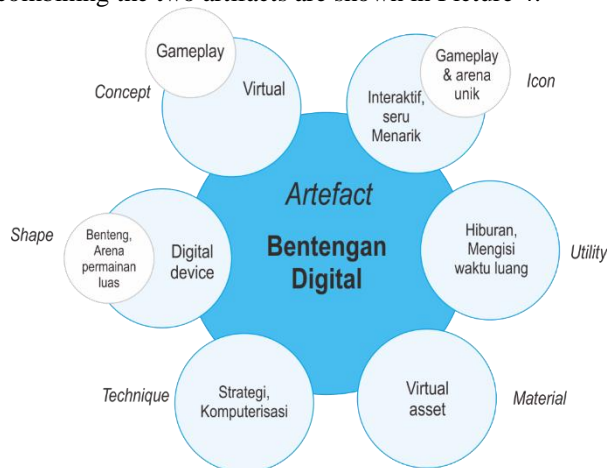


Picture. 3 Results of Analysis of Elements in Digital Games

The elements that exist in traditional bentengan games are then combined with the elements that exist in digital games in general, so as to produce a combination of bentengan games that are in digital form. This process will result in the loss of some elements that are contrary to elements from other artifacts. This can not be avoided, because preserving traditional games is not limited to keeping it there, but also must be able to develop in



accordance with the times, so it is not denied that in its development there will be values that intersect and even cancel each other out [10]. The results of the process of combining the two artifacts are shown in Picture 4:



Picture. 4 Digital Bentengan Elements

Changes that occur there are elements in the technique, material and utility. Technique changed because the place that would become the arena of the game was no longer in the real world, so all the gameplay, skills, strategies and equipment turned into computerized. The same is true for materials where all the components in a traditional handwriting game will turn into virtual shapes. Utility changes due to the disappearance of some functions of the conventional playing game, which is a function for sports because in digital games the player will not move much.

2. Level Makro

Level makro can be explained in the form of motivation that underlies why the transformation is done. There are 3 levels of motivation, namely:

- Main Motivation.** With the design of bentengan games in the form of digital games, it is hoped that this game will be widely known and played by the public, especially millennials, so that the culture of bentengan games will continue to be sustainable.
- Secondary Motivation.** The social motivation of designing digital playing games, among others, can be used as a means of connecting between players, where it can add a sense of intimacy between fellow players. As for economic motivation, the game that has been turned into a digital game can be a digital product to be sold to the public.
- Other Motivations.** Other motivations contained in the design of digital bentengan games can be seen from the side of ecology, where ecology can also be interpreted as a study of interactions between living things, then of course there will be something that can be examined from changes in previous community interactions that play bentengan games manually and today's society that plays it in electronic media.

Based on the description above, adjustments are needed for the game to be made with the results shown in the table 1:

Table 1. Transition Results

Permainan Bentengan Tradisional	Permainan Bentengan Digital	Penyesuaian Peraturan
Jumlah pemain 4-8 orang per tim.	Jumlah pemain 1 orang melawan 1 pemain lain secara acak.	Jumlah pemain menjadi satu orang agar lebih simpel dan fleksibel.
Lama permainan tergantung dari kesepakatan para pemain dan lamanya persiapan untuk menyiapkan arena permainan.	Lamanya permainan ditentukan oleh sistem.	Lamanya permainan perlu diberi batasan waktu oleh sistem.
Penentuan tim 'penyerang' dan 'bertahan' bisa ditentukan dengan suit, tergantung kesepakatan atau tim mana yang lebih dulu meninggalkan benteng.	Penentuan 'penyerang' dan 'bertahan' ditentukan oleh sistem, dilihat dari siapa yang lebih dulu meninggalkan benteng.	Penentuan 'penyerang' dan 'bertahan' perlu ditentukan dan diatur dengan jelas oleh sistem untuk efektifitas permainan.
Sebelum permainan dimulai, kedua tim menentukan tempat mereka masing-masing.	Sebelum permainan dimulai pemain otomatis ditempatkan di satu tempat.	Karena pemain 1 vs 1 maka posisi pemain otomatis ditentukan oleh sistem.
Semua peraturan dan ketentuan dalam permainan dijalankan masing-masing oleh pemain.	Semua peraturan dan ketentuan dalam permainan dikendalikan oleh sistem.	Pengaturan dan instruksi-instruksi permainan dilakukan secara otomatis oleh sistem.
Tidak terdapat apapun di lapangan pertandingan selain pilar yang menjadi 'benteng' dan area tawanan masing-masing tim.	Di dalam area pertandingan terdapat beberapa rintangan untuk kedua pemain yang bertanding.	Tanpa merusak konsep permainan asli yang di dalamnya terdapat kejar-mengejar antara pemain yang bertanding, versi digital dibuat dengan tambahan rintangan pada area permainan agar lebih menantang bagi para pemain.

