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### Development of Arabic Syntax Game Based on Unity Application

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#### Abstract

*In this era of online learning, teachers can not teach arabic syntax by lecture method. The presentation of linguistic rules clearly cannot be done directly, Then educators have a responsibility to innovate arabic syntax learning through the unity-based Arabic syntax educational game so that it is very easily understood by learners and does not cause boredom in the midst of learning that is carried out entirely online. The use of educational games is the right solution in overcoming this problem. The aims of this study are: (1) to find out the needs of lecturers and students, (2) describe the prototype picture of the Nahma. (3) describe the expert's assessment of the Arabic syntax educational game product. The data of this study were obtained through non-test data. The non-test data used is in the form of interviews, observations, and questionnaires on the needs of lecturers and students, Expert validity test questionnaire on Arabic syntax games and photo documentation.*

**Keywords :** Game, unity, and sintaksis Bahasa Arab

#### Introduction

Currently, Indonesia is slowly starting to enter the new normal era, after previously carrying out social distancing, physical distancing, and large-scale social restrictions (PSBB) amid the spread of the Covid-19 pandemic. Suspected cases of Covid-19 in Indonesia were first reported on March 2 last as many as two cases (Dewi, W. A. F. :2020). Since then, the government has immediately implemented a series of policies to prevent the spread, spread and increase of suspects. In line with that, all activities related to public gatherings that can be carried out without face-to-face meetings are temporarily closed, and their implementation is transferred to another system. The implementation is carried out in stages in line with the increasing number of suspects which is quite fast.

The Covid-19 pandemic, which spreads so fast, has no doubt had a huge impact and influence on people's lives in all fields, including education. Educational activities that are usually carried out face-to-face in schools and campuses have had to be diverted into learning with an online system to prevent and suppress the spread of the virus. Of course, changes to the system more or less affect the learning process. In fact, for some parties it is considered disturbing and difficult. Just a small example of parents of students, even educators who do not understand the internet, it will definitely be difficult to adjust. Lectures at all universities are also carried out online per the third week of March 2020, since there was an appeal *social distancing*. (Suara Merdeka "https://www.suaramerdeka.com/opini/pr-04128755/hadapi-covid19-pencegahan-paling utama?page=all. accessed 8 maret 2021.

Around March 16-18 2020, universities in Indonesia began to implement this online system of lectures through the decisions of the heads of their respective institutions based on circulars from the Ministry of Education and Culture (Kemendikbud) and the Ministry of Religion (Kemenag) for religious universities. For universities that start their even semesters in January–February, of course, they have done quite a lot of face-to-face lectures. However, this is

not the case for universities, which the majority start their even semester lectures in March. In fact, it can be said that even semester lectures are entirely carried out online. Based on Circular Number: 657/03/2020 concerning Efforts to Prevent the Spread of Covid-19 (Corona) in Higher Education.

Lectures with an online system are also carried out by the Arabic Language Education Study Program, Semarang State University, in all subjects. Online lectures are carried out using various facilities and services, applications and websites. The services used include Zoom Meeting, Google meet, Google Classroom, CloudX, Whatsapp, and many other applications. The use of these applications is adjusted to the agreement between the course lecturers and students, as well as adjusting to the needs of the lecture itself. Online lectures are also carried out for basic nauw science courses. Nahwu science courses are typical Arabic courses which are programmed in 3 courses in 3 semesters continuously (Kemenag or.id)

Based on the results of initial observations related to understanding and learning arabic syntax in Arabic language study program at Semarang State University, there are several problems in learning arabic syntax including: using an online system and without the use of multimedia in learning makes students experience boredom and difficulty digest the rules of the language being studied. It is proven by the results of preliminary research conducted by researchers on 30 early semester students who were randomly selected, 50% of students stated that arabic syntax learning was very difficult, 34.38% of students said it was difficult, 3.1% said it was normal, 3.1% said it was easy, and 9.3% others stated very easily. Apart from that 71.

