ANDROID MOBILE BASED DEVELOPMENT OF AN ADVENTURE 3D EDUCATION GAME SEEKING MEDICINE HERB

Andy Wirawan[1], Iskandar Ikbal[2]
[1,2]Informatics Engineering-Indonesia Computer University
Jalan Dipatiukur No 112-116 Bandung. 40312
wirawanandy04@gmail.com[1], iskandar.ikbal@email.unikom.ac.id [2]

ABSTRACT

Medicinal herbs are plants or plants that have more function that is for treatment. Differences of herbal medicine with ordinary drugs apart from its function also from the way of manufacture. But the fact that there are still many Indonesian people do not know what medicinal plants that can be used in Indonesia, based on the results of questionnaires distributed as many as 53 people also say ignorance about the medicinal plant of 77.3%. Game is a term in English, in other words that is doing an activity to achieve or complete a mission in the game, some games have a challenging nature, fun and can make addictive, for that in the eyes of society is still very is considered negative, but not if added educational elements in it that will become educational game where the goal makes players feel addicted, and fun but at the same time get the element of education in it. The research method to be used is the Luther-Sutopo version of MDLC method. The results of my research is an educational gaming adventure educational application that can be used as an alternative media to increase knowledge about medicinal plants in Indonesia ranging from usefulness and recipe to process it. based on the results of questionnaires distributed to 31 people, found the overall results of each respondent to the purpose of research is in the positive category
Keywords: Game, Education Game, Medicine Plant, herb, Adventure, Android.

1. PRELIMINARY

Herbal medicine is a plant or plant that has more functionality, the difference with regular medication apart from its function also how they produce."The advantage of herbs, that is, not just a single function, the compound in herbal medicine is intact, so the active compound in the natural form is more Easily synchronized with the body's metabolic system," said Tjok Gde As Member of Homeopathy and Natural Health Practitioners in a discussion at Deltomed Factory Laboratories, Wonogiri, Central Java [1]. In addition, herbal remedies are made without a mixture of chemicals therefore more people trust them. "This herb is very easy to get in Indonesia. Unfortunately, there are still many who do not know the benefits of Reviews These crops for health. Perhaps at this time only a handful of people are still eating them. [1]". But the fact that there are still many Indonesian people do not know what medicinal plants can be used in Indonesia, based on the results of questionnaires distributed as many as 53 People also say ignorance about the medicinal plant of 77.3%. Why we should know the herbal medicine? According to the book "Herbal archipelago" the which has been approved by Prof. Dr. CJ Soegihardjono, Apt. As a Professor of Traditional Medicine at the Faculty of Pharmacy, Sanata Dharama University of Yogyakarta, it is said "Herbal medicine can be very powerful and effective, There are many cases of diseases that can not be cured medically, but can be cured with herbs medicine "[2]. According to Indonesian Medical dictionary words are all things related to medicine such as doctors, nurses and other personnel associated with medical services for Patients [3]. Therefore it is very important we know what plants can be used as herbal medicine. Game is a term in the English language that can be interpreted is a game, in other words that is doing an activity to Achieve or melenyesai a mission in the game, the nature of the game, among others, challenging, fun and can make-addictive , for that in the eyes of society still highly Considered negative, but not if the added educational elements in it that will Become of educational games where the goal makes players feel addicted, and fun but at the same time get the element of education in it. Based on Reviews These problems, the educational game was developed entitled "girder adventure looking for medicinal plants" As an alternative media to know about medicinal plants in Indonesia.

1.1 *Medicine Plants*

Medicinal plants are none other than plants that have special properties as a medicine. Usually, in rural neighborhoods each house has plants that can be used as herbal remedies or commonly known as "live pharmacies". Medicinal plants are common in the housing of other aloe vera, turmeric, kencur, mangkokan leaves, and others. Not a few of them who use medicinal plants as a family business. So, in addition to treatment in the family, can also supplement the family income [2] .The of understanding of traditional medicinal plants issued by the Minister of Health of the Republic of Indonesia roomates that tanman medicine defines Indonesia as listed in the Minister of Health Decree No. 149 / SK / Menkes / IV / 1978, the which is [4]:

1. Plants or parts of plants used as ingredients of traditional medicine or herbal medicine.2. Plants or parts of plants used as part of the starting materials of the drug.3 raw materials. Plant or part of the extracted plant and the result of the plant's extraction may be used as a medicine.

