Build Educative Game as Tool Teaching Science Nahwu Jurumiyah for Android Based

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***Abstract*- The lack of media support learning, so that learning science nahwu far less effective, less attractive, monotonous, and ultimately make them easily bored if nahwu studied in the form of a text book or a book that is easily torn, scattered or lost. On this basis, the authors conducted a study with the title "Building Educational Games As A Tool-Based Teaching Science Jurumiyah Nahwu Android". The method used is the method of Research and Development. Stages in the research process is the stage of the analysis, design, development, implementation, and testing. With this application, it is expected that the learning sciences jurumiyah nahwu be more interactive, effective, interesting and not boring that comes with the game. By leveraging smartphones or tablets that have android operating system which has been held by most people today is expected that the process of learning science Jurumiyyah Nahwu can still be done everywhere and more flexible .**

Key Words: game, nahwu jurumiyyah, android, research and development.

I. INTRODUCTION

Learning of Nahwu divided into 3 levels includes NahwuJurumiyah, NahwuImirithi, and Alfiyah, but only NahwuJurumiyah taken by the researcher in this research. A learner will easily learn Arabic's grammar when they have achieved better understanding of detailed basics of Nahwu expanded in NahwuJurumiyah.

Currently most of parents assume-learning Nahwu is only in boarding schools or Islamic schools, meanwhile tight schedule of students insists them to think that Nahwu is difficult and complex hindering them during learning process. Insufficient media of learning Nahwu triggers the ineffective, uninteresting, and impression of only watching lead them to boredom of learning Nahwu by reading torn-able book and textbooks.

In another hand, the currently advance development of technology such as *mobile phone*, *smartphone* has attracted attention by its advance features. The android, one of the most popular system of *smarthphone*, based on International Data Coorporation (IDC) has dominated 52% of domestic market. Some factors triggers the high number of its users in Indonesia, such as the affordable price of android device, the significances of its offered contents and various applications. Meanwhile, in global market about *smartphone,* its dominating percentage has decreased in 2013 due to Android's presence begins to dominate under 79,3%, **31,2% by Apple, 8,7% by Windows Phone, 6,8% by Blackberry, and 5,8% by other operating system**. Based on those findings, the researcher took Android because its gains more users by years[1].

Currently in this era, the use of game is not only to amuse but also as educational media giving solution in learning NahwuJurumiyah through educative game by using *mobile* technology based on *android* system. This method is considered to be interesting due to this *mobile* application could cover both of textual, and audio visual learning and practically effective anywhere.

Based on those backgrounds, the researcher takes title "Creating Educative Game Application as Learning Media of NahwuJurumiyah based Android in *Qowa'idulLughatil*", is a effective, interactive, less-saturated, learning application of NahwuJurumiyah completed by games to measure students' understanding about NahwuJurumiyah by using *smarthphone* or *tablet* used *android* in order to create flexible condition of learning anywhere.

II. REVIEW TO RELATED LITERATURE

A. NAHWU

Nahwu is grammatical language-knowledge allowing the students to know the I'rab or bina'nya, to know what sounds' word includes rofa', nasab, jar, or even jazem which changes by a specific circumstance in the sentence.

[1]Baihaki, 26 Oktober 2012, http://www.beritateknologi.com/handphone-android-lebih-keren-dibanding-iphone-apple-di-kalangan-anak-muda/

B. GAME

The term of game taken from English language means permainan. Game refers to "Intellectual Agility". The first computer game created in 1962 by MIT engineers titled *Spacewar*. This game was played on a car-like PDP-1 computer. Although its graphic was low but it was the modern one.

Some category of game such as:

1. Shooting
   This game needs speed reflect, body's coordination, and timing; the example are GTA and Crysis.
2. Fighting.
   Required reflect, and body's coordination to memorize the pattern of skills; the example of this game are: Mortal Combat and Tekken.
3. Adventure
   This game emphasizes on story's plots and thinking ability to analyze visually, to solve the riddles and to conclude some event; the example: King Quest and Space quest.
4. Simulation, construction, and management.
   This game describes the realm as if it were the real world by considering full-detailed factor; the example: The Sims, Roller Coster Tycoon.
5. Strategy
   This game requires coordination and strategy to play. Most of the games are battling game; such as: Warcraft, Age of Empire.
6. Sport
   Adapted from reality and requires agility and strategy to play. Such a: PES 2012 and NBA.
7. Puzzle
   Riddle games requires players to solve the riddle. Examples: Tetris, Minessweeper and Bejeweled.
8. Edugames
   This game created to a specific purpose as educational media for children to know color, letter and number, mathematics, and learning second and foreign language.