From the various things above, researchers are interested in developing the arabic syntax game based on the Unity application in the Arabic Language Education study program. The game that will be developed is expected to be a solution to the problem of arabic syntax learning that is carried out online, besides that students' understanding of arabic syntax can be obtained in a simple and fun way. The development of this game is also one of the adaptations of arabic syntax teaching which tends to be conventional towards millennials.

### **Games**

Jason explained that the Indonesian language "Game" means "game". The game referred to in the game also refers to the notion of "intellectual agility" (intellectual playability). While the word "game" itself can be interpreted as an arena for the decisions and actions of the players. There are targets to be achieved by the players. Intellectual agility, to a certain extent, is a measure of the extent to which a game is interesting to play to its full potential. (Anonim, Unity dan kelebihan dan kekurangannya. (<https://www.unisbank.ac.id/v2/berita-fti/mengenal-unity-3d-game-engine-beserta-kelebihan-dan-kekurangannya/> downloaded pada 19 Februari 2021))

According to Wahono game is a structured or semi-structured activity which is usually intended for entertainment and sometimes can be used as a means of education. The characteristics of games that are fun, motivating, addictive and collaborative make this activity popular with many people. Game is an interesting and fun game. (Virvou M., G. Katsionis, & K. Manos. 2005. *Combining Software Games with Education: Evaluation of its Educational Effectiveness*. Educational Technology & Society. online. Tersedia di <http://www.ifets.info/> Online.Accessed: 4 februari 2021.)

Kirriemuir and McFarlane divide games into:

- a. Action, games with this genre are the most popular games. This type of game requires the player's reflex ability. One of the popular action subgenres is First Person Shooter (FPS). In FPS games, speed of thinking is required. This game is made as if the player is in that atmosphere.
- b. Action Adventure, this genre combines action and adventure game play. For example, players are invited to explore an underground cave while defeating enemies, and look for ancient artifacts, or cross a river.

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- c. Sports, this game genre brings sports to a computer or console. Usually the gameplay is made as close as possible to the actual sports conditions.
- d. *Puzzles*, the puzzle genre presents several forms of game offerings such as puzzles, matching the colors of the balls, mathematical calculations, arranging blocks, or recognizing letters and pictures.
- e. Word Games, word games are usually designed to test proficiency with language or to explore its properties. Word Games are generally used as a source of entertainment, but have been shown to serve an educational purpose as well.

## UNITY APP

Unity is a Game Engine built in 2004 by David Helgason (CEO), Nicholas Francis (CCO), and Joachim Ante (CTO) in Copenhagen, Denmark and launched in 2005. Unity itself is very popular among developers because of its engine, which is very easy to use even for new users though. Initially, Unity was a paid software and was used by about 53% of developers worldwide. However, in 2009, they launched their product for free and this resulted in the increasing popularity of Unity itself. Until now, Unity itself is divided into 3 categories, namely Unity Free, Unity Plus, and Unity Pro (Anonim, Unity dan kelebihan dan kekurangannya. (<https://www.unisbank.ac.id/v2/berita-fti/mengenal-unity-3d-game-engine-beserta-kelebihan-dan-kekurangannya/> downloaded 19 Februari 2021).

Graphics in unity applications are made with high-level graphics for OpenGL and DirectX. Unity applications support all file formats, especially common formats such as all formats of art applications. The unity application is compatible with 64-bit versions and can operate on Mac OS x and windows and can produce games for Mac, Windows, Wii, iPhone, iPad and Android.

## ARABIC SYNTAX

Arabic syntax is one of the main elements in Arabic. That is, to study and understand Arabic texts, both classical and modern, non-Arabic people absolutely master the science of nahwu, because this knowledge helps in understanding the meaning and intent of the word changes in Arabic.

Arabic syntax learning courses are introductory courses in Arabic grammar or syntax. After taking this course, students can explain syntax and the object of study as well as the tradition of Arabic syntactic studies including construction, categories, functions, relations, patterns, inflectional systems, verb conjugations, noun declination, and Arabic syntactic analysis.

