Designing Horticulture Education Game

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Abstract- **Learning about fruit crops can be done by utilizing the gaming media. The purpose of this research is to design a game with a concept of horticulture including planting, caring for, and maintaining fruit trees. This game is packaged in an attractive appearance and resembleing the state of the garden. The game was tested by 43 hortimart visitors the result shows that the game is easy and fun to play so that users will continue to use it but it isn't influence by age, gender, and usefulness of the game.**

Keywords- Horticulture game, easy to use, fun, usefulness.

I. INTRODUCTION

Agriculture in the broad sense (Agriculture) is defined as land management activities. This management is intended for the benefit of plant and animal life, while the soil is used as a container or place the management activities, which are all for human survival [1]. One Indonesian agricultural commodities is growing rapidly Horticulture (fruit trees). Fruit plants are a group of horticultural plant species other than the vegetable plant, medicinal plant materials and plantations of the whole or part of the fruit can be consumed in a fresh state and after being processed [2]. Horticultural commodities classified as a commercial commodity with high economic value (high value commodity), so it must be produced efficiently in order to compete in the market and from aspects of production, the potential for development of horticultural commodities can be improved in terms of aspects of land availability and opportunities for technology adoption [3].

Based on data from the SPH 2014, the total production of fruit crops in Indonesia amounted to 19,805,997 tons, an increase of 8.30 percent compared to the year 2013, which amounted to 18,288,279 tons [4], From these data indicate that the development of the agricultural sector, especially in commodity Horticulture (fruit trees) and also increased public interest in the fruit crop increased. However, knowledge about the solution of problems in horticulture is still very little a lot of people do not understand. While agricultural education has a rich heritage to develop the student's personal skills and provide job skills needed in agriculture [5]. Learning and agriculture can be integrated into the classroom. The teachers believe that agriculture provides closeness, connectedness, and the authenticity of the content area to teach them to their students [6].

Just as experienced by Hortimart Agro Center, the high consumer interest in horticulture (fruit trees) but still little knowledge of consumers on fruit crops. Though hortimart sell seeds - seeds of quality but because of the lack of consumer knowledge about planting, care and maintenance of the plants make seeds - the seeds can not grow well and dies. According to the Manager of the division Agrosupply in Hortimart Center problem Agro-issue for fruit trees is often the case in Hortimart Agro Center among other things: plant diseases, Selection of fertilizers, watering, how to breed, farming techniques.

Further education and training is a very important factor for the agricultural sector. Rapid technological advances have led to the implementation of Internet applications in learning. technological advances and growing current information [7]. one of the effects of

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page 34

the technological advances that game, the game is a result of the multimedia processing that is used to facilitate the learning process effective and fun as well as in the form of a tool [8]. Game has some genre one of them is an arcade and simulation, arcade games is a game whose only purpose is to chase points and pass through the existing level. Traits - traits of arcade games that have a short game level but will increase the level of kesulitanya along with a growing level [9]. While the simulation game is a game to reflect that there are situations in real life however, the situation was almost part or taken out of context [10]. Digital games can not only play the function of entertainment, but it can assist students in learning more active and deeper and wider. Educational game dimanfaakan increase student motivation and learning achievement [11]. educational game content that can be defined as a video game or interactive application whose primary purpose is not only for entertainment but also training in various fields such as health, marketing, education [12]. Educational games and also interpreted as a medium for learning media and increase knowledge in a unique and interesting concept. Educational game is very necessary to play of colors and images because it will attract the attention of children. Not only on the level of difficulty of the game which necessitated [13]. For it in the game need to increase knowledge of the fruit crop.

II. RESEARCH METHODOLOGY

A. Data source

In this study using two types of data sources, namely primary and secondary data sources:

1. Primary Data Source is the source of data in the form of oral, words - words, and actions are obtained directly from the source [14]. In this study the sources of the data from interviews with Directors and Employees hortimart.
2. Secondary data sources are is the source of the data obtained from sources that are not dirictly [15]. Secondary data sources were used that document data in the form

of journals, books, research reports that support the research.

B. Research methods

The research method be decisive for determining the data collection techniques and measures research. The research method is the procedure and steps in conducting research. The study was preceded by interviews to directors and employees hortimart agro center to obtain the data required for the design of the game. After the game is finished designed Dr.plant need to do due diligence by testing cobakan to the visitors as well as distributing questionnaires to them. Questionnaire results were statistically tested to obtain the results of the feasibility Dr.plant game.

