

Designing AR based PWIM to Promote Students' English Vocabulary in the Higher Education of Indonesia

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Abstract English as a compulsory subject in the higher education of Indonesia is thought as an English for Specific Purposes (ESP). It means that the material provided must be relevant to the study program. Besides focusing on the study program, the use of interactive instructional media in a class is a must since most of teachers believe that it can help them to reach the goal better. The teaching should be more interactive by providing interactive instructional media to attract students' motivation to learn. Nowadays, technology grows rapidly and provides various alternatives in developing instructional media. One of them is the use of Augmented Reality (AR). In this study, the AR is combined with the Picture Word Inductive Model (PWIM) to design the instructional media, named AR based PWIM. The design is used to promote students' English vocabulary of non-English Department who take Basic English course. Since vocabulary is believed as the most important thing in language learning. The research design is a research and development (R n D) design that followed ADDIE development procedures. It starts with the analysis, design, develop, implement and evaluate. Based on the development phases, it can be concluded that the design of AR based PWIM is a relevant model to promote students' English vocabulary in the higher education of Indonesia. Finally, the researchers suggest future research to conduct an experiment study related to the new AR based PWIM instructional design to measure the effectiveness of the

design.

Keywords English Learning, Innovative Learning, Active Learners, Higher Education

1. Introduction

Nowadays, we are in the situation in which every aspect of life becomes unstable. The situation is called as Covid-19 pandemic era. It is caused by the corona viruses that attack human's life massively. It also impacts all of the aspects of life in the world, including in the education field. Schools and campuses are closed. Teaching and learning process should be done from home. Students should study from home and teachers should teach from home. The class activities are done by online. It becomes new activities for most of Indonesian people; that is why fast response is required to adapt quickly. World Health Organization (WHO) stated that in the era that had not been happened before, the world has prepared itself for the COVID-19 pandemic era that is caused by the novel virus SARS-CoV-2[1]. As teachers, especially English teachers in the higher education, we have to be productive always though we cannot go anywhere, keep staying at home and must teach from home. We should also be able

to create something new in order to provide interactive teaching learning process that is suitable for every situation.

Teachers are supposed to do a lot of innovations especially for the teaching of English for students who have low English ability. The condition in which students have low English ability almost happens in all countries in which English still becomes a foreign language. A study conducted by [2] found that at this time schools have matters in which most of students have low performance in language. Thus, teachers are supposed to have great creativity in their teaching practices to assist their students in improving the language performance. Focusing on such condition, an instructional media should be developed variously and attractively. They should be an interesting media that can attract students' attention to learn. As we know that most of students tend to study when they are having teachers with them; if the media cannot attract them more, it will be useless anyway. It will not motivate them to learn at all and finally the goal of teaching cannot be gained. Their English ability will not increase. That is why, innovation is very important to support the teaching learning process.

Realizing such kind of situation, this study is designed. Creating a new interactive instructional media focusing on the teaching of English vocabulary for students is the main goal of this study. Vocabulary becomes the focus in designing the instructional media because the basic foundation in learning English is vocabulary. In fact, many students in Indonesia still have low English vocabulary. It was proved by [3] in their study which showed the low students' vocabulary proficiency. It's really a big problem since it is believed that students can have good performance in English (reading, writing, speaking and listening) when they have enough vocabulary. Vocabulary, beside the grammar and pronunciation, is one of the most important things to master the language [4]. The design also considered about the use of mobile phone as the tool to learn. Beside it is the closest thing for most students, it also provides many applications that can help students to learn. For such reasons, instructional media based on Augmented Reality (AR) is chosen. It is believed that AR based instructional media is an interesting media for teaching nowadays. It provides a lot of interesting visual media that can support learning activities [5]. Thompson in [6] explained that teachers should also consider that students tend to learn more using visual media rather than listening or reading. It's really different from the old generation. Many studies have been successfully designing an AR based instructional media. The study using Mobile Mixed Reality-Building Information Modelling (MMR-BIM) showed that it can increase environment of learning which facilitates unique learning experiences, engagement and motivation.