B.1 ANDROID

Android is OS mobile grows among other OS, such as Windows mobile, I-Phone, Syimbion which offers vary content and optimizes hardware. However, this current OS exist by promoting own built-core application without observing the third party's potential.

Android is an operating system design for *mobile* devices based linux which covered operating system, *miidleware* and application. In the beginning, Google Inc. bought a new comer-Android Inc to create phone cell software. Then, to develop Android, it was built Open Handset Alliance, consortium of thirty software company, telecommunication, includes google, HTC, Intel, Motorola, Qualcomm, T-mobile, and Nvidia.

During the releases period of Android, 5th November 2007, Android and Open Handset Alliance supported open source development to mobile device. In another side, Google releases Android codes under lisence of Apache, a lisence of software and open platform of mobile software. Currently, most of vendors are HTC, Samsung, LG, Sony Ericsson, Nexian, and many vendors in the world of smartphone's production and tablet devices based on Android. The reason was Android is an operating system belong to *open source* so that it is freely distributed and used by any vendor.

B.2 ORIENTED BASED PROGRAMMING

Oriented based programming is a programming concept of more structural create programming code, grouped based on involved objects to use in the application's creation. Oriented based programming divides programing code of application into a number of object by computer applications' views and its process.

B.3 FLOWCHART

Flowchart is a telling chart of resolving steps. Flowchart is a serving way of an algorithm. There are two kind of flowcharts describes the progress with computers:

1. System Flowchart
   A chart shows the sequence process in a system showing the device input media and output media as well as its data storage progressing system.
2. Program Flowchart
   A chart shows the sequence of instructions described with specific symbols to solve problem in a program.

To compare between system flowchart and program flowchart, there is evidence that program flowchart specifically describes about the sequence of instruction arranged by the program to apply in computers.

B.4 STORYLINE

Storyline or plot is used in especially adventure, RPG, RTS, and action games. However it is also preferable to create storyline in any genre of game, example to create it in puzzle game. But when a creator of puzzle game create an interesting storyline, then the game will be better.

B.5 THEORITICAL FRAMEWORK

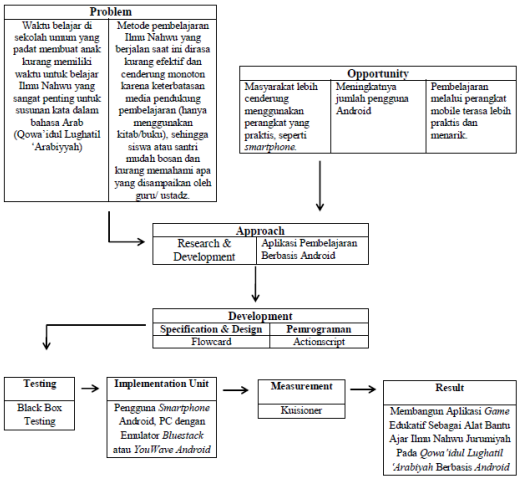

Figure 1Theoritical Framework

III. THE RESEARCH METHODS

A. PROCEDURE OF THE RESEARCH

The design of the research is *Research and Development* or research and development method to create specific product and to test its effectiveness.

