Identifying The Criteria of Designing Augmented Reality for Vocabulary Learning in Primary School

Imam Santosa[1], Neny Nurkhamidah[2], Rossy Wulandari[3]
STKIP Media Nusantara Citra

Article Info	Abstract
	The ease of implementing Augmented Reality in the classroom makes AR as a useful learning medium for educators. AR can be used to be teaching media for vocabulary learning. The purpose of this study was to identify criteria in developing a prototype design for educational games based on AR for teaching English vocabulary for elementary school students. this research will also describe the procedures that are followed in designing the educational game design. This procedure is contained in a process called the successive approximation model (SAM). In order to identify the performance gap of present condition, three categories of questionaries were utilized; the activities used to teach vocabulary, the difficulties in teaching vocabularies, and the need and suggestion on teaching vocabulary. The participant of the study is 24 teachers of primary school in the Area of Jabodetabek. The findings of the research revealed that grammar translation method is the most activities used by teacher which indicated the teacher tranquil in the old method in teaching vocabulary. Moreover, the teachers mostly had difficulties on uninteresting activities and lack motivation by the student in learning vocabulary. Additionally, the result of the study emphasizes the need of criteria in choosing vocabulary inside the Augmented reality-based teaching media for vocabulary learning. There criteria of designing augmented reality for vocabulary learning are the use of approach that actively encourage the student to join the activity, which is communicative language teaching and the content of vocabulary in the augmented reality program based on the control of following measures; Word frequency, Structural value, Universality, Subject range, Definition words, Word-building capacity and Style of primary school level.
Info Artikel	**ABSTRACT**
	. Kemudahan penerapan Augmented Reality di dalam kelas menjadikan AR sebagai media pembelajaran yang bermanfaat bagi para pendidik. AR dapat digunakan sebagai media pengajaran untuk pembelajaran kosakata. Tujuan dari penelitian ini adalah untuk mengidentifikasi kriteria dalam mengembangkan desain prototipe game edukasi berbasis AR untuk pengajaran kosakata bahasa Inggris untuk siswa sekolah dasar. penelitian ini juga akan menjelaskan prosedur yang diikuti dalam merancang desain game edukasi. Prosedur ini terkandung dalam sebuah proses yang disebut successive approximation model (SAM). Untuk mengidentifikasi kesenjangan kinerja kondisi saat ini, digunakan tiga kategori kuesioner; kegiatan yang digunakan untuk mengajar kosa kata, kesulitan dalam mengajar kosa kata, dan kebutuhan dan saran untuk mengajar kosa kata. Partisipan penelitian ini adalah 24 guru SD di wilayah Jabodetabek. Temuan penelitian mengungkapkan bahwa metode terjemahan tata bahasa adalah kegiatan yang paling banyak digunakan oleh guru yang menunjukkan guru tenang dalam metode lama dalam mengajar kosa kata. Selain itu, sebagian besar guru mengalami kesulitan pada kegiatan yang tidak menarik dan kurangnya motivasi siswa dalam belajar kosa kata. Selain itu, hasil penelitian menekankan perlunya kriteria dalam memilih kosakata dalam media pembelajaran berbasis Augmented reality untuk pembelajaran kosakata. Ada kriteria merancang augmented reality untuk pembelajaran kosa kata adalah penggunaan pendekatan yang secara aktif mendorong siswa untuk bergabung dengan kegiatan, yaitu pengajaran bahasa komunikatif dan isi kosa kata dalam program augmented reality berdasarkan kontrol langkah-langkah berikut; Frekuensi kata, Nilai struktural, Universalitas, Rentang mata pelajaran, Kata definisi, Kapasitas pengembangan kata, dan Gaya tingkat sekolah dasar.

Corresponding Author:
Imam Santosa
STKIP Media Nusantara Citra
Imam_santosa@stkipmnc.ac.id

1. INTRODUCTION

Mobile technology is becoming a technology that is easy to use all over the world. Everyone can use technology in the form of smartphones, tablets and technology devices that have internet access. Apart from being used for daily activities such as social media, exchanging messages and telephone, mobile technology can be integrated effectively in language learning. One technology that can be applied is Augmented Reality (AR), which can provide a different introduction to be used as a medium for visualization, training and other functions.