Most of studies found that AR based instructional media affects greatly on the teaching learning process.

Thus, in this study the use of AR based instructional media is chosen. Later, the researchers combine the Picture Word Inductive Model (PWIM) as the learning design in the classroom. PWIM is chosen since many previous studies about the model affects positively in many situations [7] – [8]. It is also chosen because PWIM is a teaching model that focuses on the picture as the main activity. On the other hand, AR also focuses on the pictures. It is believed that both of them can support each other as an AR based PWIM for teaching English vocabulary of non-English department students in the higher education of Indonesia.

2. Review of Literature and Method

2.1. Review of Literature

The literatures used in this study included the elements of vocabulary teaching, components, PWIM and the syntax and also the AR theory and design.

2.1.1. Vocabulary Teaching

Vocabulary is one of the most important language components that should be learned by students, especially non-native speaker who want to comprehend English and fluently speak the language. It is an important component in supporting their language skills. Vocabulary is one of the four language components; spelling, grammar, phonology and vocabulary. It is also an important element that cannot be separated from each other in language learning process, since vocabulary supports students' English performance for speaking, writing, listening and reading [9]. It is believed that students who are learning a language then they have a great mastery on vocabulary, they will be succeed in using the language both in comprehending the meaning of word in the speaking activity or written one.

Harmer in [9] explained that there are some aspects that have to be discussed in learning vocabulary; they are word meaning, extending word used such as idioms, word combination or collocation, and the grammar of words that comprises noun, verb, adjective, and adverb. Speakers use vocabulary for themselves to communicate well with the listeners. When they communicate by using spoken language, for example, they have to use the vocabulary or words in good utterances and pronunciation. That is why having many vocabularies can help the students to find the messages of the utterances. If students know more vocabularies, they will be easily expressing the ideas.

Regarding the important of vocabulary in mastering the foreign language, teachers should aware about the principal component in teaching the vocabulary itself. Nowadays, vocabulary is taught simultaneously while teaching the other skills of English (reading, writing, listening and speaking), especially for students of

non-English department. They have to learn and master the language in only two semesters during their study. That is why; the small portion of it should be used effectively to increase students' vocabulary. In doing so, some strategies are implemented. Teachers have to remember also that vocabulary should be taught both directly and indirectly; vocabulary learning has to entail active engagement in learning assignment and remember also that dependence on a single vocabulary instruction method will not result in optimal learning [10]. Numerous studies on English vocabulary learning strategies have been conducted by Tsai & Chang, 2009; Loucky, 2002; Dolati & Mikaili, 2011; Taki & Khazaeni, 2011 [11]. Those researches have focused on students' strategies in learning vocabulary, effects of dictionaries usage on vocabulary acquisition, effects of games usage to facilitate students' vocabulary learning, or the use of cell phones or other mobile devices for teaching or learning vocabulary. Recently, the development of applications on mobile phones supports the development of teaching material for vocabulary learning. It is believed to be a relevant media since mobile phone is a tool that is closely related to the students' daily life nowadays.

2.1.2. Picture Word Inductive Model (PWIM)

Picture Word Inductive Model (PWIM) is a strategy that focuses on inquiring students' knowledge based on picture. Here, students have to identify pictures and then analyze all words related on it. It helps the students more in developing their knowledge and building their comprehension related to the pictures given that must be relevant with the topic used. The PWIM is an art language approach that is integrated and oriented to a study for improving writing and reading ability. Each cycle of PWIM uses a big photograph including a detail that can be explained to the students as a general stimulus to produce words or sentences. Teachers work with the students using movements that include in the PWIM cycle to support the development of students' verbal language and vocabulary, their phonological awareness and their word analysis ability, reading comprehension and word arrangement, phrases, sentences, paragraphs, and wider reading book level, and also their observation and research skill. The cycle of PWIM research lasted for six to eight weeks [12].