1.2 Education Game

In accordance with the meaning, the game is a game, so educational game is a game in the which there are elements of education that aims to Convey educational information in the form of games.Here are the characteristics of games for learning [5]:

1. There are challenges and adjustments, meaning there are challenges at each level, different levels of different levels of difficulty.
2. Interesting and Exciting, the game can the make students engrossed in an activity and understand the purpose of the game.
3. Do not patronize based on experience, students do not need to be trained first, let them try Themselves, if they fail they will think to change Reviews their strategy.
4. Interactive, very clear good games are interactive games, users see what will happen as a result of Reviews their actions.
5. Feedback, the user can deduce from the feedback provided by the system, for example if pressing the jump button, then the system will show the character jumping.
6. Social and cooperation, the game must create dialogue and exchange ,
7. The opinions and knowledge among fellow players.Expertise, All students in one class certainly do not have the same ability, ad students who can serve as assistants to help other students explain about the game.

1.3 Multimedia Development Life Cycle

The software development method I use is the Luther-Sutopo version of MDLC. According to Luther-Sutopo, there are six stages in the MDLC cycle, the following are the stages and their explanations [6]:

a. Concept

The initial stage where Determining the purpose of why this application is made and will be addressed to Whom, for this case will be distributed to the public in order to better know and learn the plants that can be used as herbal medicine.

b. Design

At this stage will be done detailed specifications for applications that will be made, usually at this stage will be used story board.

c. Collecting material

The stage of collecting what materials will be required for this application, multimedia is definitely related to images, video and audio.

d. creating

Stage of making the application, after all the material is enough, the application development is run, usually using the game engine applications such as Unity3D, Adobe Flash, construct 2. For this case I use Unity3D.

e. testing

Conducting two tests of alpha and beta testing, alpha testing is the testing of each page created, testing of bugs, conformity control, the sound produced. While Beta Testing is a test performed by users who are included with the questionnaire.

f. distribution

The last stage where the distribution of the application has been done after the test results and has been declared worthy to use.

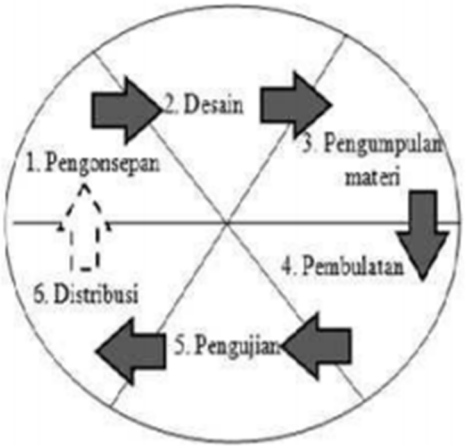


Figure 1 Multimedia Develompent Life cylce

2. RESEARCH CONTENT

2.1 Analysis of the games that will be built

Edication This game is about Medicinal Plant Single Player and played offline, the which means no need internet connection to play this educational game. In this game will be given missions / quests from NPC to search for medicinal plants scattered around the village. Here is a gameplay as well as a picture game of medicinal plants:

1. To finish the game, players must complete the missions / quests.
2. The quest / mission will be given by NPC Who is in the village.
3. Different Missions, Also different medicinal plants to be sought.
4. Medicinal plant information can be accessed via the journal button.
5. Players can berinteraksi with other NPCs to get additional info.