The purpose in arabic syntax learning is for students to be able to describe syntax and the object of study as well as the Arabic syntax study tradition including construction, categories, functions, relations, patterns, inflectional systems, verb conjugations, noun declination, and Arabic syntactic analysis (Unnes.ac.id)

## Method

The type and research approach used is research and development (research and development) which is applied to the field of education. According to Borg and Gall educational development research is a process used to develop and validate educational products. The results of development research are not only the development of an existing product but also to find knowledge or answers to practical problems. Research and development methods are also defined as a research method used to produce certain products, and test the effectiveness of these products (Sugiyono: 2012 :297). Furthermore, research and development is a strategy or research method that is powerful enough to improve practice (Sukmadinata, Nana Syaodih: 2012)

The data in this study were collected through observation, questionnaire, interview techniques. The questionnaires and interview about the students and lecturers' needs about the product arabic syntax game, the observation during the process of arabic syntax.

The research subjects are Arabic Language Education Study Program students who take arabic syntax courses.

## **Results and Discussion**

The results of the study include two things, namely: (1) the results of the analysis of the needs of lecturers and students on development of an arabic syntax game based on the unity application in the Arabic language education study program and (2) game learning media prototype arabic syntax game based on the unity application in the Arabic language education study program suitable for students, lecturers and curriculum (3) describe the expert's assessment of the Arabic syntax educational game product.

### **Needs Analysis Results arabic syntax game based on the unity application in the Arabic language education study program.**

The first step taken by researchers in developing arabic syntax game based on the unity application in the Arabic language education study programs to analyze the needs of lecturers and students on the media. This needs analysis is carried out in two ways, namely by conducting direct interviews with lecturers of arabic syntax courses and distributing needs analysis questionnaires to lecturers and students.

Interviews were conducted by researchers to lecturers of arabic syntax courses to support data on needs analysis. Interviews were conducted with arabic syntax lecturers at the Arabic language education study program, Semarang State University with the aim of knowing the lecturers' opinions about basic nahwu learning that had been going on, especially before using learning media with educational games.

Arabic syntax learning at Semarang State University is carried out for 2 hours or 2x50 minutes. The Nahwu course was taught by Ustadz Singgih Kuswardono, Ustadz Yusuf Muhammad Hasyim, Ustadz Muhlisin Nawasi, Ustadz Darul Qutni, and Ustadz Ahmad Miftahuddin.

In the opinion of lecturers, in general, students are less enthusiastic when learning does not use media so that students have difficulty in learning basic nahwu. This is because lecturers emphasize more on conventional learning. Lecturers only use the grammatical-tarjamah learning method, and never use learning media.

Lecturer also stated that it is very good if there is the development of learning media that can motivate and assist students in understanding arabic syntax material. So the next step is media needs analysis.

Research respondents are students of the Arabic Language Education Study Program UNNES, UIN Walisongo Semarang, and IAIN Salatiga semester 2 50 people take the Nahwu Basic course in each campus, with a total of 14 male respondents and 36 female respondents, in addition to this 5 lecturers who teach Nahwu courses. Respondents were asked to fill out a questionnaire that had been prepared and interviews were conducted with respondents' representatives. The results of data analysis are as follows.

The questionnaire for analyzing the needs of lecturers and students consists of several aspects, namely (1) aspects of media content and material, (2) visual aspects of media, and (3) aspects of media support.

#### **A. Aspects of media content and material**

Aspects of media content and materials include the urgency of developing educational game media, types of games, game design, game duration, in-game menus, learning material

themes, number of levels on evaluation, number of questions, and the language used in the game.

Based on questionnaire it can be described that game is was very necessary to develop game media applications to improve understanding of basic nahwu/basic syntax, the types of game is puzzles, the games so that they can be played via smartphone devices, game duration was 5-10 minutes for one game theme, the design of this game will also contain three elements, namely Competence, Nahwu Material, evaluation/game, the the main theme of the game is classification of words, Classification of ism, fil, and harf, i'rab, marfu'at, manshubat, and mahfudhot, that the majority of respondents chose Arabic-Indonesian as the language in the game display.

### **B. Visual Aspects Of The Media**

The visual aspects of the media include color types, image illustrations, image types, pointer shapes, and game resolution.