The ease of implementing AR in the classroom makes AR as a useful learning medium for educators (Billinghurst & Dünser, 2012) AR in the classroom increased student motivation and student focus (Cai et al., 2014; Dunleavy & Dede, 2014; Wang et al., 2014). AR also provides a different experience in learning such as the process of collaboration and sharing knowledge in group learning activities (Kose et al., 2013). This learning experience allows the application of inquiry-based learning methods that make students active to ask questions and think critically ((Cai et al., 2014). AR is widely integrated in the learning process of English as a foreign language. Liu (2007) shows that AR used in the English learning activity provides a contextual learning experience. The potential of AR in learning English increases student learning motivation, whose impact can also reduce student learning anxiety (Chien et al., 2020). AR also provides learning satisfaction shown by students (Chen, 2020). Furthermore, Majid et al (2015) highlighted the use of AR to break the limitation of text based method on learning to become attractive education in the classroom.

However, with all the advantages possessed by AR in the learning process, the application of AR must adapt to the needs and goals of learning English (Kurniawan, 2020). This suggests that the use of AR is not just transferring English learning content into it but also needs to pay attention to the language learning process and its objectives. The role of vocabulary in learning a foreign language is inevitable. Rich vocabulary will totally help students mastering English and its four major skills which cover listening, speaking, reading, and writing. This importance is proven by Tnanh Huyen & Thi Thu Nga (2003) who define vocabulary as a language element that links the four language skills including listening, speaking, reading, and writing in learning a foreign language. Further, Hornby (1995) defined vocabulary in three senses that cover a) the total number of the words which make up a language; b) all the words known to a person or used in a particular book, subject, etc; and c) a list of words with their meaning. The importance of vocabulary was also noted by Ridge (2008) in believing that vocabulary plays crucial part in one's foreign language learning and language proficiency that can affect how well learners speak, listen, read and write. Brown, (2001), however, emphasizes the significance of vocabulary to communication by asserting that, in fact, survival level communication can take place quite intelligibly when people simply string words together-without applying grammatical rules at all. In this sense, vocabulary is regarded as one of essential factors that gives big influence to the people's communication. Thus, vocabulary should be ideally placed as important aspect of language learning that should be given much attention in the practice of TEFL so as to improve students' vocabulary mastery.

Mastering vocabulary means that students have comprehensive knowledge about the vocabularies which include the meanings, the spoken form, the written form, the grammatical behavior, the word derivation, the collocations of the words, the register of the word - spoken and written, the connotation or associations of the word, and word frequency (Thornbury, 2002). In assessing students' vocabulary mastery, Schmitt (1997) in Setiawan, 2010) state that receptive and productive knowledge may prove the only realistic way to measure depth of vocabulary knowledge. Receptive knowledge is words that the learners recognize and understand. Furthermore, Mulyansari (2019) to master vocabulary, alternative techniques should be administered. In addition, mulyansari pointed out how Morphological Awareness Instruction could improve students' vocabulary mastery.

A preliminary study was conducted by researchers to initiate the learning design development process to measure the performance gap. The results of the analysis show that there is a gap in teaching English vocabulary in several schools in Jakarta. Teaching vocabulary which is traditional as limited as word definition still dominates the vocabulary teaching methods at the elementary school level.

Based on the explanation above, this study focuses on the introduction of English vocabulary to students through AR in the form of educational games. AR educational games offer a different experience on learning supplements that provide contextual, visual, interactive and educational experiences. Some of the nature of games that provide visual and interactive experiences in the process have been proven to be successful in increasing student motivation in learning vocabulary (Derakhshan & Davoodi Khatir, 2015; Noviyanti & Bahri, 2019; Putri, 2013; Tunchalearnpanih, 2012).

The problem of this research is how the form of AR-based educational games is appropriate and in accordance with the teaching of English vocabulary for elementary school students. The purpose of this study was to identify the criteria to develop a prototype design for educational games based on AR for teaching English vocabulary for elementary school students.

Augmented Reality or AR is translated as a way of seeing the world with the addition of artificial content in it such as 2D / 3D graphics, audio and video (Mealy, 2018). Furthermore, AR positions the content generated through the computer system above the real-world view. Redondo et al (2014) revealed the inherent characteristics of AR, namely direct interaction, virtual and 3D elements and the combination of 3D virtual elements with elements in the real world. This can be interpreted that the direct interaction is realized because there is a combination of 3D virtual elements with real-world conditions. This is possible because the shape of our environment is 3D.