Furthermore, [12] explained that this instructional model covers six phases;

- a). Identify the pictures and explore the words.
- b). Analyze the characteristics of the words, categorize it and develop the strategy in solving the words.
- c). Create sentences.
- d). Write titles.
- e). Classify the sentences.
- f). Write sentences into paragraphs.

The PWIM can increase students' vocabulary. Students mention some words, look at the words and listen to the spoken words many times. When creating the sentences,

teachers create the correct sentences. Students also learn from the teachers' sentences and use it to create own words. When the students classify their words and the sentences, they choose general attribute just like Bruner's achievement.

Based on [12], the syntaxes (the learning steps) of PWIM are:

- a). Choose the pictures.
- b). Students identify what they see in the pictures.
- c). Students give the words for what they see. Teachers draw a line from the picture to the word, say the word, spell the words while looking at each word, say the words and then students spell the words together with the teacher. A pictorial dictionary is appeared.
- d). The teachers lead the pictorial word dictionary, concern on the words characteristics and lead the students to always spell and read it (*see/say/spell/say*).
- e). Students group the words and share the developed categorization (pictorial cards are printed and distribute to students).
- f). In this point, many words are often added to the word pictorial dictionary and to the word bank in the classroom.
- g). Ask students to write down title for their pictorial word dictionary. Teachers produce a title for their pictorial word dictionary. Teachers lead the students to think about "prove" and information in the pictorial word dictionary and about what they can say about the information.
- h). Teachers create a model by writing sentences about the pictures, use the thinking process to create thing aloud process.
- i). Students produce and share sentences that are directly close to their pictorial word dictionary. Teachers note it; give a duplicate to the students and interactive board or paper.
- j). Students group the sentences.
- k). Teachers design a model by putting sentences categories into an effective paragraph.
- l). Students practice writing or dictate paragraph. It can be used to develop a book to be shared to their parents.

PWIM has showed effective result in developing students' English skill. It has been used for improving vocabulary, reading, writing and speaking for different level of educations [7]–[9]. It is an interesting finding for the researchers to design another PWIM to teach English vocabulary for students who come from non-English department. Later, the teaching model is combined with the implementation of Augmented Reality (AR) as the new technology invention that is hoped to be a new invention in the teaching and learning innovation. Then, it will be called as an AR based PWIM as the result of this study.

2.1.3. Augmented Reality

Recently, a lot of famous international research institutions, universities and enterprises have focused in the research of AR, published the great number of papers and scientific research results [13]. Augmented Reality (AR) is a new development of technology that allows the user enjoying another way of experiences. Here, the users can find other objects beside the real objects [14]. Augmented Reality allows people utilize familiar, everyday objects in common ways. It is different because the objects provide also a link to the computer network. It also allow the people not to immerse in an artificially created virtual world, but the goal is to augment objects in the physical world by enhancing them with a great of digital information and communication capabilities [15] [16]. It proves that AR is a great innovation to be considered.

AR applications also present amazing challenges to a programmer in designing the apps. For example, when superimposing virtual information onto real objects, how can the user tell what is real and what is not? How can the correspondence between the two be maintained? Actions that work invisibly in each separate world may conflict when the real and the virtual are combined. For example, if a computer menu is projected onto a piece of paper, and then another piece of paper is placed on top of the first paper, the computer project continues to be on top [16].

AR, in line with the virtual reality, assists students in comprehending the material shared by the teachers. It

allows students to collect previous background knowledge and gain new information related to the material given. When the teachers adopt virtual reality in education and learning, it is related to the fact that this technology can improve and facilitate learning, increase memory capacity and make better decisions while working in entertaining and stimulating conditions. In fact, when we read textual content (on a printed document for example), our brain uses a process of interpretation of everything we read, which increases our cognitive efforts [14].It attracted the researchers to design an instructional media based on AR. Then, the instructional media is combined with the teaching model; PWIM that later became an AR based PWIM.