Based on Questionarre, it can be described that analogous colors as game design colors, image illustrations for vocabulary were very necessary in the game display, the type of caricature image, animation clicker as the most suitable form of pointer, the high resolution type.

### **C. Audio aspect of media**

The audio aspect of educational game media consists of two components or aspects which include audio illustrations and the type of audio contained in the navigation.

Based on Questionarre, it can describe that audio illustrations is very needed, and the audio type is sound effects.

### **Arabic Syntax Game Prototype Based on Unity**

Based on the questionnaire analysis of the needs of lecturers and students, the making of the Unity-based arabic syntax game was made according to the references and considerations of the results of the analysis of the needs of the students and lecturers. Although in the making of the Unity-based arabic syntax game, there are many adjustments with several considerations, the results of the needs questionnaire analysis are still used as a reference in making the Unity-based game and adapted to the needs of students and lecturers.

Unity-based educational game media designs were created using the Action Script 2.0 application, Corel Draw CS2 and Adobe Photoshop CS2, to design illustration images, navigation, layouts and gamecoding. Design creation goes through two stages before being validated by software engineers and materials experts. The first design was made as an initial product which was then consulted with software engineers, and materials experts. After receiving some input, the initial product design was revised.

Meanwhile, the theme in this educational game is adjusted to the arabic syntax material curriculum.

### **First Design of Unity-based N arabic syntax Game Prototype**

The initial menu display for educational games consists of (1) game titles, (2) material menu displays (3) material display (4) game menus.

Picture 1.  
Initial View

Initial view, to enter this game, the user simply points the cursor towards the start button.



Picture 2.  
Display Material Menu



The following is a menu display of the material to be studied in this game in accordance with the material to be studied in the Arabic syntax.

Picture 3.  
Display Materials and Games



The material is explained in a simple way to be easily understood by game users, and games are made in stages according to the results of the needs analysis.

### Validation and Suggestions for Improvement of the Arabic Syntax Game Prototype

After compiling a prototype of the Unity-based Arabic syntax game learning media, the next step is to validate the Unity-based Arabic syntax game. Validation was carried out by two experts, namely an educational game media expert who is a software engineering expert and game developer from the alumni of the Masters in Visual Communication Design Bandung Institute of Technology and an Arabic material expert who includes an Arabic lecturer at the State University of Semarang. The categories for the assessment of the Arabic syntax game prototype based on Unity are:

Table.1

Categories of media prototype validation

Skor	Kategori
4	very appropriate/very suitable
3	worthy/appropriate
2	not worthy / not suitable
1	very inappropriate / very inappropriate

**Software Engineering-Based Media Expert Validation of the Arabic syntax game**

The validation was carried out by Muhammad Nasirul Umam, a software engineering expert and game developer from ITB alumni. The validation of media experts based on software engineering includes several aspects, namely (1) software engineering aspects, (2) communication aspects, (3) audio aspects, and (4) visual aspects.

**Software Engineering Aspect**

One of the validations of educational game media includes aspects of software engineering, whether in terms of software engineering it is appropriate and accurate, as well as the fulfillment of the parts in an educational game media, and so on. The results of the validation from a software engineer and game developer on aspects of software engineering can be seen in the table below:

Table 2.

Validation of software engineering-based media experts on the software engineering aspects of the Arabic Syntax game based on Unity.

Aspect	value	Reason
Maintainable (can be easily maintained/managed)	3	Game applications are quite easy to maintain, it's just that it would be better if there was an application maintenance guide. Maintenance manual file can be created separately
Usability (easy to use and simple in operation)	4	The use of the game is very easy to understand by users and the way of operation is very simple so it is not confusing. Instructions for use that already exist in the game application are also good and easy to understand
Compatibility (learning media can be installed or run on various existing hardware or software)	4	The design of this game application is very good with no need to use special programs to run it
Clarity and completeness of media program documentation (installation instructions, trouble shooting and program design)	3	Installation instructions can be created and saved in separate files. The program design is quite good in terms of graphics and code
Reusable (part or all of the learning media can be reused)	3	This learning media is quite reusable because it can also be used for other learning media with material modifications

From table above, it can be concluded that the maintainable aspect is appropriate because game media is very easy to maintain. Meanwhile, from the aspect of its use, it is very appropriate and simple to make it easier for users to operate educational game media. The compatibility aspect is very suitable because the application design is very good and there is no need to use special programs in its operation. In addition, the aspects of clarity and completeness of media program documentation which include installation instructions, trouble shooting, and program design are appropriate. This media is also reusable because it can be reused for other learning media with the modification of educational game materials.