C. Development

1. Concept

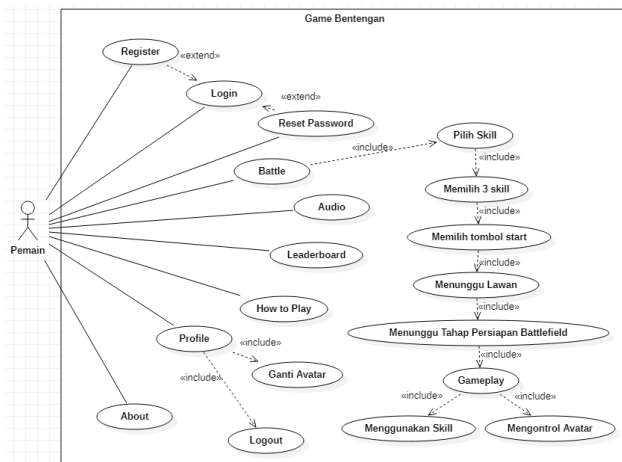
The game concept is explained in table 2 below:

Table 2. Bentengan Game Concepts

Judul	Bentengan
Audiens	Umum
Durasi	Sampai dinyatakan kalah oleh sistem atau waktu bertanding sudah habis
Teks	Teks untuk petunjuk dan keterangan dalam permainan
Image	Gambar background dan icon (*.png)
Audio	Instrumen dalam game (*.mp3)
Animasi	Animasi karakter 3D
Interaktifitas	Tombol dan analog controller
Tema	Adu strategi dan kecepatan untuk menyentuh benteng lawan tanpa tertangkap
Karakter	Terdiri dari 2 karakter
Deskripsi	Game ini merupakan permainan tradisional bentengan yang diubah menjadi bentuk digital agar lebih mudah dimainkan masyarakat masa kini sehingga tetap lestari.

2. Design

Game design is explained in the form of use case diagrams. Use Case diagram is one of the important diagrams used to illustrate the requirements of the system and explain visually the context of the interaction between actors and the system [11] [12]. The following is a Use Case diagram of the game shown in the picture 5:



Picture. 5 Use case diagrams with games

3. Obtaining Material Collecting

This stage is carried out the process of making and gathering all the elements needed in the game. The elements used in the form of images, music, animation, text and 3D objects. Image editing is done using Corel Draw X7.

4. Assembly

At this stage a merging of all multimedia elements that have been made beforehand and starting to arrange the game based on the concepts that have been made. This process is carried out using Unity 2019.2.4f1. and the process of making program code using Visual Studio Community 2019. Some game interfaces that have been made include shown in Picture 6, 7 and 8 below:



Picture. 6 Main Menu Interface



Picture. 7 Initial Interface Enter Match



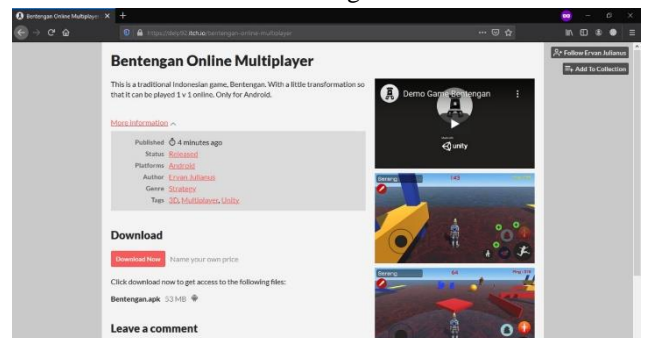
Picture. 8 Match Interfaces

5. Testing

The testing process is carried out in two stages, namely alpha test and beta test. Alpha test uses the black box testing method which functions to test functionality without testing the design and program code to find out whether the functions, input and output of the software are in accordance with the required specifications [13] [14] and beta test uses questionnaire methods to get responses about the application / game from end users. The questionnaire contains 20 positive questions with 5 aspects consisting of the contents of the game, appearance, features and functions, ease and usefulness, and appeal of the game. Testing is done online, using purposive sampling technique. The target purposive sampling is students of Siliwangi University, Department of Informatics with groups of Multimedia and Game Technology expertise. In this study the number of respondents who were successful was 35 people. Questionnaire calculations use the Likert scale [15] with 5 answer choices scales namely "Very Good", "Good", "Enough", "Not Good", "Very Not Good". The results of the black box testing showed that most of the application functions were running as expected, whereas for the results of the questionnaire, on average 84% of the respondents' content was "Very Good", 82% of the respondents' views were "Very Good", 84% of the respondents' features and functions were "Very Good", 81% of the respondents' ease and usefulness were "Very Good", and 77% of the respondents' attractiveness were "Good". The average overall rating of respondents said 82% of this digital game has a value of "VERY GOOD".

6. Disribution

The last stage is game distribution. The game is uploaded to itch.io with the name Bentengan as shown below:



Picture. 9 Contrarian Games on itch.io



V. CLOSING

Bentengan games have been successfully transformed into digital form using the ATUMICS method, where in the process there are some elements that have changed to be in accordance with the concept of digital games. Elements that can still be maintained are combined with elements of digital games to form the concept of a digital game that has the same cultural value as the original game. The implementation was successfully implemented well on the Android platform and used the 3D concept. The results of alpha testing from the developer side showed that most of the application functions were running as expected and the results of beta testing showed satisfactory results with an average overall rating of respondents saying 82% of the digital game has a value of "VERY GOOD" and is enough to describe the real handheld game.

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