Multiplatform-Based Educational Game of Islamic History in Walisongo Era

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Abstract

Islam arrived in Indonesia through various intermediaries. One of its dissemination ways was through preaching brought by Walisongo (nine saints). When learning history, most children are bored because the textbook only contains written texts, which are less interesting for them. The purpose of this research was to develop a multiplatform-based educative game as an interactive learning media. The methodology of this research was SDLC method (*System Development Life Cycle*) which was derived into a stage of system systematically starting from planning, analysis, design, implementation, testing and caring. The testing of this research used the testing of black box and usability by using questionnaire for the respondents who had used the educative game. The result of this research was a learning medium in the form of an educative game built by using the multiplatform-based construct.

Keywords: Walisongo, educational game, construct 2, multiplatform

1. Introduction

Walisongo is one of the propagators of Islam in Indonesia, especially in Java Island. Their role was very great in establishing the Islamic kingdoms in Java, as well as their influence on the society's culture broadly and their direct preaching. The learning materials about Walisongo's Islamic teaching dissemination are included in the formal material of SKI subject for the 6th grade students. Generally, it is hard for children (students) to memorize many materials they acquire in class because there is no interesting illustration when the teacher delivers the learning materials. One of interesting learning models is the material delivery through learning while playing; therefore, the children will become happy and the materials are easy to be acquired. This research aimed at developing an interactive learning media for the children and for the teachers in delivering the materials.

Walisongo consists of Sunan Gresik (Maulana Malik Ibrahin), Sunan Ampel (Raden Rahmat), Sunan Giri (Jaka Samudra/Raden Paku), Sunan Bonang (Raden Makdum Ibrahin), Sunan Drajat (Raden Syarifuddin), Sunan Kalijaga (Raden Mas Said), Sunan Kudus (Jaffar Shhadiq), Sunan Muria (Raden Umar Said), and Sunan Gunung Jati (Syarif Hidayatullah) (Bina Karya, 2009).

Indriani and Setiawan, (2012) in a journal entitled "Membangun Educative game Sejarah Walisongo" created a game in which the player has a mission to save nine pictures of Walisongo figures. The game is included in Maze Game type and the platform is for desktop.

Yudistiro (2014) in a journal entitled "Sistem Informasi Sejarah Walisongo Berbasis Android" introduced Walisongo through story, biography, guessing some pictures and quiz. The display application is in the form of text and a picture of Walisongo.

Edugame is an educative game designed and made to stimulate the power of thought by including the increasing of concentration and problem solving skills. The type of educative game is chosen not only due to its purpose for learning but also the function of the game itself (Dewi, 2012).

Construct 2 is an application used to make a HTML 5-based Two Dimension (2D) game. Construct 2 does not use a special programming language and is easy to be understood. The features of construct 2 consist of powerful event system focusing on logic. Flexible Behaviors (physical properties, movement, plat former, etc.), Instant Preview, Stunning Visual Effects, Multiplatform Export can publish game with a broad platform selection only through one project. Game Construct 2 can be published on a web-based platform such as Chrome Web Store, Facebook, Kongregate, Newgrounds, and Firefox Marketplace. Meanwhile, the program also enable the user to get performance similar to PC, linux, or mac as well as mobile platform such as iOS, android, and blackberry (Sudarmilah, et. al, 2013). Based on the review of previous researches, the writer made a comparison table in Table 1.

2.   Method

The research method used by the researcher was System Development Life circle (SDLC) method. It was conducted in order to produce a good research and according to the objective of the research. The SDLC flowchart was shown in Figure 1.

2.1.   Selecting a Title

The research was started by making a title "Developing a multiplatform-based educative game of Islamic History in Walisongo Era" which aimed at developing an interactive learning media through educative game.

2.2.   Needs Analysis

The needs analysis was conducted to determine the data needed in making the educative game.

2.3.   Data Collection

The data were collected from reference books and internet for the material about the history of Walisongo that would be included into the educative game.

2.4.   Application Design

The application design included making a game design that would be displayed. This design consisted of two stages:

2.4.1. Storyline

The delivery of material in this game was designed by using an animation which provided information regarding each Walisongo with a certain description.

Besides, the application had two game genres. The first was puzzle game that would explain about the biography of each Walisongo. The user must complete the pairing of puzzle to know the information on each Walisongo. The second was adventure game. In this game, there would be a child as the player who went on an adventure to search knowledge. The

adventure game had three levels in which every level had a certain obstacle that must be overcome. This game has 4 chances to play. If the player wanted to continue to the next level, he or she must get reward trophy in the form of nine books. Every level had different material questions. According Sudarmilah, et al. (2015) children preferred chalice/trophy by 30 points or 41.7% and coin by 25 points or 31.7%. Children did not like explosion. This also met children's psychology that tended to be happy if someone gives reward to them.