2.2. Method

This research is focused on developing instructional model that is adapted from the Picture Word Inductive Model (PWIM) to promote non-English department students' vocabulary mastery. The instructional model is later combined with augmented reality (AR). The method used in this research is a research and development since the aim of the study is developing an instructional media. This research is a research & development (R n D) using the ADDIE model that consists of 5 steps; analysis, design, development, implementation and evaluation [17]. The chart design is adopted from [18] as shown in Fig. 1 below.

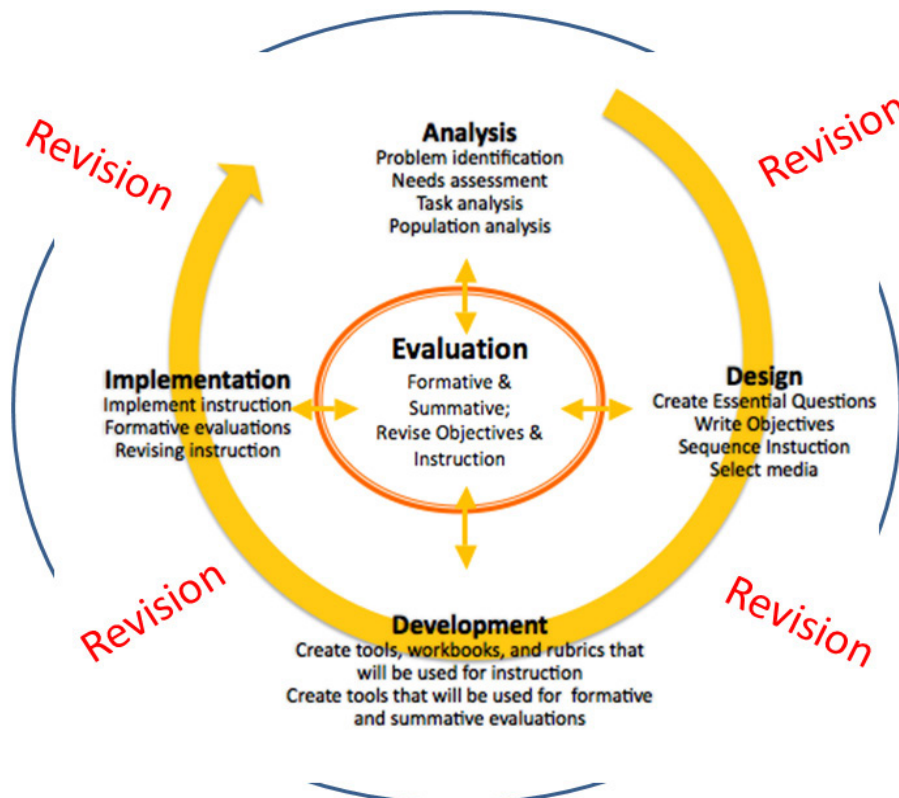


Figure 1. ADDIE Model (Rosset, A. in Shahril, et.al., 2015)

The detail explanations of the research design in this study are:

- In the phase of analysis, researchers determined the course topic, learning objective, the need of learning media and the condition.
- In the phase of design, the researchers conducted arranging the aim of the product, mapping the elements' goal needed, and designing the model.
- In the phase of development, the researchers conducted collecting material, designing, testing and distribution, developing product evaluation instruments, content expert validation, instructional media and design, revision based on the experts' suggestion, trying out, and revision based on the students' suggestion.
- In the phase of Implementation, the researchers implemented the AR based PWIM that has been developed.
- In the phase of Evaluation, the researchers revised the product based on the tryout and the finalization of the AR based PWIM completed with the application used to scan it; that is Artivive.

The study uses three techniques of analysis; 1) Descriptive qualitative analysis to analyze the data from the result of the experts' validations, 2) descriptive quantitative analysis to analyze the data gained from the score in the questionnaire and finally it should prove that the design of AR based PWIM is relevant to promote students' vocabularies.