2.2 Material Analysis

Based on 1001 Traditional Herbal Indonesian archipelago Traditional Herbs by Native Suparni and Ari Wibowo, as well as a book Smart Dictionary of herbal medicine by Abu Muhammad and Margaret, Then the medicinal plants to be Discussed of both books. Explanation of each material can be seen in table 1

Table 1 materials analysis

Quest Number -	Quest	Advantage Of The Medicine Plant
1	Looking for roomates is 1 Mediine Plant Plant Fennel (Foeniculum vulgare Mill)	Can Cure Cough
2	Looking for 2 roomates are Mediine Plant Sweet Fennel (Pimpinella anisum) and Beluntas (Baccharis indica L.)	Sweet Fennel plant to Cure Diseases Itching And Beluntas medicinal plants to Treat Fever.
3	Looking for 2 roomates are Andong Mediine Plant (Cordyline fruticosa Linn.) And rue (Ruta Angusti folia L. Pers.)	Andong plant can eliminate injuries from bruises and medicinal plants inggu Can Overcome dandruff.
4	Looking for roomates are 3 Mediine Plant Roots Wangi (Vitiveria Zizanionides L.), Bamboo Tali (Asparagua Cochinchinenesis Louc.), And Keji Beling (SeriCocalyx Crispus)	The roots of fragrant plants can cure rheumatism, medicinal plants can heal Bamboo Tali Lung Disease., And medicinal plants Keji Beling can cope with kidney stones.
5	Looking for roomates are 3 Mediine Plant Sunflower (Helianthus Annuus L.), Bidara Upas (Convovulus mammosa), and Daun Dewa (Gynura segetum).	Medicinal Plants Sunflower to prevent premature aging, medicinal plants Bidara can Upas Curing Cancer and medicinal plants Daun Dewa may Addressing High Cholesterol.

2.3 storyline

Storyline descriptions for educational games herbs can be seen in table 2

table 2 storyline

Quest Number	Quest Giver	Description
1	Pak Agus	Galang seek Pak Agus in front of the house to accept the mission.
		Galang received the first mission.
		Galang have to look for any plant ordered the uncle to be sought.
2	Pak Arief	Galang looking for Mr. Arief home to accept the mission.

		Galang receive second mission.
		Galang have to look for any plant ordered the uncle to be sought.
3	Bu Nurul	Galang looking for Bu Nurul in front of the house to accept the mission.
		Galang receive Third mission
		Galang have to look for any plant ordered the uncle to be sought.
4	Bang Ilham	Galang seek Bang Ilham in front of the house to accept the mission.
		Galang receive the fourth mission.
		Galang have to look for any plant ordered the uncle to be sought.
5	Paman Fajar	Galang looking for paman fajar in front of the house to accept the mission.
		Galang receive Fifth mission.
		Galang have to look for any plant ordered the uncle to be sought.

2.4 Analysis of Non-Functional Requirements

Analysis of non-functional requirements are divided into three, namely hard perangkan needs analysis, anaisis software requirements and user needs analysis. The purpose of the non-functional requirements analysis is to determine the system requirements specification, this specification also includes elements or components-komponene what is needed for the system to be built system can be implemented.

A. Hardware Requirements Analysis

The following is an analysis of the hardware requirement are used for establishing the adventure educational game girder find medicinal herbs, can be seen in Table 3

table 3 Hardware Requirements Analysis

hardware	*Specification*
processor	Amd FX-4300 Vishera
memory RAM	8 GB
Hard Drive	1 TB
VGA	4GB
monitor	1366x768
keyboard	Standard
Mouse	Standard
Speaker	Standard

B. Analysis Software Requirements

The following is an analysis of the system software needs to be built.

table 4 Needs Analysis software

Software	Specification
Operating system	Windows 8.1 64 bit
Unity	Unity 2017 64 bit version as a game engine
blender	Blender 2.79 To create a 3D Object
fuse	To make the characters involved in the game.
Mixamo	To Animation 3D objects
Adobe Illustrator	Creating a 2D Object

C. Analysis of User Needs

In addition to the analysis of hardware and software, the user needs analysis is also needed to be educational game app uses the medicinal plants. Analysis of user needs are classified into two categories as follows:

1. User's knowledge and experience
   The knowledge and experience that users are expected to use the app can be seen in Table 5

table 5 knowledge and user experience

Knowledge and User Experience	
knowledge Android	Can operate basics android smartphone.
Application experience	Never use applications such as games.
Language skill	Indonesia

2. User characteristics
   Characteristics Users who are expected to use the app can be seen in Table 6

table 6 knowledge and user experience

Knowledge and User Experience	
users	Indonesian society
Age	18-25 years
Gender	Boy and girl

The use of hand	Good condition
disability	No
Access rights	Using the app / game

2.5 Analysis Functional needs

The analysis will describe what activities can be carried out by adventure educational game app girder find medicinal herbs. The following is an analysis of functional requirements.

