Development of AR-Manner 1.0 as a Learning Media for Communication Ethics to Contact Lecturers in Higher Educations using Augmented Reality Technology

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ABSTRACT

Innovative learning techniques need to be carried out in the 21st century today, where technological developments are growing very rapidly and require innovative learning to improve ethics education in a higher education environment. One of the innovative technologies that have a major impact on scholars is Augmented Reality (AR), [1]. The purpose of this research is to develop AR-Manner 1.0 as a medium to introduce communication ethics using Augmented Reality in the PTI UMS environment. The method used in this research is Research and Development. The first stage is a needs analysis and literature study. The second stage is to design media using use cases. The third stage is the implementation or manufacture of learning media AR-Manner 1.0 and testing the functionality and compatibility tests by media experts. The fourth stage is the software testing stage which includes 2 stages of testing, namely verification and validation tests and knowing the quality and feasibility. The results of the analysis show that the AR-Manner 1.0 learning media is feasible to use. However, this research still needs further research for the development of better media.

Keywords: Learning media, Communication ethics, Augmented reality.

1. INTRODUCTION

The development of technology has made education to be a part of everyday life [2], not to mention the use of social media. Social media has become a thing that is commonly used in the academic world today [3], but it also has various weaknesses. [4] said in their study revealed that millennials tend to be freer to express something in the digital world without thinking further about the effect and only expressing emotional outbursts. Several cases that occurred in Indonesia about interactions in the educational environment showed that there are changes in attitude regarding the interaction patterns of students and lecturers [5,6]. Social media is a very close thing to connect every element, including students and lecturers [7]. Many of these cases cause misunderstandings between lecturers and students.

Lecturers often think that student communication is impolite, while students should assume that the lecturer has not carried out their duties properly. As a result, the relationship between lecturers and students cannot run well.

From the data obtained based on interviews with lecturers of PTI UMS, it is stated that students must have an ethic to communicate with lecturers because if students do not understand the ethics when contacting lecturers, students will lead to dependence on lecturers such as making things easier, which will affect academics. Some cases that often occur are; Incorrect time [calling late at night, outside service hours) for thesis guidance, and using inappropriate words.

The results of interviews conducted with PTI UMS lecturers stated that student communication ethics in contacting lecturers was important because if students

did not understand ethics when contacting lecturers, students would result in improvements to lecturers such as making things easier, which would affect academics. Some cases that often occur; Incorrect time (calling late at night, outside service hours) for thesis guidance, using inappropriate words.

There is a previous study [8] with the title "Students' awareness of language ethics" which is almost the same as this research, the difference is that [8] only focus on literacy studies and has not been packaged attractively. using media platforms.

This study aims to improve student ethics in the university environment in establishing communication using Augmented Reality. One of the outputs from this research is a mobile application with augmented reality that can be used as a learning media. The use of augmented reality is very effective and attractive for teenagers because augmented reality has a great influence on students [1] and is able to increase student motivation in obtaining better investigative skills [9].

2. RESEARCH METHODS

The method used in this research is the Research and Development [R&D] method. This study uses the waterfall model, the product is developed using the waterfall type software development life cycle. According to [10] overall the stages of this model are very systematic, have several steps that must be taken in developing software starting from analysis, design, coding, experimentation, and maintenance which can be described as follows:
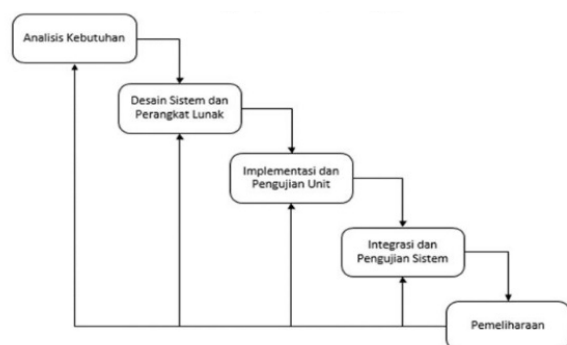

Figure 1. Waterfall Model (Somerville, 2011]

Data collection techniques in this study were observation and questionnaires. Observation is a data collection technique that is carried out by making direct observations of the object or place to be studied. While the questionnaire or questionnaire is a tool to collect data in the form of a list of questions submitted to respondents to be answered in writing. The scale used for measurement is the Guttman scale and the Likert scale.