C. Development of the game

Game Development Dr.plant starts with a needs analysis in getting the interview and observation in hortimart. Then proceed with the design concept of the game from the results of a needs analysis. The next process is the process of game design using the program adobe illustrator cs 6. Once the design is complete then proceed with the making of the game with a progam construct 2. Next, continue the process of testing if found a bug / error then the game will be improved and will perform testing process again. Game Development Method can be seen at Figure 1.
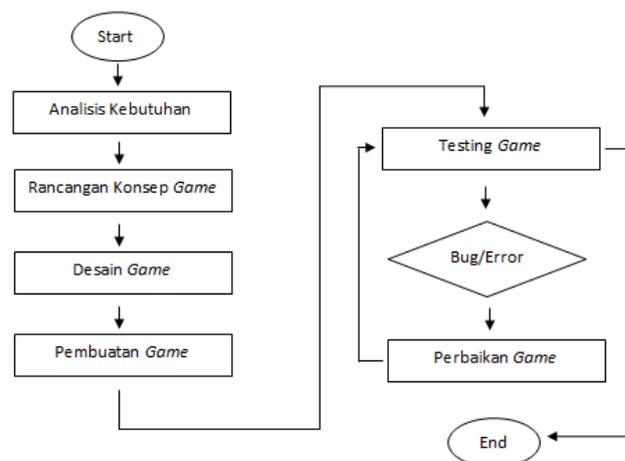

Figure 1. Game Development Method

D. Game Testing

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page 35

Testing Dr.plant game begins by designing a post-test questionnaire to test the game to the respondent, then distributing questionnaires to the respondents by testing Dr.plant game. After the results of the questionnaire obtained then the data is processed by Microsoft Excel program for mengelompakan berdsarkan variables. The processed data then tested using IBM SPSS Statistics 22 program, with 3 tests namely validity, reliability, and correlation to test the feasibility of a game. Method of Testing Game can be seen at Figure 2.
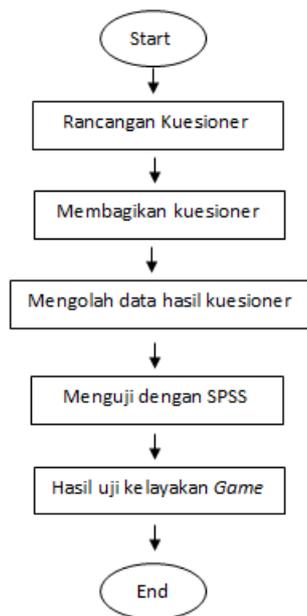

Figure 2. Method of Testing Game

III. RESULTS AND DISCUSSION
A. Design of Game

After observing the data from surveys and interviews in Hortimart Agro Center then designed based mobile game android 2 dimensions Dr.plant game. Dr.plant game arranged with gameplay and gameplay design flowchart form to facilitate the process of making games. This game has two genres namely Arcade which uses the concept highscore or collect the highest points without restriction and Simulation with the concept of completing a challenge with limited time, the game begins with the loading screen and then, into the main yard Dr.plant game. Dr.plant game on the main page there are some games

that play button menus, catalogs, credit and exit (X). When the player presses play then it will go to a category page, there are several games that can be played, namely Tap Plants which include a game about taking care of the interest by pulling weeds so that flowers can grow well, Tap Hama containing permaian about caring for fruit crops in a way eradicate pests (ants, fruit flies, ladybugs) that attacks fruit crops. Planting simulations which include a game about planting fruit trees properly so that plants can grow well. When the player presses the credit will display credit page that contains information about the game maker. When the player presses the catalog will open the catalog page that contains multiple menus that Fruit which contains a variety of fruit crops in Hortimart with information about fruit crops, the price of the plant, and the plant's benefits. Fruit Crops medicine that contains information about the drug to eradicate pests of plants and to fertilize the plants with information, how to use, and price. Fruit Plant Breeding containing about how to breed good fruit crops. And when the player presses out (X) then the player will be out of the game. Fruit Plant Breeding containing about how to breed good fruit crops. And when the player presses out (X) then the player will be out of the game. Fruit Plant Breeding containing about how to breed good fruit crops. And when the player presses out (X) then the player will be out of the game.

B. Gameplay

Dr.plant is a learning game about fruit crops in hortimart and applied in the android platform. Game Dr.plant created with the aim to introduce and provide information on fruit crops in hortimart with attractive graphical use for learning to use the game more interesting when played. In the game there are 3 types of games Dr.plant that is plants Tap, Tap pests, Simulation plant and existing plant catalogs are 3 categories of fruit trees, medicinal plant fruit and plant propagation fruit with attractive appearance. Game Dr.plant made with gameplay that is easy and with an attractive appearance and resembles the original state when the garden to be played by visitors

hortimart. Display Menu Game can be seen at Figure 3.