Table 1. Previous studies

Comparison	Journal 1	Journal 2	Journal 3	Journal 4
Title	Membangun game edukasi sejarah Walisongo	Rancang Bangun Application Edugame Sejarah Walisongo (Sunan Kalijaga) Dengan Unity 3D	Sistem Informasi Walisongo Berbasis Android	Membangun Game Petualangan Sejarah Peninggalan Sunan Kudus Berbasis Android
Writer, Publisher, and Year	Nelly Indriani Widiastuti (2012)	(M.Arroyyan & Yoannita, 2015)	Yudistiro (2014)	(Arifin, Listyorini, & Rina Fiati, 2015)
Problem that is discussed	How to make a game by involving the players existing in Walisongo	How to make a game of Walisongo (Sunan Kalijaga) by using unity 3D	Making an educational material through technology media	Building a game to explain about Sunan Kudus
Object Display	2D	3D	-	2D
Type of Game	Maze Game	Adventure	Quiz	-
Tools	Eclipse	Unity 3D	Game Maker Studio	Construct 2
Platform	Windows	Android	Android	Android
Strength	Using algorithm of Best First Search in the game	A kind of adventure game; thus, it is interesting to play.	Android-based information system	Android-based game

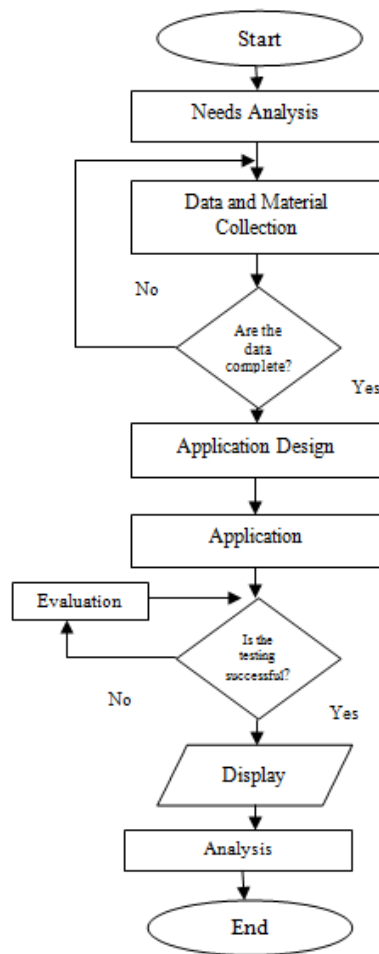| Weakness/ Suggestion for further development	This game does not involve the original story of Walisongo. The game mission only takes picture of Walisongo.	The character of players does not involve Walisongo, it only discusses one of Walisongo.	-	The screen resolution should be increased, more interesting animation

Figure 1. SDLC flowchart

2.4.2. Storyboard

Sunarya & Arthana (2014) in their journal sthat that storyboard is a sketch of picture which is arranged based on the script or the story idea that will be conveyed to others. The game that would be developed had 1-3 storyboards. The followings were several examples of storyboard of educative game.

The main page was when the user opened the application for the first time. There were four main menus. The main menu page was shown in Figure 2. Figure 3 and 4 presented the edugame storyboards.
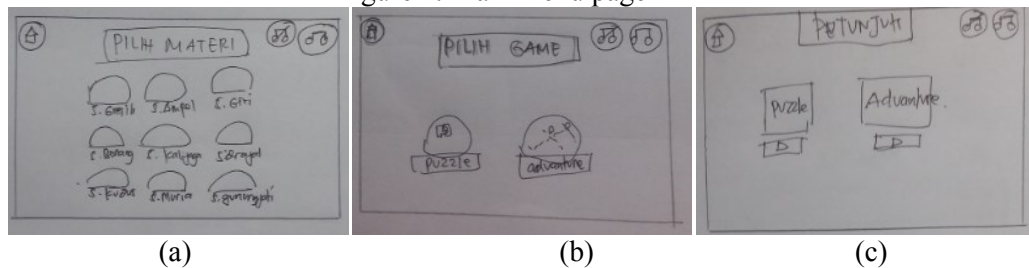
Figure 2. Main menu page