3. Result

The result is explained based on the five-phase of development:

a). The Phase of Analysis

The design of the AR based PWIM here is used for teaching Basic English course for students of visual communication design study program. The topic used is descriptive text. The learning objective is students are able to identify, summarize, implement and also argue the English material related to Visual Communication Design study program actively and passively. Then the learning objective is divided into some achieved final goals. Then the focus here is students are able to identify, summarize, and write a descriptive text related to Visual Communication Design study program. The indicator used is students can identify and translate English vocabularies related to Visual Communication Design study program in a descriptive text.

The AR based PWIM is designed for the students whom have to learn online and their need about an interesting instructional media to engage them learning the English whenever and wherever they want. The combination of AR and PWIM is hoped to be a great model in teaching vocabulary as the most important element in learning the foreign language. Students are hoped to be motivated more since the learning media can be accessed from their gadget; not only playing games on their gadgets but also learning something important from their gadgets. It is believed that providing an interesting instructional media will assist the students learning well.

b). The Phase of Design

In designing the AR based PWIM, the researchers adopted the PWIM developed by Calhoun and then added the AR technology on the pictures that have been prepared. The design of the AR based PWIM can be seen in Figure 2.

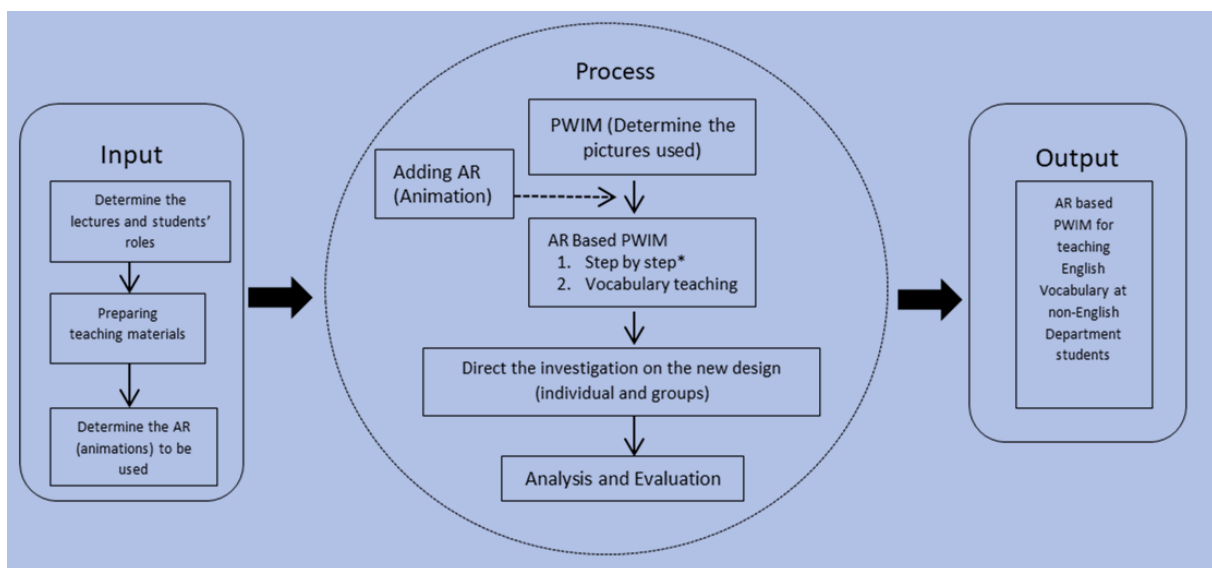


Figure 2. The Design of AR based PWIM

Input

In the input cycle, firstly the researchers determine the role of teachers and students in learning Basic English. They have different roles but the same goal of learning that is improving students' learning outcome in the course. Then, the teachers prepare the material. The material is related to the first topic used in the course that is Descriptive text. Here, the focus is the vocabulary used in describing something related to visual communication design study program. The last is determining the AR including the cards consisting of illustrations and animation as the AR based instructional media.