Figure 3. Display Menu Game

As for the play menu, there are 3 different games that plant tap, tap pests, plant simulation that is packaged in a game arcade and simulation game. The gameplay in the game Dr.plant can be seen at Figure 4.
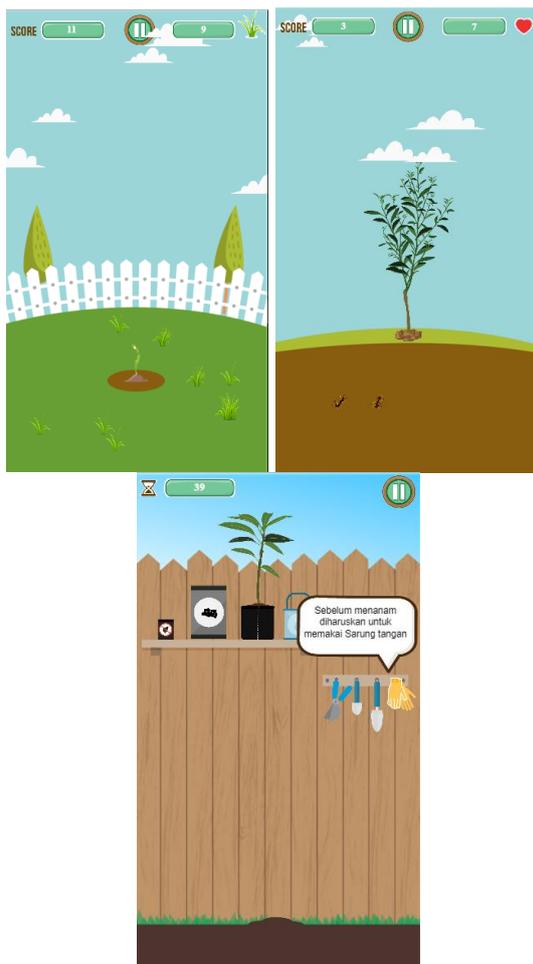
Figure 4. The gameplay in the game Dr.plant

As for the catalog menu, there are three different categories namely fruit trees, medicinal fruit plants, and the development of fruit crops. Image catalog menu in the game Dr.plant can be seen at Figure 5.

Figure 5. Image catalog menu in the game Dr.plant

C. Testing Game

The perform of Dr.plant game was tested by hortimart agro center visitors to get the response after they played the game. This research used hypothesis to continuted the test instrument, The hypothesis were :

H1: Usefulness (M) Dr.plant game has a strong influence on the intention (T).

H2: Easy (U) Dr.plant game has a strong influence on the intention (T).

H3: Pleasure (S) Dr.plant game has a strong influence on the intention (T).

D. Validity of Variables Questionnaire

This study uses four research variables are Usability (M), Easy (U), Fun (S), intention (T) to play the Game Dr.plant. All variables need to be tested for validity studies to gauge whether the questions on the questionnaire were able to represent each variable in revealing the attitudes of respondents. To test the validity of each variable then conducted two tests is test by comparing with r table and Principal Component Factor Analysis. Testing by comparing r tables by comparing the calculation results "Corrected Item-Total Correlation" with the value contained in the r-table (at the price of n - 2) and because of the number of questionnaires is 43 -2 hence the

SISFORMA: Journal of Information Systems (e-Journal)Vol. 6 | No.1 |Th. 2019
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page 37

minimum value of r table is 0,308 (n- 2 = 41), as in table 1.

Table 1. Value - The value of r Product Moment

N	Taraf Signifikansi		N	Taraf Signifikansi	
	5 %	1 %		5 %	1 %
3	0,997	0,999	38	0,320	0,413
4	0,950	0,990	39	0,316	0,408
5	0,878	0,959	40	0,312	0,403
6	0,811	0,917	41	0,308	0,398
7	0,754	0,874	42	0,304	0,393
8	0,707	0,834	43	0,301	0,389
9	0,666	0,798	44	0,297	0,384
10	0,632	0,765	45	0,294	0,380
11	0,602	0,735	46	0,291	0,376
12	0,576	0,708	47	0,288	0,372
13	0,553	0,684	48	0,284	0,368
14	0,532	0,661	49	0,281	0,364
15	0,514	0,641	50	0,279	0,361
16	0,497	0,623	55	0,266	0,345
17	0,482	0,606	60	0,254	0,330
18	0,468	0,590	65	0,244	0,317
19	0,456	0,575	70	0,235	0,306
20	0,444	0,561	75	0,227	0,296
21	0,433	0,549	80	0,220	0,286
22	0,423	0,537	85	0,213	0,278
23	0,413	0,526	90	0,207	0,270
24	0,404	0,515	95	0,202	0,263
25	0,396	0,505	100	0,195	0,256
26	0,388	0,496	125	0,176	0,230
27	0,381	0,487	150	0,159	0,210
28	0,374	0,478	175	0,148	0,194
29	0,367	0,470	200	0,138	0,181
30	0,361	0,463	300	0,113	0,148
31	0,355	0,456	400	0,098	0,128
32	0,349	0,449	500	0,088	0,115
33	0,344	0,442	600	0,080	0,105
34	0,339	0,436	700	0,074	0,097
35	0,334	0,430	800	0,070	0,091
36	0,329	0,424	900	0,065	0,086
37	0,325	0,418	1000	0,062	0,081

By testing using variable r r tables with a minimum of 0,308 table as shown in Table 4.2. From Table 2 looks M1 and S3 is not valid because the value of the variable is less than 0,308, while for the variable M2, M3, U1, U2, U3, S1, S2, T1, T2, T3 declared invalid because of the variable value of more than 0,308. Then for further testing by the Principal Component Analysis Factor M1 and S3 are not included.