| (a) | (b) | (c) |

Figure 3. Storyboard (a) menu of selecting material, (b) menu of selecting game, (c) menu of instruction
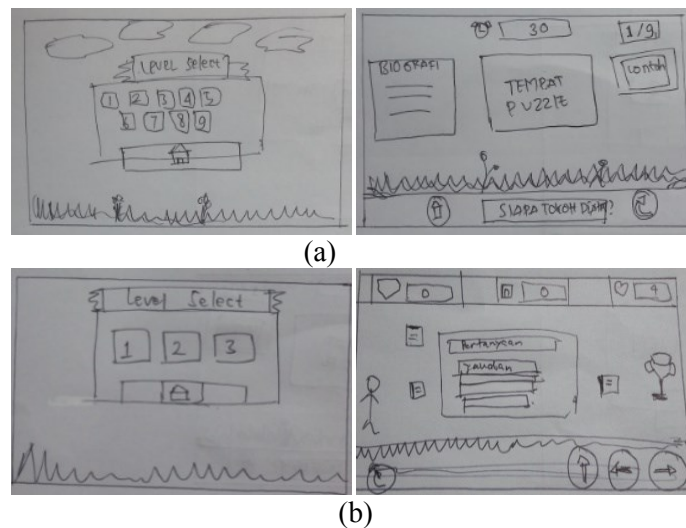

(a)

(b)

Figure 4. Storyboard (a) puzzle game and (b) adventure game

2.4.3. Characters in the game

This educative game used nine characters of Walisongo who functioned as the supporting animations in explaining the material about Walisongo. There were also other supporting characters. Besides, in the adventure game, there was a child who served as the main character, who was used as the player in the adventure game.

2.5. The Making of Application

The making of this educative game application used several software, they were:

a. Corel Draw

Corel Draw was used to make the design of 2D object.

b. **Format Factory**
   Format Factory was used to convert audio .mp4 into .ogg.
c. **Construct 2**
   Construct 2 was used to make the game in overall.
d. **Cordova**
   Cordova was used to export to android device and NW.js to export .exe
e. **Testing**
   The testing of this educative game was conducted after finishing the making of educative game.

3. Results and Discussion

3.1 The Results of Research

The result attained by the researcher after passing many stages of application building was an interactive multiplatform-based media.

3.1.1. Main Menu Page

The main menu page would appear after a loading process from the system. The main menu page was shown in Figure 5.


Figure 5. Main menu page

There were three menus on the main menu page; they were: the main menu button of the material to enter into the existing material, the instruction menu button to enter into the layout of game instruction as well as the game menu button to enter into the layout of selecting game, and the close button to quit the application.

3.1.2. The instruction Menu Page

The instruction menu page contained the general explanation on how to play the game. The instruction menu page was shown in Figure 6.
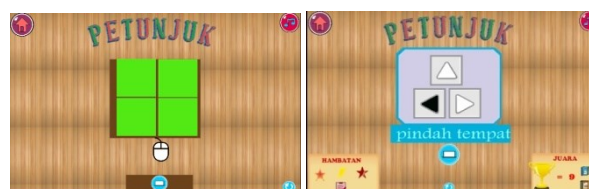
(a)   (b)

Figure 6. Instruction menu (a) puzzle and (b) adventure

3.1.3. Material Menu Page and Material Explanation

The button 'material menu' contained the material explanation, the buttons 'next' and 'preview' were to go to the next page or previous page. The button 'back' was used to return to

the menu 'select the material,' and the button 'music' is to mute or unmute the voice. Material menu page and material explanation were shown in Figure 7.

(a)   (b)

Figure 7. (a) Material page and (b) Material explanation page

3.1.4. 'Puzzle Select' and 'Game Puzzle' Page

The button 'puzzle select' had a button to select puzzle that would be played. The page of game Puzzle had 'home' button to return to the main menu, meanwhile, button 'reload' was used to return to 'puzzle select'. 'Puzzle select' and 'game puzzle' page were shown in Figure 8.
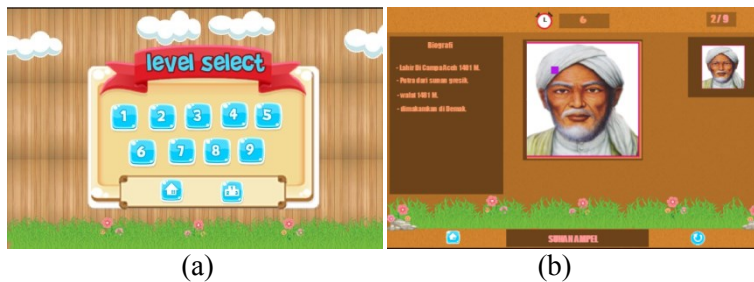

(a)   (b)

Figure 8. (a) The page 'puzzle level select' and (b) the page 'game puzzle'

3.1.5. Select Level of Adventure and Game Adventure Page

The page 'level select' had a button 'level select' to enter each level, and button 'home' to return to the main menu. The page 'game adventure' had a button 'navigation' to run the player, and 'reload' to return to 'game level select'. Selecting level of adventure and game adventure page were shown in Figure 9.