Table 3.  
Percentage of validation of software engineering aspects

Score	Category	Total	(%)	cAspect/Indikator
4	ery suitable	2	40	a) <i>Usability</i> b) <i>Compatibility</i>
3	Appropriate	3	60	a) <i>Maintainable</i> b) <i>Clarity and completeness of media program documentation</i> <i>Reusable</i>
2	Not suitable	0	0	-
1	Very inappropriate	0	0	-

Based on table, the arabic syntax game based on Unity in the software engineering aspect gets a score of 4 or the very appropriate category is 2 indicators or 40%. While the score of 3 is on 3 indicators or 60%. So that the highest score is 3 (appropriate) and it can be concluded that this media is suitable for the software engineering aspect with a percentage score of 3 is 60%.

In addition to the assessment above, there are also suggestions for improvement, namely instructions for installation, maintenance and trouble shooting of application programs can be created and placed in a separate file from the educational game application file so that it will be easier for users to understand.

### Communication Aspect

Aspects of communication that must exist in an educational game learning media include communicative aspects, creative in ideas and pouring ideas, simple and attractive, interactivity, and providing motivation to learn.

Table 4.  
Software engineering-based media expert validation of the communication aspect of the arabic syntax game based on Unity

Aspect	Value	Reason
Communicative (according to the message and acceptable to the target audience)	4	The interaction between the media and students is very good because the game contains game play that can connect students with the media.
Creative in ideas and pouring ideas	3	Ideas and ideas are quite interesting and in accordance with the characteristics of student learning in the pandemic era.

Simple and captivating	3	Game made as simple as possible but still captivating and can attract attention.
Interactivity	4	Interactivity in this game is very good.

Based on table above, it can be seen that in the communicative and interactivity aspects, it is very appropriate because the educational game media already has game play (learning evaluation exercises) that are designed attractively so that there is interaction between students as users and educational game media. In addition, in the aspect of creative ideas and pouring out ideas and simplicity of educational games, it is appropriate because educational game media are designed to be simple but still attractive and can attract students' attention in the learning process.

Table 5.  
Percentage of validation of communication aspect

Score	Category	Total	percentage (%)	Aspect/Indicator
4	Very suitable	2	40	a) Communicative b) Interactivity
3	Appropriate	2	40	a) Creative in ideas and expressing ideas Clarity and completeness of media program documentation b) Simple and alluring
1	Very inappropriate	0	0	-

Based on table the Arabic syntax game based on Unity in the communication aspect gets a score of 4 or the very appropriate category is 2 indicators or 40%. While a score of 3 is on 2 indicators or 40% and a score of 2 on 1 indicator or 20%. So a score of 3 (appropriate) and 4 (very appropriate) is the majority score and it can be concluded that this media is very suitable for the communication aspect with a score of 4 as much as 40%.

In addition to this validation, there is a suggestion given by software engineering experts, namely giving an award symbol at the end of the evaluation because the reward or award for students who successfully complete the questions in the game evaluation is also very important to increase student interest in learning.

#### Audio Aspect

Aspects of audio assessment include narration, sound effects, and backsound music. Here is an expert validation of the audio aspect.

Table. 6  
Software engineering-based media expert validation of the audio aspect of unity-based educational game media

Aspect	Value	Reason
Narrative	3	Narrative is good enough
Sound effect	3	Sound effects on every navigation are good and interesting
Backsound music	3	Background music on game play is good

Based on table above, the software engineer stated that the narration, sound effects, and backsound music were good and appropriate. The arrangement of these three aspects is appropriate and not excessive.