Process

The process cycle is divided into several steps. The researchers determine the model of teaching used; that is Picture Word Inductive Model. Since the model is focusing on the picture, cards are used as the main learning media. Then the cards were completed with an animation as the AR technology. Then, the researchers are designing the step by step of the teaching model based on the syntax of PWIM. Those are 1) Look at the picture (Scan it using Artivive Apps), 2) Identify the object (find the name, function, characteristics, etc.), 3) Write down some words based on your identification, 4) Pronounce the words that you have found, and 5) Find the meaning for every word you have found.

After finishing the learning design, trying out to a small group of students and also validation from the expert was conducted.

Output

Finally, the output results AR based PWIM for teaching English vocabulary to non-English department students.

c). The Phase of Development

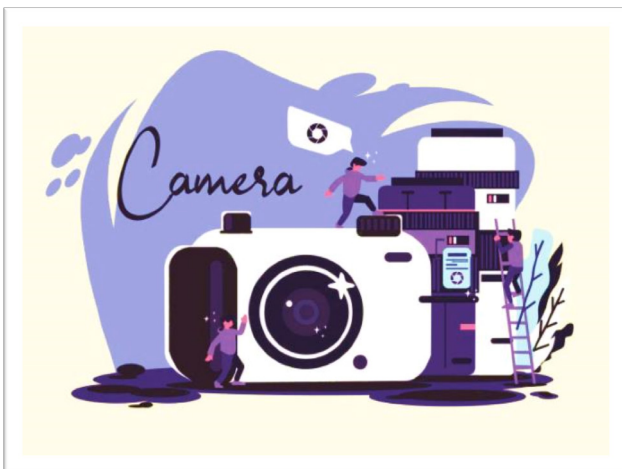


Figure 3. The sample illustration (camera)

In developing the instructional media of AR based PWIM; the researchers asked a programmer, an illustrator and also an animator to prepare the pictures used in this model. The illustrator prepared the pictures as the main media for teaching using PWIM. The pictures are created based on the advice of the researchers. All of the pictures are selected based on the tools that are familiar with the visual communication design study program. At the end of the pictures design, they are four pictures prepared including camera, CorelDraw, Photoshop and Drone. The sample picture can be seen in Figure 3.

After completing the illustrations, then the researchers asked an animator to create animation related to the four pictures. The animation is completed with sound that can attract the students more in identifying the pictures.

Lastly, the programmer developed the instructional media using the illustrations and animations to create an AR instructional media using an Artivive application. Artivive is an AR tool that makes artists creating new part of art by connecting classical with digital art. This application is quite easy to be used in developing the AR based instructional media. Then, the result of scanning the card can be seen in Figure 4.



Figure 4. The sample of scanning result

d). The Phase of Implementation

Before implementing the AR based PWIM to small group students, the researchers consulted two experts related to the design of the instructional media and to find out the validity of it. In collecting the data, questionnaires for the experts and the small group students were used. The questionnaires were in the types of close ended and open ended question. Suartama stated that the close ended question was completed with four scales for the designed based on the e-learning [19]. Later, the data analysis was conducted based on the data gained from the questionnaires (quantitative and qualitative). The quantitative data was in the form of scores from the experts and the students. The qualitative data was in the form of suggestions from the experts and the students related to the development and the implementation of the

design. Analysis techniques were used to make a decision about the development of the AR based PWIM. The scores obtained were summed up and averaged and later it was converted into categories using a table of 4 scale criterion referenced test that can be seen in table 1.

Table 1. The 4 Scale of Converting Actual Scores

No	Range	Score	Category
1	$X \geq Mi + 1.Sbi$	$X \geq 3$	Very Good
2	$Mi + 1.Sbi > X \geq Mi$	$3 > X \geq 2,5$	Good
3	$Mi > X \geq Mi - 1.Sbi$	$3 > X \geq 2$	Fair
4	$X < Mi - 1.Sbi$	$X < 2$	Poor

Note:

X = Respondent score (score achieved)

Mi = Ideal Mean = $\frac{1}{2}$ (ideal maximum score + ideal minimum score)

Sbi = Ideal standard deviation

Sbi = $\frac{1}{6}$ (ideal maximum score - ideal minimum score)

Maximum Score = 4

Minimum Score = 1

Mi = $\frac{1}{2}$ (4 + 1) = 2.5

Sbi = $\frac{1}{6}$ (3) = 0.5

X = actual score

The first data was from the expert validation. The result of the questionnaires can be seen in Table 2.