Table 2. Test Result Validity product moment r table method

	Corrected Item-Total Correlation	r table	Information
M1	, 266	0,308	Invalid
M2	, 310	0,308	valid
M3	, 339	0,308	valid
U1	, 550	0,308	valid
U2	, 681	0,308	valid
U3	, 462	0,308	valid
S1	, 318	0,308	valid
S2	, 472	0,308	valid
S3	, 261	0,308	Invalid
T1	, 442	0,308	valid
T2	, 487	0,308	valid
T3	, 487	0,308	valid

After the test r table, then perform the testing process Principal Component Analysis and variable factors M1, S3 is not included in the testing to get appropriate results. From Table 3 shows that the outcome was appropriate and expected all the variables to be held the same position. Testing with this technique to ensure that all the indicators in each variable is convergent.

Table 3. Validity Testing Results Factor method of Principal Component Analysis

	Component		
	1	2	3
M2	, 107	-, 062	, 843
M3	-, 067	, 319	, 741
U1	, 040	, 804	, 304
U2	, 161	750	, 490
U3	, 128	, 764	, 017
S1	, 323	, 437	-, 179
S2	, 700	, 416	-, 265
T1	, 796	-, 011	, 275
T2	, 674	, 402	-, 125
T3	, 878	, 013	, 113

Thus indicator declared valid and can be used for the next test is an indicator of M2, M3, U1, U2, U3, S1, S2, T1, T2, T3.

E. Variable reliability Questionnaire

Cronbach's Alpha coefficient used for testing the reliability (Confidence) questionnaire. Reliability of the test results are listed in Table 4.4 in the category of the variable M *questionable*, Variable U in the category of Good, the variable S in the category of Poor, and for variable T in the category Acceptable. This calculation in accordance with the Internal Consistency Crombach alpha in Table 4 and Table 5.

Table 4. Cronbach's Alpha coefficient for each variable research

variables	Coefficient Cronbach's Alpha	result
Usefulness (M)	.613	*questionable*

Ease (U)	.808	*Good*
Fun (S)	0,532	*Poor*
Intention to use (T)	0.754	*Acceptable*

Table 5. reliability ratings

Cronbach's alpha	Internal consistency
α ≥ 0.9	Excellent
0.9 > α ≥ 0.8	Good
0.8 > α ≥ 0.7	Acceptable
0.7 > α ≥ 0.6	Questionable
0.6 > α ≥ 0.5	Poor
0.5 > α	Unacceptable

F. Correlation

The hypothesis used in the study using correlation between variables to test whether the variables: Usability (M), Easy (U), Fun (S) has a strong correlation with variable Intention (T). Seen from Table 6 that U and S have a strong correlation with the intention (T). Usability and was found in the variable (M) proved to be unrelated to the intention (T). This indicated that the Facility (U) and pleasure (S) in use Dr.plant game has a very close relationship with the desire of users to continue to use (T) Dr.plant game.

Table 6. Correlation between variables

correlations

	A	G	K	MM	SU	SS	ST
A	1	-,030	-,089	,008	,114	,027	-,016
G	-,030	1	,403**	,347*	,227	-,007	-,285
K	-,089	,403**	1	,288	,240	,108	,059
MM	,008	,347*	,288	1	,387*	-,026	,112
SU	,114	,227	,240	,387*	1	,359*	,327*
SS	,027	-,007	,108	-,026	,359*	1	,532**
ST	-,016	-,285	,059	,112	,327*	,532**	1

IV. CONCLUSIONS

Dr.plant game is an horticulture game about fruit plants. Dr.plant game created with the concept of learn and play so that visitors can know about different kinds of fruit trees. Dr.plant game has some graphical look and approach the game with the original situation in hortimart. Fromresults of tests performed, it was concluded that Dr.plant game is a game that is easy to play and fun for visitors hortimart. This is evidenced by the results Dr.plant game testing to 43 respondents visitors hortimart, Dr.plant game easy and fun when played so that users will continue to use gaming Dr.plant and is not affected by the perception of age, sex, and perceptions of the usefulness of the game.

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