AR uses computational technology in the manufacturing process which is used to create virtual environments, 3D objects, and interactive activities(Kesim & Ozarslan, 2012). In addition, AR has the main tools in its use, namely displays, computers, input and tracking devices. All forms of computer systems function to integrate and interpret virtual object objects into the real world through certain tools that can take various forms, such as head mounted displays, handheld displays and pinch gloves.

AR technology allows us to interact with virtual objects. Information on virtual objects is added in AR projection which will later be displayed on certain media screens in real and real time (Fernando, 2013 in (Mustaqim, 2017)).

The process in AR always refers to 3 main working principles, namely direct interaction, virtual and real elements or 3 dimensions (Azuma, 1997).The three principles will be combined in the form of AR. The real object that has been marked will be detected by the camera, then the data will be forwarded and processed to be combined with the virtual object. Furthermore, the results of the merger will appear in the form of an AR display on the technology used such as smartphones.

In the development of AR for certain purposes, there are 4 factors that need to be considered, the purpose of forming AR, unique problem solving offered by AR, the target market of the AR, end users or users of the AR (mealy, 2018). With the various characteristics possessed by AR, AR has the potential to be developed for specific interests in various aspects, especially in the field of education. Wu (2013)emphasized 3 aspects of the potential possessed by AR in education; engagement, contextualization and authenticity. Engagement is defined as the ability of AR to increase participation in learning. This participation increases the sense of being involved in the activity. Role-playing in AR also allows students to feel there and provides a realistic and comprehensive experience. Furthermore, AR makes it possible to present an outdoor activity to be presented in the room or something called contextualization. And authenticity is the ability of AR to make adjustments to authentic learning resources by following the changes that exist. AR is appropriate as a supplementary medium in inquiry-based learning methods. Chiang et al (2014b)

revealed that AR brings students in learning to be more active in interacting with one another in the process of getting an understanding of the material. This learning process also provides a hands-on learning experience. These results are supported by research E. Liu et al (2019) which shows positive perceptions of educators about the use of AR in learning English. This is also supported by positive responses from students.

Learning Vocabulary is an essential part of learning English as a foreign language. It can be said that it is impossible to learn a foreign language without going through the process of learning vocabulary. However, problems arise when educators begin to doubt the accuracy of the method in teaching vocabulary (Berne & Blachowicz, 2008). Vocabulary learning needs to move away from traditional techniques, namely introducing vocabulary by translating it in another direction (Mediha & Enisa, 2014).

There are several approaches teaching vocabulary, each approach has own characteristic which help teachers to reach the objective of the lesson. The first approaches is grammar-translation. The activities of GMT are translation, reading comprehension, antonyms and synonyms, fill in the gaps. Memorization and use words in sentences. Next is direct method which include, reading aloud question and answer exercise, getting students to self-correct, conversation practice fill-in-the-blank exercise, dictation map drawing and paragraph writing. Next is audiolingualism: dialogue memorization, backward build-up (expansion drill), repetition drill, chain drill, single- slot substitution drill, multiple-slot substitution drill, transformation drill, question and answer drill, use minimal pairs, complete the dialogue, grammar games. And last, communicative language teaching; information gap activities, jigsaw activities, picture series, storytelling, information transfer activities, debates and group discussions, role plays or mini dramas (Ridge, 2008).

Several studies summarize several aspects of vocabulary learning techniques to increase motivation, active student participation, collaboration, and even students' final abilities (Susanto, 2017). Bakhsh (2016) revealed the vocabulary teaching techniques using games. The research emphasizes that several aspects of games can be used for learning vocabulary. This is reflected in the increasing level of student active participation in learning. Furthermore, Ciftcmuy & Uster (2009) emphasized that vocabulary learning, in context, produces results that are different from traditional techniques. The results of the study showed an increase in students' ability to capture vocabulary learning and reduced student retention.