A. Use Case Diagram

Use-case diagrams are used to what can be done by the system, it replaces the task diagram context diagram on conventional or pendekata structured approach [7]. Here is a use case image contained on the adventure educational game girder find medicinal herbs.

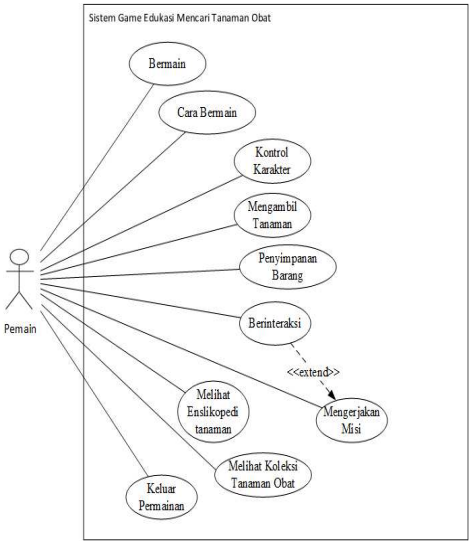


Figure 2 Use Case diagram

B. Class Diagram

Class diagram modeling menunujukkan any classes contained in the system and the relationship between these classes, attributes atribuut serja existing operations in the classroom [7]. Here is a Class Diagram image contained on the adventure educational game girder find medicinal herbs.

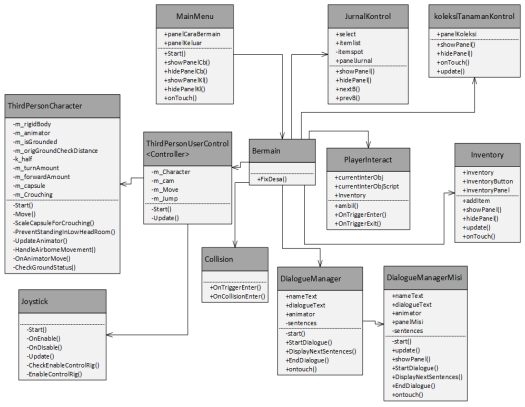


Figure 3 Class Diagram

2.6 System Design

System Design that aims to design educational game system built from design menu structure, design antark face and semantic networks.

A. Menu Structure Design

The design of the menu structure that aims to simplify the user understand the contents of each menu in this educational game. The following menu structure educational game that can be seen in Figure 4

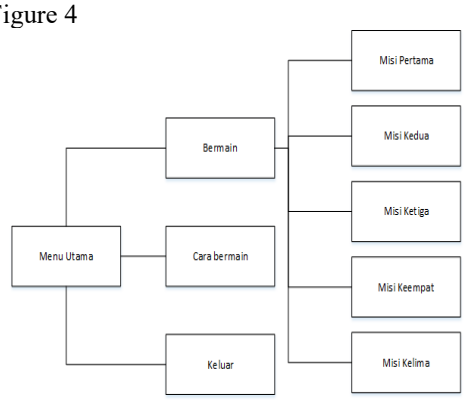


Figure 4 Menu structure

Brazilians berukut explanations of each menu:

a. Play: Start the game Adventure girder
b. How to Play: see explanation of permainana adventure girder and an explanation of each function button located on the shore adventure game.
c. Exit: Exit the girder adventure game.

2.7 Implementation Interface

Here is an implementation of the interface on the Game *"Petualangan galang mencari tanaman obat"*