(a)   (b)   (c)   (d)
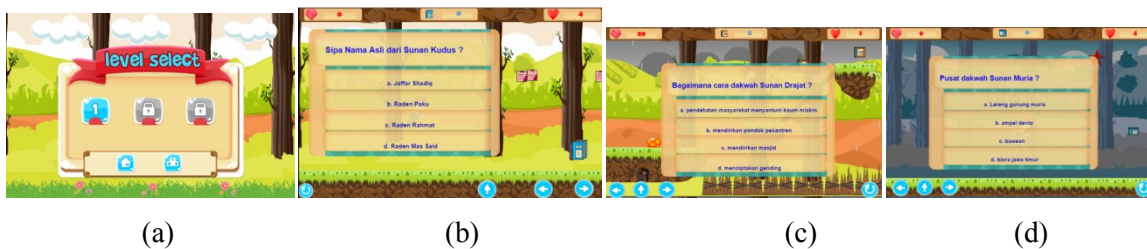
Figure 9. (a) level select, (b) level 1, (c) level 2 and (d) level 3

3.2   Discussion of the Research Results
3.2.1 The Testing of Black Box

The testing of *Black Box* aimed at knowing the function of software in this game operating whether the data input and output had run as expected (Adiwijaya et. al., 2015).

Table 2. Results of Black Box Trial of 'Main' Menu

No	Tested Items	Input	Output	Conclusion
1	List of Main Menu	Click every 'menu' button	The selected menu is displayed	Correct Access
2	'Quit' button	Click 'Quit' button	Application directly stopped and quitted from the system	Correct Access

Table 3. Results of Black Box Trial of Menu 'Material Select'

No	Tested Items	Input	Output	Conclusion
1	List of Material Menu	Click every 'menu' button	The selected menu is displayed	Correct Access
2	'Home' button	Click 'Home' Button	'Opening the main menu' is displayed	Correct Access
3	'Music' button	Click 'music' button	Music will be stopped	Correct Access
4	'Mute music' button	Click 'mute music' button	Music will run	Correct Access

Table 4. Results of Black Box Trial of Page 'Material Explanation'

No	Tested Items	Input	Output	Conclusion
1	'Right arrow' button	Click 'right arrow' button	Opening the page 'next explanation'	Correct Access
2	'Left arrow' button	Click 'left arrow'	Opening the page 'previous explanation'	Correct Access
3	'Back to material select' button	Click 'back to material select' button	Opening the page 'material select'	Correct Access
4	The descriptor voice in delivering the material of Walisongo	Page 'descriptor of Walisongo material'	The descriptor voice of Walisongo material on the page	Correct Access
5	'Music' button	Click 'music' button	Music will be stopped	Correct Access
6	'Mute music' button	Click 'mute music' button	Music will run	Correct Access

Table 5. Results of Black Box Trial of Menu 'Instruction Select'

No	Tested Items	Input	Output	Conclusion
1	'Puzzle (guessing the figures)' button	Click 'puzzle menu' button	'Opening the puzzle instruction page' is displayed	Correct Access
2	'Adventure' button	Click 'adventure menu' button	'Opening the adventure instruction page' is displayed	Correct Access
3	'Home' button	Click 'Home' button	'Opening the main menu' is displayed	Correct Access
4	'Music' button	Click 'music' button	Music will be stopped	Correct Access
5	'mute music' button	Click 'mute music' button	Music will run	Correct Access

Table 6. Results of Black Box Trial of Game Select

No	Tested Items	Input	Output	Conclusion
1	'Puzzle (guessing the figures)' button	Click 'puzzle menu' button	'Opening the puzzle instruction page' is displayed	Correct Access
2	'Adventure' button	Click 'adventure menu' button	'Opening the adventure instruction page' is displayed	Correct Access
3	'Home' button	Click 'Home' button	'Opening the main menu' is displayed	Correct Access
4	'Music' button	Click 'music' button	Music will be stopped	Correct Access
5	'mute music' button	Click 'mute music' button	Music will run	Correct Access

Table 7. Results of Black Box Trial of Game Puzzle Level Select

No	Tested Items	Input	Output	Conclusion
1	List of 'level select' menu	Click every 'level menu' button	'The selected level' menu is displayed	Correct Access
2	'Home' Button	Click 'Home' Button	'Opening the main menu' is displayed	Correct Access
3	'Score' Button	Click 'Score' Button	'Opening the score page' is displayed	4.