However, vocabulary teaching faced challenge and difficulties. Suardi & Sakti (2019) exposed the problem in the teaching vocabulary. The first one is choosing appropriate vocabulary in teaching to suit student ability and interest. Next, the unstable motivation of the student creates difficulties in delivering the material. Uninteresting activity may lead student not paying attention in learning vocabulary. And limitation of the method to assessing and evaluating student.

2. METODE PENELITIAN

The purpose of this study was to identifying the criteria of prototype of educational games based on AR for vocabulary learning. In particular, this research will also describe the procedures that are followed in designing the educational game design. This procedure is contained in a process called the successive approximation model (SAM).

The method in this research is based on qualitative-based research in the form of research and development. One of the characters in qualitative research, namely interpretive, underlies the choice of this research method. Creswell (2003) stated that research is a form of interpretive inquiry in which researchers make interpretations of what they see, hear and understand. Interpretation cannot be separated from previous background, history, understanding and context. Through this method, the researchers looked at the key instrument collecting data through examining documents

Using the phases outlined in the SAM as a guide. Preparation, iterative design, and iterative development ilemnt are the three primary aspects of SAM. The first and second phases, however, are the

focus of this research. This study begins the preparation phase by gathering all essential information and background knowledge for the project. Next, all design, prototype, and assessment are iteratively rotated in tiny stages during the iterative design phase.
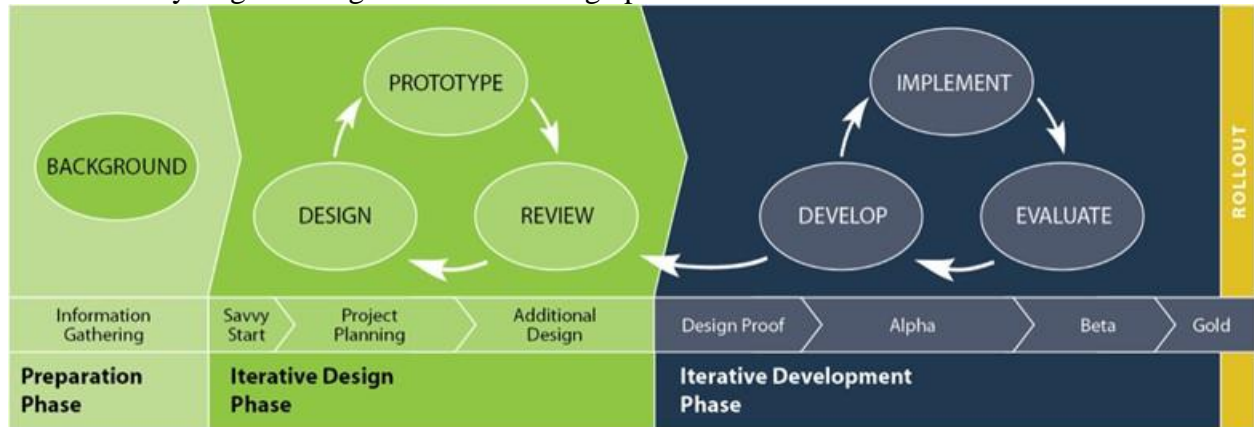
Successive Approximation Model

In order to analyze the needs of the target users of educational AR games and evaluate the development stages, the target population in this study were teachers of English as well as class teachers at the elementary school level in Jakarta Area. The process of selecting the research sample will use random sampling and stratified random sampling methods. The choice of this method is used in order to create representation from the population under study.

The instruments used in this study were a questionnaire and interview. Questionnaires and interviews were used to collect data on needs analysis for the prototype design of AR games designs. The questionnaire consisted of three main questions categories. The first is the existing activity how teacher teach vocabulary, the second is the problems existing in teaching vocabulary and the last one the suggestion of teaching vocabulary in developing new media. It aims for accurate data about the needs of teacher and education in this learning media vocabulary learning.

3. FINDINGS AND DISCUSSION
3.1.Findings

To examine the essential information as in the first phase of SAM, the researcher utilized questionnaire. The results were obtained from participants of the study. The study divided the qualitative data into categories; the activities of teaching vocabulary, the problems of teaching vocabulary and the suggestion of teaching vocabulary.