From the result of the experts' questionnaire, it was

gained 3.4 as the final score for the design of the AR based PWIM for teaching vocabulary. It means that the design is in a very good category and relevant to be used in teaching vocabulary for students of Visual Communication Design study program.

The implementation of the AR based PWIM for vocabulary teaching was done by the researchers to 15 students of visual communication design study program from various academic year that have taken the Basic English course (5 students from 2016 academic year, 5 students from 2017 academic year, and 5 students from 2018 academic year). They came from different academic years. It was hoped that the result of the implementation can give valid information whether the media is relevant or not for teaching vocabulary.

During the implementation of the media, the researchers started it by distributing five different cards to each student. Then, the teacher asked the students to identify the cards and scan them using the Artivive. After identifying the card, the teacher asked them to write down some words related to the pictures; to complete the words with the meaning and ask them to pronounce each word they found. Here, the teacher checked the spelling and the pronunciation and so that the students have the correct words. After the teaching process was finished, the teacher gave the students a questionnaire related to the implementation of the teaching model. The result of the students' questionnaire is presented in Table 3.

Table 2. The Result of Expert Validation

No	Questions	Expert 1	Expert 2	Average	Category
1	Does the use of AR base PWIM match the topic of the course?	4	3	3.5	very good
2	Has the direction used been completed?	4	2	3	very good
3	Is the learning goal of the development of the AR based PWIM clear?	4	2	3	very good
4	Are the illustration and the animation used in the instructional media suitable with the course?	4	3	3.5	very good
5	How is the clearness of the illustration and animation used in the instructional media?	4	4	4	very good
6	Does the AR based PWIM match the learning goal?	4	2	3	very good
7	Is the development of AR based PWIM interesting?	4	4	4	very good
8	Do the illustrations and animations make the material clear?	4	3	3.5	very good
9	Is the AR based PWIM ease the vocabulary learning?	4	3	3.5	very good
Average overall				3.4	very good

Table 3. The Result of Students' Questionnaire

No	Questions	Students														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	How is the clearness of the material explained by using the AR based PWIM?	4	3	3	4	3	4	4	3	3	3	3	4	4	3	4
2	Can you understand the material more easily by using the AR based PWIM?	3	3	4	4	3	4	3	3	2	3	3	2	4	4	4
3	Have the illustrations and the animations in the AR based PWIM been clear?	3	2	3	4	4	3	3	4	4	4	3	4	3	3	4
4	Does the AR based PWIM motivate you to learn?	4	3	4	3	4	3	3	4	3	4	4	3	4	3	3
5	How do you feel learning by using this AR based PWIM?	3	4	3	3	3	4	3	4	4	3	3	4	3	4	4
6	Do you think that the media is easily used in learning?	2	3	3	3	3	4	4	3	4	3	4	4	4	4	3
7	Can you understand the illustration and animation well?	3	4	4	3	4	3	3	3	3	4	3	3	3	3	4
8	Do you think that it is interesting learning?	3	3	3	3	4	4	3	3	4	4	3	4	4	3	3
9	Can you understand the whole steps used in the learning process?	4	3	3	3	4	4	3	4	4	3	4	3	3	4	3
Total		29	28	30	30	32	33	29	31	31	31	30	31	32	31	32
Average		3.2	3.1	3.3	3.3	3.5	3.6	3.2	3.4	3.4	3.3	3.4	3.5	3.4	3.4	3.5
Category		Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good
Overall Average		3.4														

From the analysis of the students' questionnaire, it was gained 3.4 as the final score for the implementation of the AR based PWIM for teaching vocabulary based on the students' questionnaire. It means that the design is in a very good category and relevant to be used in teaching vocabulary for students of Visual Communication Design study program. Finally, from the result of expert validation and the implementation to the small group of students, it can be said that the AR based PWIM is a relevant model for teaching vocabulary since it was in the category of very good.

e). The Evaluation Step

The evaluation step was conducted based on the result of the expert validation and the implementation of the instructional design. It was based on the open ended questionnaire following the close ended questionnaire from each questionnaire, experts and students.