2.7.1 Implementation Interface Main Menu

Implementation of the main menu interface is shown in Figure 5



Figure 5 Implementation Interface Main menu

2.7.2 Implementation Interface How to Play

Implementation of the interface means play can be seen in Figure 6



Figure 6 Implementation Interface How to play

2.7.3 Implementation Interface Starting Game

Implementation of the interface to start the game can be seen in Figure 7

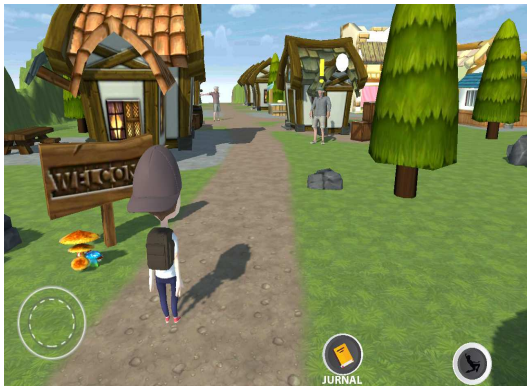


Figure 7 Interface Implementation Start game

2.7.4 Implementation Interface Interact with NPC

Implementation of the interface to interact with the NPC can be seen in Figure 8



Figure 8 Implementation Interface interact with NPC

2.7.5 Receiving Mission Interface Implementation

Receive Mission interface implementation can be seen in Figure 9

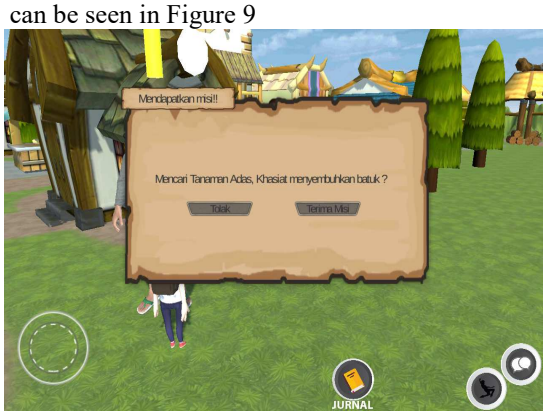


Figure 9 Receiving Mission Interface Implementation

2.7.6 Implementation Interface Working Mission

Implementation of interface do the mission can be seen in Figure 10



Figure 10 Implementation Interface do the mission

2.7.7 Implementation Interface Enslikopedia

Enslikopedia interface implementation can be seen in Figure 11



Figure 11 Implementation Interface enslikopedia

2.7.8 Completing missions Interface Implementation

Implementation of the interface complete the mission can be seen in Figure 12

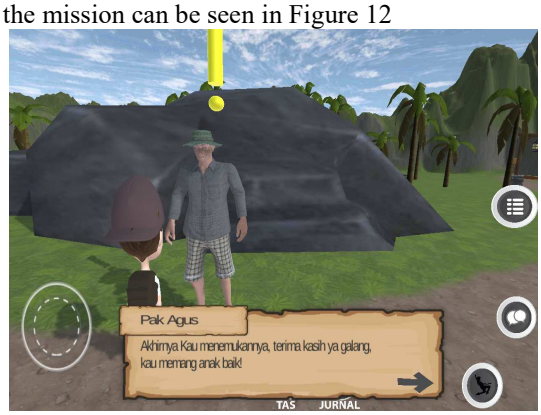


Figure 12 Implementation Interface completing missions

2.7.9 Implementation Interface Collection of medicinal plants

Implementation of the plant collection interface can be seen in Figure 13



Figure 13 Implementation Interface Collection of medicinal plants

2.8 Testing System

System testing is a stage that aims to identify errors and deficiencies in applications that have been built, so it can be known if the system is built meets the criteria and is in conformity with the purpose or not.

2.8.1 Scenario Testing BlackBox

Here is the scenario black box testing performed by the system needs a device that has been designed, the test scenario can be seen in Table 7:

table 7 BlackBox Testing Scenarios

No.	Component Tested	Testing methods
1.	Main course	*Black Box*
2.	control Characters	*Black Box*
3.	interact	*Black Box*
4.	Man on a Mission	*Black Box*
5.	Seeing Enslikopedi Medicinal Plants	*Black Box*
6.	Taking Plant	*Black Box*
7.	See Storage Bags	*Black Box*
8.	See Plant Collection	*Black Box*

2.8.2 Blackbox Testing Results

Testing interact and see the storage bag can be seen in table 8 and 9

table 7 testing interact

component Test	Test scenario	Expected results	Test result
interact	Main Character approached NPC	Featuring a button to talk	[✓] Successfully [ ] Not successful
	Touching the "Talk"	Displays a dialog with NPC	[✓] Successfully [ ] Not successful

table 8 Testing see storage bag

component Test	Test scenario	Expected results	Test result
See Storage Bags	Touching Button "Bag"	Panel Displays Pentimpanan bag	[✓] Successfully [ ] Not successful
	Touching the "Cross"	Eliminating Panel Storage Bags	[✓] Successfully

			[ ] Not successful

2.8.3 Conclusion Testing System

Following the black box testing, it can be concluded that all the functional needs of the adventure educational game app girder find medicinal herbs has aligned what to expect.