To find out the performance gap in vocabulary learning, questionnaires consisting of closed ended questions and open-ended questions were distributed to 24 samples consisting of elementary school teachers in the Greater Jakarta area. The questionnaire consists of 3 categories that are needed in the formation of prototype designs of English vocabulary learning media. The first is learning activities in the classroom. Vocabulary learning activities are derived from 4 approaches as references, namely grammar translation method, direct method, audiolingualism, and communicative language teaching. The following are the results of the questionnaires that have been distributed:

Grammar tanslation method

Grammar Translation Method
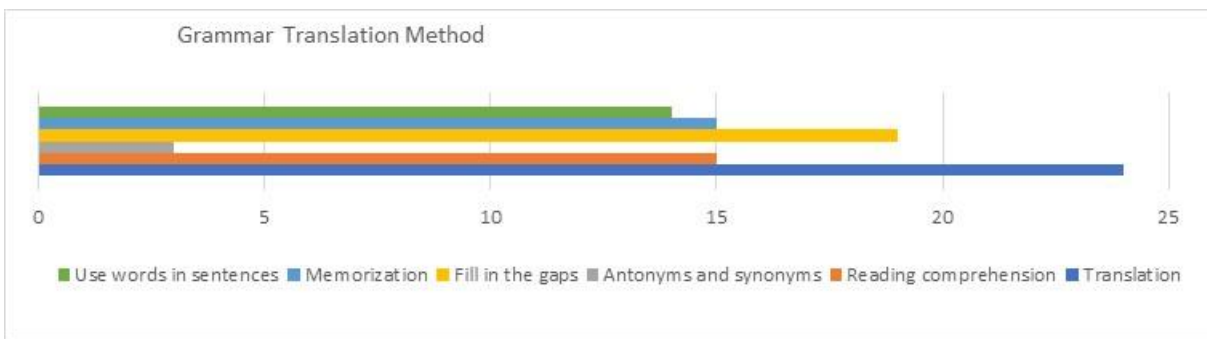
In the grammar translation method approach, 24 or all of the participants showed that the activity of translating words in vocabulary learning. Followed by activities fill in the gap, reading comprehension, memorization, use words and sentences and at least are antonyms and synonyms.

Direct method
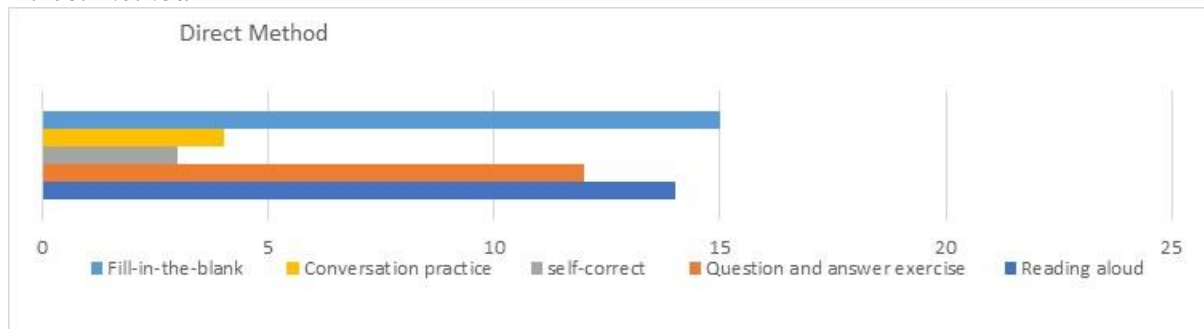
Direct Method

In the Direct method approach in vocabulary learning, fill in the blank dominates this approach (15), which is followed by reading aloud (14), question and answer exercise (12), conversation practice (4) and only 3 participants use self-correct activities. .