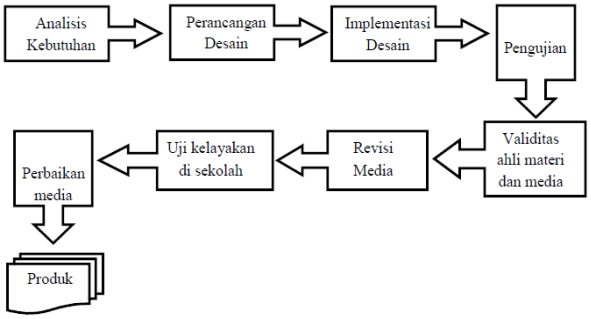

Figure 2 Research and Development

B. THE OBJECTS AND PARTICIPANTS OF THE RESEARCH

The experimented object is the educative game as a learning media of NahwuJurumiyah based on *android*as the course's aid in the Arabic's grammar (*qowa'idullughatil 'arabiyah).*

The taken participants comment on the learning media of the fourth graders of excellent associated primary school of BumiKartini, Jepara as the genral consumer s (average age 10-12 years).

C. THE TECHNIQUE OF COLLECTING DATA

The used techniques of collecting data were predicting needs, observing in a small scale or interviewing the experts, and literature studying method. The literature studying method became the consideration to gain secondary data related to books, journals, articles, or references as the informative source of this research.

The technique to take participants' responses was questionnaire, a technique by providing statement or questions to record participants' answers. The questionnaire types are:

a. Based on the respondent, divided into direct questionnaire and indirect questionnaire. The direct questionnaire is answered directly and submitted by the asked respondent at once, meanwhile the indirect one refers to a questionnaire which is submitted and answered by non-asked respondent.
b. Based on the responses, divided into six types called: close questionnaire, open questionnaire, check list, interview, observation and curriculum vitae.

The used questionnaire of the research was direct questionnaire by the check-list answers. The data of the research was qualitative taken from the questionnaire's average score of the students. The expected content of the questionnaire were aspect of motivation, interest, ease, and significance. After the gained qualitative data, then the data is converted into 5 scale qualitative scores of likert scale based on this converted scoring table 1.

Table 1 Convertion Data

Interval Skor		**Kategori**
$x > Xi + 1{,}80$ Sbi	X > 3,4	Sangat Layak
$Xi + 0{,}60$ Sbi $< x \leq Xi + 1{,}80$ Sbi	2,8 < X ≤ 3,4	Layak
$Xi - 0{,}60$ Sbi $< x \leq Xi + 0{,}60$ Sbi	2,2 < X ≤ 2,8	Cukup layak
$Xi - 1{,}80$ Sbi $< x \leq Xi - 0{,}60$ Sbi	1,6 < X ≤ 2,2	Kurang Layak
$x \leq Xi - 1{,}80$ Sbi	≤1,6	Sangat Kurang Layak

Explanation:
Ideal average (*Xi*): -x (Maximum score + Minimum score)
Ideal deviation (Sbi): -x (Maximum score – Minimum Score)
X : The average score of the implementation
Maximal Score : 5
Minimum Score : 1
Xi : -x (4+1)= 2,5
Sbi : -x (4-1) = 0,5

IV. DESIGNING SYSTEM AND FINDINGS

A. THE DESIGNING PROCESS

The modeling process or called as designing process has purpose to illustrate the ongoing activities and the transition process among those activities.The detailed explanation of modeling process used physical modeling by drawing *flowchart system* on figure 3. During the applications runs, the users will see an opening application, then it will appear a main menu consists of four sub-menu: learn, game menu, score menu, and helping menu.