Data analysis used quantitative techniques in data collection when this experiment was carried out. Quantitative method is the method used to test the hypothesis that has been set by the researcher.

There is a rule in the Likert calculation, where the final result of the calculation is made in the form of a percent according to the assessment interval with the calculation below:

- Maximum Score = Number of respondents x highest Likert score [1]

- Minimum Score = Number of respondents x lowest Likert score [2]

- Index (%) = (Total Score/Maximum Score) x 100 (3)

$$Precentage\ of\ eligibility\ (\%) = \frac{score\ obtained}{maximum\ score} \times 100\%$$

3. RESULTS AND DISCUSSION

3.1. Need analysis

At this phase, the researchers conducted a needs analysis of the software requirements to be developed. The analysis was carried out by observing existing software and conducting literature studies to support the basis for making ethical learning media to contact lecturers using augmented reality.

3.1.1. Needs of Functionality

Media could open the camera

Media could open the help menu

Media could open the information menu

Media could play the audio and video

Media could detect AR Card that contains the importance of ethics AR Card

Media could detect AR Card that contains every mistake that students frequently use while contacting lecturer

Media could activate flash

Media could activate autofocus on the camera

Media could close the application

3.1.2. Needs from Developers

Needs of Hardware

- Laptop/computer
- Android smartphone

Needs of Software

- Unity

- Photoshop
- Adobe Illustrator
- Blender

3.2. Design

This system uses a use-case diagram to know the function of AR-Manner 1.0 media. There is 5 function that could be run by the system. This function is described in Figure 2.
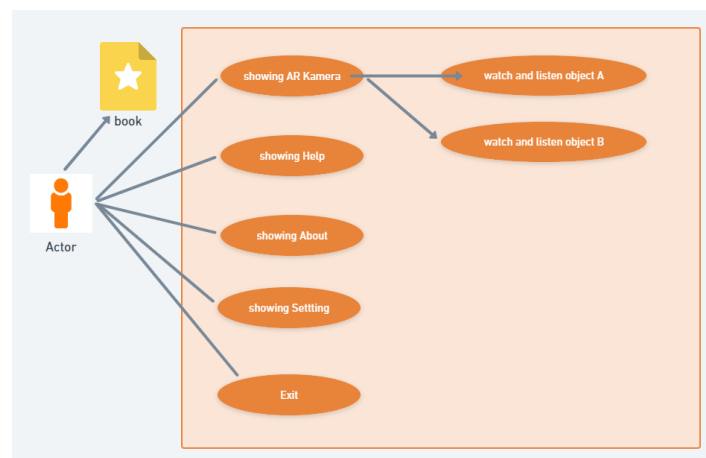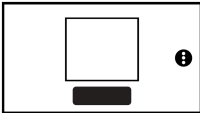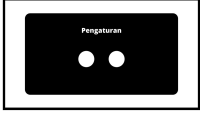

Figure 2. Use case AR Manner

In the use-case diagram, the system could run 4 functions which are AR Camera menu, Help menu, About menu, Setting menu, and Exit Menu. If actors choose the AR Camera menu, it will show a camera to scan the AR Code. Help menu will show a guided tour on how to use the application. About menu will show detailed information about developers. Setting menu will show an option to adjust the volume of the in-app volume. Exit menu will bring the actor to the home screen.

Table 1. Storyboard

No	Page	Design	Information
1	Home screen	AR-MANNER 1.0 "Augmented Reality Etika Komunikasi" Home screen	There will be a splash screen with loading progress
2	Main menu	Main menu	Consist of AR-Camera, Help, About, Settings, and Exit menu

No	Page	Design	Information
3	Before tracking picture	Camera screen (before detecting)	The application will open a camera to detecting the picture
4	Detecting picture on card	Camera screen (after detecting)	After the Picture is detected, there will be a video about the ethics of communicating with the lecturer, also some mistakes that are often found by students.
5	Help	Petunjuk Penggunaan Aplikasi / Deskripsi petunjuk penggunaan aplikasi / Help	This page contains how to use the application
6	About	Informasi Pengembang / Deskripsi pengembang / About	This page contains a piece of detailed information about the developer
7	Setting	Pengaturan / Setting	This page contains a setting to adjust the in-app volume
8	Exit	Keluar / Ya Tidak / Exit	A confirmation page to go to exit application