Table 8. Results of Black Box Trial of Adventure Game Level Select

No	Tested Items	Input	Output	Conclusion
1	List of 'level select' menu	Click every 'level menu' button	'The selected level' menu is displayed	Correct Access
2	'Home' Button	Click 'Home' Button	'Opening the main menu' is displayed	Correct Access
3	'Score' Button	Click 'Score' Button	'Opening the score page' is displayed	5.

Table 9. Results of Black Box Trial of Game Puzzle

No	Tested Items	Input	Output	Conclusion
1	'Home' Button	Click 'Home' Button	'Opening the main menu' is displayed	Correct Access
2	'Back' Button	Click 'Back' Button	Opening the page of puzzle level select	Correct Access

Table 10. Results of Black Box Trial of Game Adventure

No	Tested Items	Input	Output	Conclusion
1	'Left' Button	Click 'Left' Button	The character walks to the left	Correct Access
2	'Right' Button	Click 'Right' Button	The character walks to the right	Correct Access
3	'Up' Button	Click 'Up' Button	The character jumps	Correct Access
4	'Back' Button	Click 'Back' Button	Opening the page of puzzle level select	Correct Access
5	Book Icon	The character takes the book icon	Questions about the material are displayed, the adventure game is paused	Correct Access
6	'Answer select' button	Click 'Answer select' button	The adventure game is not paused, it continues till receiving a trophy	Correct Access
7	Trophy Icon	The character takes the trophy icon	Opening the page of winning adventure game	Correct Access

Table 11. Results of Black Box Trial of 'winning puzzle' page

No	Tested Items	Input	Output	Conclusion
1	'Next' Button	Click 'Next' Button	Opening the puzzle level select page	Correct Access

Table 12. Results of Black Box Trial of 'winning puzzle' page

No	Tested Items	Input	Output	Conclusion
1	'Back' Button	Click 'Back' Button	Opening the page of puzzle level select	Correct Access

Table 13. Results of Black Box Trial of 'Winning Adventure Game' page

No	Tested Items	Input	Output	Conclusion
1	'Next' button	Click 'Next' button	Opening the page of level select and opening the next level	Correct Access

Table 14. Results of Trial on Several Android Versions

No	Name	Specification	Conclusion
1	Samsung Galaxy Grand Prime	RAM 1 GB, OS V4.4.4	Application can run, Audio is displayed
2	Samsung Grand Neo Plus	RAM 1 GB, OS V4.4.4	Application can run, Audio is displayed
3	Samsung Core 2	RAM 768 MB, OS V4.4.2	Application can run, Audio is displayed

3.2.2. Testing of Usability

The testing of usability was conducted in MI Gotong Royong on 25-26 May 2016 by demonstrating the edugame of introducing the Islamic history in the era of Walisongo in front of the 5th grade and 6th grade students. The usability testing was done by using instruments such as questionnaires filled out after the students played the game. In usability testing, there were two phases, which were validity and reliability tests.

a.   Testing of Validity

Priyatno (2015: 90) stated that validity is the appropriateness of an instrument to measure what you want to measure. Validity test is often used to measure the accuracy of the items in the questionnaire. The validity of the items is indicated by the correlation.

According Priyatno (2015: 91), if the count r $\geq$ r table (test 2 sides with sig. 0.05) then the item in question / instrument is declared as valid.

Validity test results on the students of MI Gotong Royong showed with reference to table r: 0.308 N obtained from a number of samples: 41 (Priyatno, 2015: 115). This was presented in Table 15.