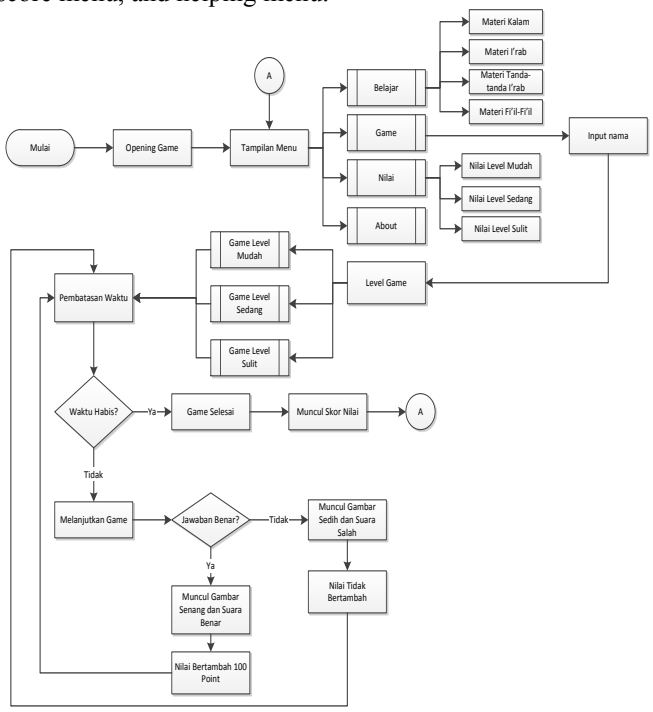

Figure 3 Flowchart

B. IMPLEMENTING SYSTEM

In this stage has purpose to determine whether a system will go as planned. Implementing is a step where the system has been analyzed and designed specifically based on the system's designs.The designing steps took *Adobe Illustrator;* meanwhile the animation used *Adobe Flash CS6* and the name creation of *Class* called as *Script.* In the coding stage, the researcher did not use *Adobe Flash CS6*, but used*FlashDevelop*, because of its nature of *open source* of language programing in *FlashDevelop* based on *.net Framework* using OPP (*Object Oriented Programming).* The file's results .apk created by *FlashDevelop* needs no *Adobe's* and *Adobe Air* installation and no larger RAM's space to run in Smartphone. When the coding step used *Adobe Flash* and an error occurred, then it will not appear in the name's lists where error occurred because of incomplete.After the implementing stage, it will be ready to test to the participants to gain data whether the system will achieve the preferred and planned objectives efficiently and to find out whether it needs to refine or no refining stage required.

C. THE RESULTS OF APPLICATION

Before promoting the application, assure the application "nahwu.apk" is installed in the android's OS. After the installation, then click the icon nahwu and there will be introductory interface as in figure 4.

Figure 4 Intro Interface

Wait the loading process after the into, there will appear start button under loading gauge as in figure 5.

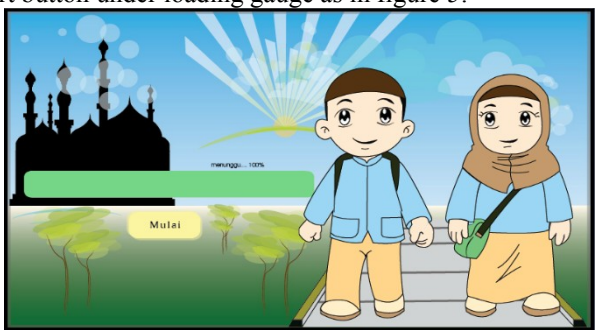

Figure 5Loading Interface

Click the button start to go to main menu. The main menu appearance consists of start menu, gaming menu, and help menu, exit menu, and also a greeting text under the interface as in figure 6.

Figure 6 Main menu Interface

When the learning menu clicked, the materials such as kalam, I'rab, tandaI'rab, and Fi'il will appear. When the each part of sub menu runs more than one interactive window,

there will be a next icon under the interface. On the right corner of the interchange there is a back button to see the main menu. The interfaceof learning menu is as figured in figure 7

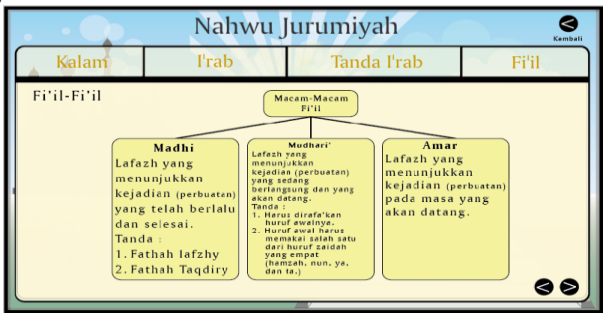

Figure 7 Learning Interface

When the appearance of main menu clicked, there will appear an interface to submit names before playing the game. Selecting the start button but there are no names submitted will alert the system to show "Please enter the name", is as figured in the figure 8.

Figure 8 Point of game

By pressing the entered name-form, the alert system will automatically disappear and start button clicked after naming, will appear game-level selections. After submitting names, the game-level selections consist of low level, medium level, and hard level will appear.