3.3. Implementation

After the needs analysis stage and the design stage, the next stage is the implementation stage. The AR Manner 1.0 application successfully displayed voice and video about communication ethics with the following results:

Table 2. Implementation

No	Page	Implementation	Information
1	Home screen	 Home screen	There will be a splash screen with loading progress
2	Main menu	 Main menu	Consist of AR-Camera, Help, About, Settings, and Exit menu
3	Before tracking picture	 Camera screen (before detecting)	The application will open a camera to detecting the picture
4	Detecting picture on card	 Camera screen (after detecting)	After the picture is detected, there will be a video about the ethics of communicating with the lecturer, also some mistakes that are often found by students.
5	Help	 Help	This page contains how to use the application
6	About	 About	This page contains a piece of detailed information about the developer
7	Setting	 Setting	This page contains a setting to adjust the in-app volume
8	Exit	 Exit	A confirmation page to go to exit application

The use of the AR Manner application is very simple, namely by pointing the camera at the card, then the system will recognize the marker and automatically AR will appear above the marker, after the user needs to tap the play button to play sound and video.

3.4. Testing

Alpha testing is done to get the results of the quality analysis of the software developed. The results of this test are the results of media expert research questionnaires in terms of functionality, and compatibility aspects as follows:

3.4.1. Functionality testing

Testing the functionality aspect is done by testing the functional requirements on the media, whether the function of the media is running or not [11].

Table 3. Functionality test results

No	Functional Needs	Results	
		Run	Error
1	Media could open the camera	✔	
2	Media could open the help menu	✔	
3	Media could open the information menu	✔	
4	Media could play the audio and video	✔	
5	Media could detect AR Card that contains the importance of ethics AR Card	✔	
6	Media could detect AR Card that contains every mistake that students frequently use while contacting lecturer	✔	
7	Media could activate flash	✔	
8	Media could activate autofocus on the camera	✔	
9	Media could close the application	✔	

The scale used in this test is the Guttman scale. the percentage of eligibility is obtained by using the following calculation:

$$Precentage\ of\ eligibility\ (\%) = \frac{score\ obtained}{maximum\ score} \times 100$$

$$Precentage\ (\%) = \frac{6}{6} \times 100\% = 100\%$$

So based on the calculation of the Guttman scale above, 100% results are obtained which from the interpretation table of the results are very feasible.

Compatibility testing

Compatibility aspect testing is done by testing the application on various types of different mobile device platforms [11]. The table of compatibility test results by device type can be seen in the following table:

From the test results above, the percentage can be calculated as follows:

$$Precentage\ (\%) = \frac{8}{8} \times 100\%$$

Table 4. Compatibility test results

No	Type of smartphone	OS version	Installation	Process
1	Redmi Note 4X	7.0.0 Nougat	succeed	No errors
2	Realme 5 Pro	11.0.0 Red Velvet Cake	succeed	No errors
3	Realme C2	9.0.0 Pie	succeed	No errors
4	Vivo Y91C	8.1.0 Oreo	succeed	No errors
5	Oppo F5	7.1.0 Nougat	succeed	No errors
6	Samsung F5	10.0.0 Queen Cake	succeed	No errors

The results of this study are in line with research conducted by [12] which says that learning media by utilizing Augmented Reality can make learning more effective and interactive. And also [13], who said that increasing effective learning can be by providing real experiences and presenting problems that occur in business practices, thereby increasing students' sensitivity in learning. Therefore, AR-Manner 1.0 learning media using augmented reality is an alternative media that can be used to explore communication ethics. However, the development of AR-Manner 1.0 media still requires further development, the functions, and materials used are still simple.

4. CONCLUSION

From the discussion above, it can be concluded that the AR-Manner 1.0 learning media could be developed with Augmented Reality. The process started from designing into an implementation that meets the standard. By using the research and development with waterfall as the software development life cycle, the result is AR-Manner 1.0 learning media that is worthy to use, but it needs further developments on some aspects such as materials, objects, and video variations.

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