Table 15. Results of test validity

Correlation	Calculate r	r Table	Validity Results
P1 with Ptotal	0.487	0.308	Valid
P2 with Ptotal	0.397	0.308	Valid
P3 with Ptotal	0.483	0.308	Valid
P4 with Ptotal	0.397	0.308	Valid
P5 with Ptotal	0.680	0.308	Valid
P6 with Ptotal	0.553	0.308	Valid
P7 with Ptotal	0.494	0.308	Valid
P8 with Ptotal	0.421	0.308	Valid
P9 with Ptotal	0.492	0.308	Valid
P10 with Ptotal	0.310	0.308	Valid
P11 with Ptotal	0.626	0.308	Valid
P12 with Ptotal	0.365	0.308	Valid
P13 with Ptotal	0.361	0.308	Valid

b.   Testing of Reliability

According Priyatno (2015: 97-98), Test Reliability is used to determine the consistency of realiable measuring instruments and measuring device that are used. If the measurement is repeated, it shows that the results are consistent. This study used Cronbach's Alpha as its measuring method.

$$r_{11} = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum \sigma_b^2}{\sigma_1^2} \right) \tag{1}$$

Explanation :

r_{11} = instrument reliability

k = many of the questions

$\sum_b^2$ = the amount of variance granules

σ_t^2 = total variance

Alpha value criteria:

0.8 to 1.0: very high   0.2 to 0.4: Low

0.6 to 0.8: High   0.0 to 0.1: very low

0.4 to 0.6: enough

Results of reliability tests on students "MI Gotong Royong" was presented in Table 16.

Table 16. Reliability test results

Alpha value	Conclusion
0.5	enough

The results of the questionnaire for students showed that the data had enough reliability.

c.   The Percentage Results of Interpretation

The percentage results of interpretation (P) were conducted based on the previously arranged questions. The formula of Interpretation Percentage / Average Score (P) was:

$$\text{Percentage of average score} = \frac{\Sigma \text{ obtained score}}{\text{Maximum score}} \times 100\% \tag{2}$$

Next, to measure the level of interpretation percentage (P) was done through the scale of interval that was stated in Sugiyono's journal (2015), which was as follows:

Score 0% – 20%   : Very Weak
Score 21% - 40%   : Weak
Score 41% - 60%   : Enough
Score 61% - 80%   : Strong
Score 81% - 100%   : Very Strong

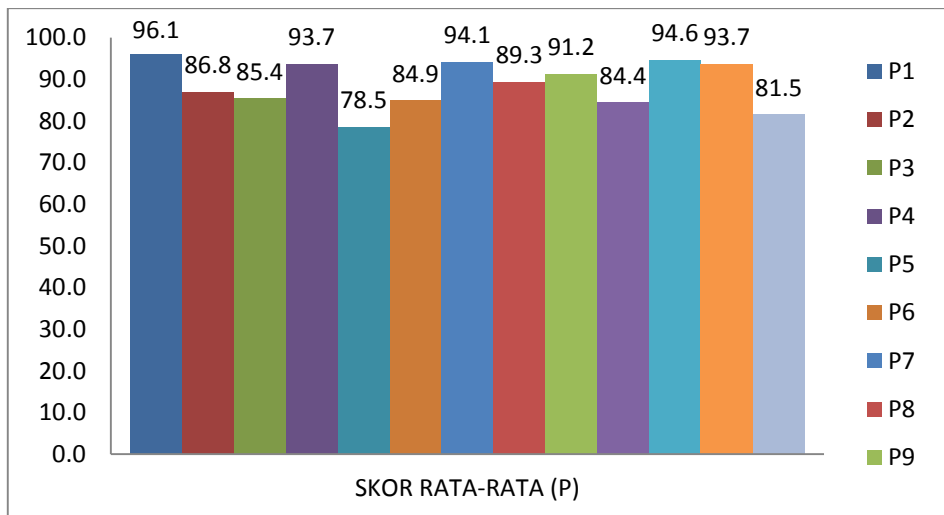From the research, the obtained results were displayed in Figure 9 :

Figure 10. Percentage from questionnaire

Legend:
P1. The application colors are interesting   P5. The background music is appropriate
P2. The menu buttons are appropriate   P6. The voice effect is appropriate
P3. The 2D Object are interesting   P7. The material audio is appropriate to the layout
P4. The animation facilitates the material delivery

P8. Materials which are brought is appropriate to the book

P9. The materials are easy to be understood

P10. The Game is easy to run

P11. The Game can increase the understanding on materials

P12. The Game can be made as learning media

P13. The game level is too easy

4.   Conclusion

Based on the results of the implementation and the testing of this application, it could be concluded that this educative game could be made as an interactive learning media. Besides, this application could be installed on desktop and android.

In developing this educative game, there were still many weaknesses. The writer hoped that this game could be developed for a better result. The suggestion recommended by the writer was to improve the making of the 2D object design.

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