Audio Lingualism
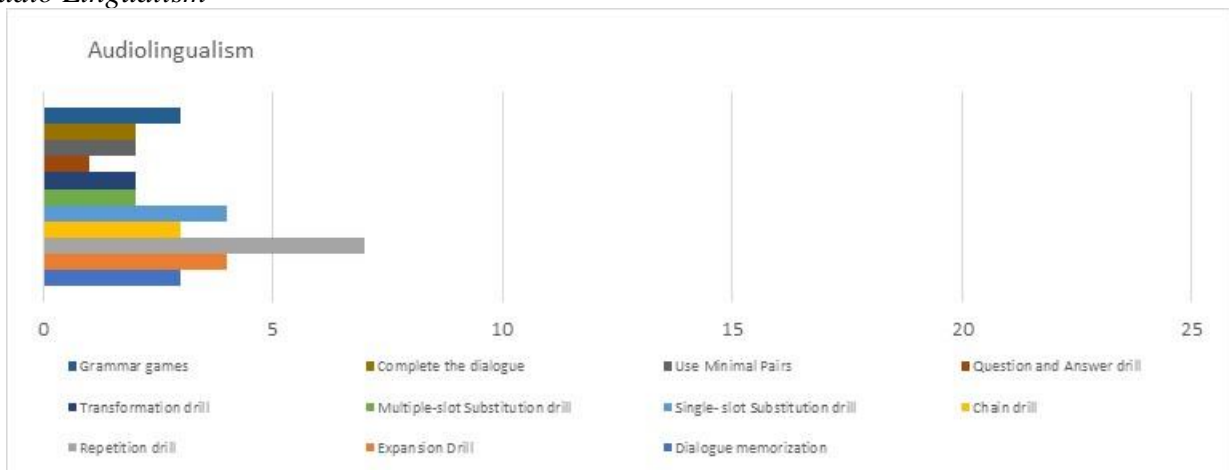
Audiolingualism

Compared to all approaches in learning vocabulary, activities in the audiolingualism approach are not used too much. The drill was recorded as the most used with a total of 7 participants.

Communicative Language Teaching
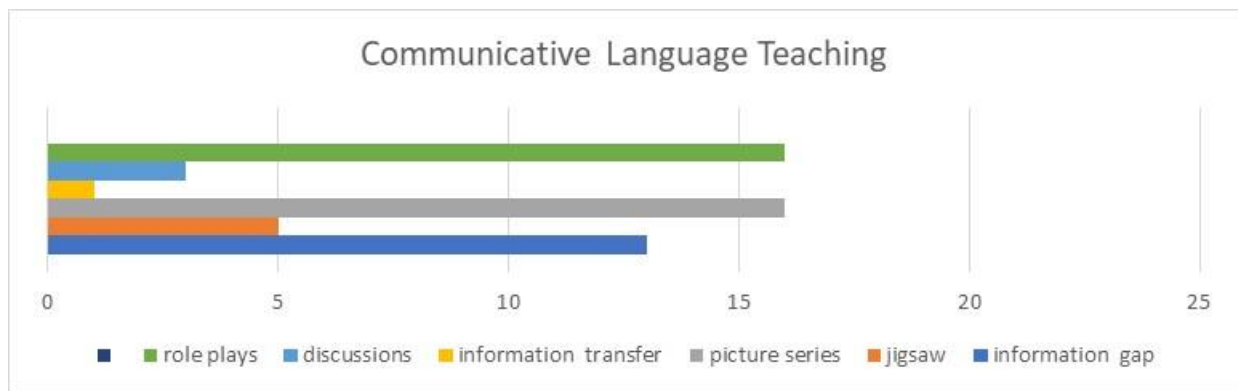
In this approach, role plays and picture series are the most used activities by teachers in learning vocabulary (16). This is followed by information gap (13), jigsaw (5), discussion (3) and information transfer (1).

From these data, it can be said that elementary school teachers use more activities related to the grammar translation method than other approacehs. This is in line with the findings of Mediha & Enisa (2014). Mediha & Enisa (2014) revealed that teachers are still stuck with the old method in learning English vocabulary. It was revealed that the introduction of words taught in class emphasized the meaning from English to Indonesian.

Moving on to the next category in collecting questionnaire data is the difficulty in teaching vocabulary in the classroom as stated in the explanation of the data below