Generally speaking, the media used is good. There was no revision for the media. The first revision was done for the design of the instructional design. The experts suggested that the instructional design should be clear in giving the direction by starting the direction with open the application, observe the illustration and the animation followed, identify (name, types, function, etc.). Secondly, the experts conclude that the media is valid and can be used to conduct the future study.

Later, the evaluation came from the result of the small group students' tryout. Among 15 students, 10 students tend to like the teaching process using AR based PWIM. 3 students said that they had difficulty in scanning the cards since there was a limitation on the internet connection. The rest (2 students) said that it was just a common way in teaching English vocabulary. Then, the revision was done based on the suggestion of the experts and the students.

4. Discussion

Providing an innovative instructional media that can fulfil students' need may result better achievement in the classroom. The media that can attract and motivate the students to learn more and more becomes a necessary focus in today's learning. Engaging the development of technology in designing the media can also provide more interesting media for students since the generation nowadays is a generation that cannot be parted from the technology itself. From the result of analyzing learning sources, it was explained that the development of interactive instructional media for English vocabulary teaching especially at the non-English department that integrated AR component to the PWIM should be a great innovation. This interactive instructional media supported the students' role in the learning activity in which the

students should master the material integrated into an interactive learning media that was developed using AR technology, beside it was also completed with interesting illustrations and animations to ease the students reaching the goal of the course. Warschauer in [20] stated that it should also be remembered that EFL learners today are more engaged in the virtual world than in traditional English classrooms. It means that designing an innovative instructional media will assist better learning experience to students.

The integration of various elements of media will make the students' learning time more effective both in class and outside the class. This development research using the ADDIE model produces a final product in the form of instructional design named AR based PWIM for Basic English course. Products developed are in accordance with the ADDIE model development procedure so that it produces an instructional design that is suitable for non-English department students majoring in visual communication design. The results of the experts' review show the validity of AR based PWIM developed from the aspect of content / material presented with very good qualifications by obtaining 3.4 (very good category) with a little revision. This means that the content / material presented in media is relevant and worthy to be used as an instructional media for students. The results of the assessment from the students also obtained a very good category with the score 3.4.

Generally speaking, the implementation of AR based PWIM as the interactive instructional media can provide an effective learning since students can learn individually both at school and outside the school according to their speed of learning. It is in line with the learning theory in which the learning process should be interactive, inspire, pleasant, challenging and motivate the students. The research by [21] confirmed that motivated and engaged students learn better and show best possible outcomes in their academic study and by using the appropriate pedagogies; teachers can also make classrooms more engaging places for students to learn.

5. Conclusions and Suggestions

At the end of this paper, it can be concluded that an innovation for education is a necessary aspect in the teaching learning activities. Creating an innovative instructional media may support the students in reaching the goal of the instructional better. The development of the technology may also complete the development of the instructional media. Selecting a technology that is closely related to the students' study program or students' need is the most important consideration in designing the instructional media.

Considering some important aspects in designing an

interesting instructional media may provide an interesting material so that students have a great willingness to learn independently. In this study an instructional media that combining PWIM with the AR technology is developed. Then it is called AR based PWIM. The AR based PWIM is firstly developed to promote students' English vocabulary for non-English department students. Vocabulary is the focus of the development since vocabulary is important element in learning foreign language and non-English department students tend to have very low vocabulary mastery.

Based on the result of the data analysis, it confirms that the AR based PWIM is relevant for teaching vocabulary. It is proved by the analysis of expert validations and the tryout that showed in the level of good with a score 3.4. From the very good level here, the researchers suggest for future studies to conduct an experiment to analyze the effectiveness of the AR based PWIM to promote students' vocabulary mastery.

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