2.8.4 Testing User Evaluation

The purpose of the test is to determine whether the application that was built is in conformity from the user's expectations or not. To find your comments and ratings from users has been distributed questionnaires have been addressed by the 31 respondents.

For the calculation will be used a Likert scale. will be used Likert scale assessment of the category, the category ratings Likert scale [8] can be seen in Table 9

table 9 BlackBox Testing Scenarios

Information	Weight
Strongly agree	5
Agree	4
Doubtful	3
Disagree	2
Strongly Disagree	1

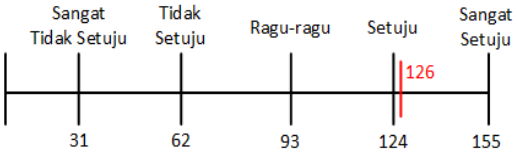
2.8.5 Results of Respondents

a. the results of respondents to the first statement can be seen in Table 10

table 10 BlackBox Testing Scenarios

statement 1		
Statement Options	**Frequency**	**Frekuensi.bobot**
SS	7	35
S	19	76
RG	5	15
TS	0	0
STS	0	0
Total	31	126

Determining Maximum Score
= Maximum Score multiplied by the number of respondents
= 5 x 31
= 155
Determining the Minimum Score 1.2
= Minimum score multiplied by the number of respondents
= 1 x 31
= 31
1.3 Percentage of Answers
= (Σ (Frekuensi.bobot) / Maximum Score) x 100%
= (126/155) x 100%
= 81.2%

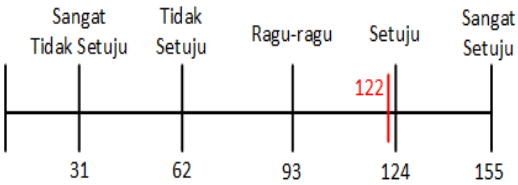


b. responder results for the second statement can be seen in Table 11

table 11 BlackBox Testing Scenarios

statement 2		
Statement Options	**Frequency**	**Frekuensi.bobot**
SS	4	20
S	21	84
RG	6	18
TS	0	0
STS	0	0
Total	31	122

Determining Maximum Score
= Maximum Score multiplied by the number of respondents
= 5 x 31
= 155
Determining the Minimum Score 2.2
= Minimum score multiplied by the number of respondents
= 1 x 31
= 31
2.3 Percentage of Answers
= (Σ (Frekuensi.bobot) / Maximum Score) x 100%
= (122/155) x 100%
= 78.7%



2.8.6 conclusion responder Results

Based on the test results of 31 respondents then, to the conclusion that game *"Petualangan galang"* can help people to become more aware of information about medicinal plants.

3. CLOSING

3.1 Conclusion

Based on the test results of 31 respondents then, to the conclusion that:

1. With the application of educational games Adventure girder find medicinal herbs, can help people to become more aware of existing medicinal plants in Indonesia.
2. With the application of educational games Adventure girder find medicinal herbs, can

help people to become more aware of the properties of medicinal plants in Indonesia.
3. With the application of educational games Adventure girder find medicinal herbs, can help people to better know the recipe fatherly cultivate medicinal plants in Indonesia.

Society also assessed (as much as 83.2%) that the adventure educational game app girder find medicinal herbs is an attractive medium for plant introduce Indonesia as well as assessing the delivery of education through the game easier to understand than just reading a book alone (84.5%).

3.2 advice

game "Petualangan galang" still many shortcomings, the following suggestions for further development of this game:

1. Plant form further clarified again.
2. Recipes fatherly cultivate medicinal plants can be more detailed.
3. Prize after finishing the stage is not only a collection of medicinal plants alone

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