In the second categories, participants pointed out the difficulties of teaching vocabulary ini young learner as presented below.
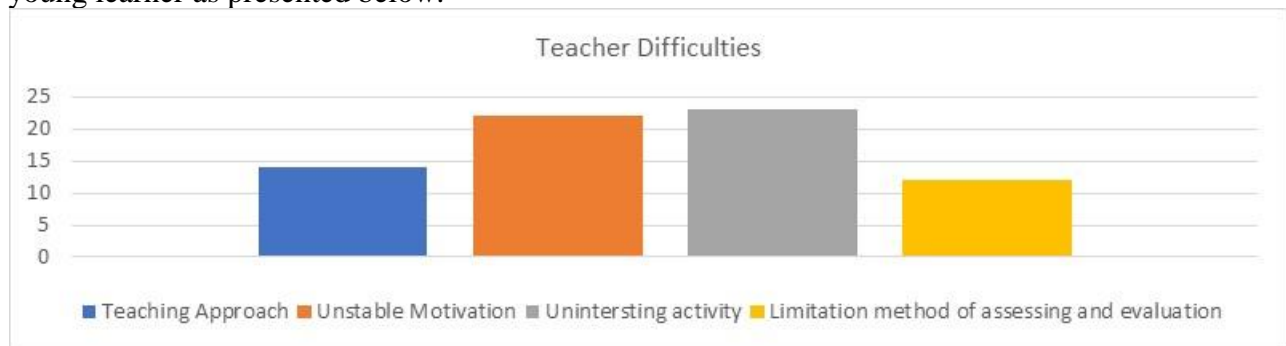
The data above shows some of the difficulties taken from the opinion of Suardi & Sakti (2019). There are 4 main difficulties, namely the teaching approach, unstable motivation, uninteresting activity, and the limitation of the method of assessing and evaluation. Uninteresting activity became the main difficulty expressed by the participants. Furthermore, the motivation of students in learning vocabulary becomes a barrier in teaching vocabulary, and is followed by difficulties in choosing the right approach and limited methods of assessing.

From these data it can be concluded that the main problem is the lack of interesting activities and no motivation in student participation in vocabulary learning. This is related to the activities carried out by educators in learning vocabulary. This is also reinforced by Mediha & Enisa (2014) that it is necessary to change the approach in learning vocabulary to move away from conventional methods.

And lastly, the questionnaire data reveals the teacher's wants and needs in learning vocabulary. Questions in this category are open ended questions. The following data has been collected:

[17] I have difficulty choosing what interesting ideas to use in learning vocabulary. If there is a tutorial for this then it will be very nice
[15] need a fun tool to learn vocabulary

> *[11] I usually use games that are available on the internet, but I often have problems that sometimes the games are paid. Want to have games that can be used and unlimited*
> *[13] I sometimes get confused in choosing the right words in learning. Want a guide on which vocabulary is the right one in learning?*
> *[22] I want an interactive tool that can be used in the classroom and easy to use*
> *[13] recently, when I teach vocabulary kind of boring, I need may be some new media or device to help me teach vocabulary and is suitable with the material in primary school.*

3.2. Discussion

This study aims to identify the criteria in designing Augmented reality program for primary school student. Based on the findings above, there are two main criteria discovered. They are the activity and the vocabulary range that suit for the primary student.

The findings of the study indicated that grammar translation method activity become the most frequent activity in teaching vocabulary. In this case, GTM delivers such monotonous activity that led uninteresting activity. Kaharuddin (2018) believed Grammar Translation Method is not suitable to be implemented nowadays. Besides, GTM need to be avoided especially for young learner. In addition, According to Eisa (2020) GMT delivers disadvantages for language learning such as Students do not participate actively in the classroom, communication is not much focused and minor attention is paid to content. He added GTM in EFL in Saudi Arabia leads to the students' weakness in skills of speaking and writing correct English sentences. Furthermore another view about the weakness of GMT came from China. Qing-xue & Jin-fang (2007) determined the weakness of GMT in teaching EFL. Qing-xue & Jin-fang indicated that GMT was not deliver communcative activities. The student was forced to memorize the grammar rule, and vocabulary which may unusable. As Mediha (2014) suggested, in teaching vocabulary, the teacher need to transform the conventional method that related with GTM to such interactive approach in teaching vocabulary. The alteration of method could deliver the solve of lack of motivation in learning vocabulary by the student.

As indicated in the findings, teacher need the activity that bring motivation and student attention in learning vocabulary. Many studies suggested one particular approach on teaching vocabulary. It is Communicative language teaching (CLT). CLT methods was proven to be such method that actively involve student in learning English (Huyen & Nga, 2003; Jue, 2010; Longhurst, 2013).