Table 7.  
Audio aspect validation percentage

Score	Category	Total	percentage (%)	Aspect/Indicator
4	Very suitable	0	0	-
3	Appropriate	3	100	a) Narrative b) <i>Sound effect</i> c) <i>Background music</i>
2	Not suitable	0	0	-
1	Very inappropriate	0	0	-

Based on table, arabic syntax game is based on Unity, in audio it gets a score of 3 on 3 indicators or 100%. So that the highest score is 3 (appropriate) and it can be concluded that this media is suitable for the audio aspect with a percentage score of 3 is 100%.

The advice given by software engineering experts is to use song instruments for background music in game play, preferably with a slow melody so that it does not disturb the concentration of students but can still provide relaxation.

### Visual Aspect

Visual aspects include layout design, typography (letter selection), color composition, illustration images, animated moving media, navigation and game systematics.

Table 8.

Software engineering-based media expert validation of the visual aspect of the Arabic syntax game

Aspect	value	Reason
<i>Layout design</i>	3	<i>The layout design is good and consistent from start to finish</i>
Typography	3	The use of 2 types of letters is good and does not reduce the beauty of the game design
Color composition	3	The analogous color composition in this game is quite good, not flashy but still harmonious
Illustration image	3	The illustration image for presenting vocabulary in this game is good enough
Animated moving media	3	The animation in this game is quite good and interesting
Navigation on each layer/scene	4	N Navigation and coding on each scene are very well organized so that it adds to the aesthetics of the game but is still easy to use
Game Systematics	4	<i>Game is very systematic</i>

Based on table above, it can be seen that the prototype of the educational game in the aspects of layout design, typography, color composition, illustration images and animated moving media is appropriate. Software engineering experts stated that the game design is attractive, not excessive, and consistent in the placement of icons in educational games. The choice of typeface that only uses two types, namely Comic Sans and Traditional Arabic gives a harmonious and aesthetic impression.

Analogous color composition is also suitable for student learning media because it is too flashy, but still attractive. In addition, the illustration and animation aspects have also been well designed and can present the intended meaning. Meanwhile, in the aspect of scene navigation

and game systematics, the design selection is very appropriate. Navigation is made with good and orderly coding so that overall it presents a systematic educational game.

Table 9.

Table Percentage of visual aspect validation

Score	Category	Total	Percentage (%)	Aspect/ Indicator
4	Very suitable	2	28.57	a) Navigate each layer/scene b) Game Systematics
3	Appropriate	5	71.43	a) <i>Layout design</i> b) <i>Typography</i> c) <i>Color composition</i> d) <i>Illustrations</i> e) <i>Animated moving media</i>
2	Not suitable	0	0	-
1	Very inappropriate	0	0	-

Based on table, the Arabic syntax game based on Unity in the visual aspect gets a score of 4 or the very appropriate category is 2 indicators or 28.57%. While the score of 3 is on 5 indicators or 71.43%. So that the highest score is 3 (appropriate) and it can be concluded that this media is suitable for the visual aspect. It was concluded that the majority of the assessments given by software engineering experts on the visual aspect were a score of 3 or appropriate/decent with a percentage of 71.43%.

Overall, it can be concluded that the Unity-based Arabic syntac game is stated according to the software engineering aspect with a percentage score of 3 (appropriate/decent) is 60%, the communication aspect is stated to be very appropriate with the percentage score of 4 (very appropriate/very feasible). ) is 40%. In addition, the audio aspect is also stated in accordance with the percentage score of 3 (appropriate/decent) is 100%, and the visual aspect is also stated in accordance with the percentage score of 3 (appropriate/decent) is 71.43%.

## Conclusion

Based on the description of Research and Development (R&D) entitled Nahma Game development of arabic syntax game based on unity application, the following conclusions can be drawn: The results of the analysis of the needs of lecturers and students for the media-based Nahwu matching game *unity* shows the results of lecturers and students wanting game media that contains 3 main components, namely: (1) menu display (2) menu of nahwu materials (3) matching games made in stages. This game media contains the theme of *word classification, i'rab classification, marfu'at, manshubat, majzummat, amil nawashikh.*

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