After selecting one of the levels, the questioning interface must be answered with limited time. If the users answer correctly, there will be a smiling emoticon with a correct written text. But when the answers are incorrectly, there will a be a sad emoticon and false written text 4.9.

At the beginning, the researcher used *Fuzzy* FSM Method (*Finite State Machine)* because it could define condition and determine when a statement or questions should change. However, after some experimental stages of the research and also interviewing some experts, to change the statements of questions can take *script random* to take them by combining *limited time script*.

It is expected to any future researcher to use *fuzzy* FSM method in this game and limit the time in every level and every question in a same level.When in the main menu' appearance the user selects scoring menu, there will appear the score based on the level category of low level, medium level, and hard level. After selecting one of the categories, there will appear names and the highest score based on each category. By selecting exit icon, the user will go back to see the main menu.

D. TEST RESULTS OF SCREEN TEST

During the application's test, it is testing the related storyline as planned in the application before implementing but also testing the reasons of the limitations' designed.

This educative game appears great on a 480x800 resolution's screen or 4 inch with Android OS rather than on 7 inch and 10 inch screen. The use of *Adobe Flash* caused the appearance becomes difficult to appear on any screen resolutions of *Android* OS, but only one resolution which greatly shows on a full screen as designed in the animating stage using *AdobeFlash CS 6*. It is expected to future researcher to create better resolution setting to run on any screen resolution of *Android OS.*

E. THE CORESPONDENT TEST RESULTS

The test was conducted in excellent-associated primary school of BumiKartini, Jepara under 25 fourth graders as the participants.The whole average scores shown in table 2.

Table 2 Average score

No	Apek Penilaian	∑ Nilai	Apek Penilaian ∑ Nilai	Kategori
1	Motivasi	816	3.264	Layak/Baik
2	Kemenarikan	394	3.94	Sangat Layak/Sangat Baik
3	Kemudahan	313	3.13	Layak/Baik
4	Kemanfaatan	612	3.497	Sangat Layak/Sangat Baik
Rata-rata Total		2135	3.46	Sangat Layak/Sangat Baik

Based on the four aspects can be drawn that based on aspect motivation was 3.264, categorized good; aspect of interest was 3.94 categorized very good; aspect of ease was 3.13, categorized good; and aspect of significance was 3.487 categorized very good; the whole average score of four aspects was 3.46 categorized very good.

V. CONCLUSION AND SUGGESTION

A. CONCLUSION

Based on the findings and discussion, it can be drawn:

1. The users could learn nahwu interactively, effectively, and not only just watching and playing the educative game of NahwuJurumiyyah.
2. The users could test their ability by playing game NahwuJurumiyyah.
3. Based on the test of screen, the game suits to run on 480x800 pixel or 4 inch screen; and only that resolution the game runs well.
4. The students' responses were good. Based on the participants' test based on aspect motivation was 3.264, categorized good; aspect of interest was 3.94 categorized very good; aspect of ease was 3.13, categorized good; and aspect of significance was 3.487 categorized very good; the whole average score of four aspects was 3.46 categorized very good.

B. SUGGESTION

Based on the findings, the addressed suggestions by the researcher are:

1. To the future researcher is expected to create this game more interesting; and need to have new model game's addition which are not only multiple choices, such as
   a. *Puzzle*: combining several randomly Arabic sentences into a good sentence and correctly in grammar.
   b. *Essay*: Writing the answers directly to the answer's form such as writing fi'il correctly.
   c. *Strategy*: Accomplishing a certain mission and answer the question after completing those missions.
2. Suggested to take questions by using database to ease editing stage.
3. Using fuzzy FSM (Finite State Machine) is fully recommended to any researcher whom wants to develop this educative game.
4. During limiting time on questions, it is suggested to add additional time in every question instead of only giving additional time in whole questions in a level. It is caused during the game creating time was not only trying to focus on a difficult questions which probably took longer time.
5. Fixing up the full screen appearance which allows it to run on every resolution screen of *Android* OS.
6. Initiating long-term follow up between teacher, parents, and students during learning process which triggers better outtake achievements.

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