In order to assimilate the CLT approach in the activity of learning vocabulary, the Augmented program will be created based on this approach. Besides, in related with the findings of teacher difficulties in teaching vocabulary especially the suitable evaluation and assessment on teaching vocabulary, the program will be designed until evaluation activity. As this program will use the CLT approach. The assessment of evolution implemented in this activity is based on CLT approach.

Some of the things that can be obtained from the finding related the content of the vocabulary. There needs to be a vocabulary selection guidance so that it is appropriate and suitable for use in vocabulary learning. In this case, to overcome this problem, It is necessary to carry out additional analysis referring to the criteria in choosing the right vocabulary, namely:

1. Word frequency
2. Structural value (all structural words included)
3. Universality (words likely to cause offense locally excluded)
4. Subject range (no specialist items)
5. Definition words (for dictionary making, etc.)
6. Word-building capacity
7. Style ("colloquial" or slang words excluded) (Howatt, 1984, p. 256)

These criteria will be used in the standard vocabulary selection on augmented reality data. Furthermore, the points obtained are the need for all learning media in the form of games. This desire

is based on the need to increase motivation in learning vocabulary. This is in accordance with what was expressed by Susanto (2017). Susanto (2017) revealed that the use of games in vocabulary learning can increase collaboration, participation in class and learning motivation. Moreover, the teacher demands also the learning media which has been already customized with the related material/curriculum in primary school so that the teacher do need adding or doing customization.

4. CONCLUSION

In summary, the primary school teacher implemented several activities of teaching vocabulary based on the presented approaches. The approaches are grammar translation method, direct method, audiolingualism, and communicative language teaching. Grammar translation method become the most used approach in teaching vocabulary. Moreover, based on the data, Teacher has difficulties in teaching vocabulary such as uninteresting activity and unstable motivation of learners. The Grammar translation method accused as the sources of uninteresting activity and unstable motivation of the student. As these problems cease to happen, the researcher proposed communicative language teaching approach as an answer. Communicative language teaching was depicted as an approach that increase student motivation and could be implemented into interesting activity. Furthermore, in order to make teacher easily use the program, the criteria on designing Augmented reality to learning vocabulary is the content itself. The content of vocabulary must be appropriate for target learner of primary student. The choice of the vocabulary should base on the following criteria Word frequency, Structural value), Universality, Subject range, Definition words, Word-building capacity and Style.

In the future, based on this information, The prototype of AR program for Learning vocabulary can be delivered. The criteria should be developed. First is the use CLT approach in the program. The further research needs to pay the attention with the procedure of CLT and the activities in CLT. Moreover, the content of vocabulary range for the AR program must be customized for primary School grade 1-3.

5. REFERENCE

Cresswell, J. W. (2003). Qualitative, Quantitative. and Mixed Methods Approaches. In *Research Design, Second Edition*. https://doi.org/10.3109/08941939.2012.723954

Eisa, S. A. H. (2020). " The Pros and Cons of the Grammar Translation Method on the Performance of Saudi EFL Learners. *Arab Journal for Scientific Publishing (AJSP) ISSN*.

Huyen, N. T., & Nga, K. T. (2003). Learning Vocabulary through Games: The Effectiveness of Learning Vocabulary Through Games. *Asian EFL Journal*.

Jue, X. (2010). *Communicative language teaching in vocabulary teaching and learning in a Swedish comprehensive class*. diva-portal.org. https://www.diva-portal.org/smash/get/diva2:328283/fulltext01

Kaharuddin, A. (2018). THE COMMUNICATIVE GRAMMAR TRANSLATION METHOD: A PRACTICAL METHOD TO TEACH COMMUNICATION SKILLS OF ENGLISH. *ETERNAL (English, Teaching, Learning, and Research Journal)*. https://doi.org/10.24252/eternal.v42.2018.a8

Longhurst, M. (2013). *The benefits of explicit vocabulary teaching in the EFL classroom*. ls00012.mah.se. http://ls00012.mah.se/handle/2043/16293

Mediha, N., & Enisa, M. (2014). A comparative study on the effectiveness of using traditional and contextualized methods for enhancing learners' vocabulary knowledge in an EFL classroom. *5th World Conference on Educational Sciences,(116)*, 3443–3448.

Qing-xue, L., & Jin-fang, S. (2007). An Analysis of Language Teaching Approaches and Methods-Effectiveness and Weakness. *US-China Education Review*.