

## INTEGRATING AUGMENTED REALITY IN ENGLISH LANGUAGE TEACHING: TRENDS IN INDONESIA FROM 2019 TO 2023

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**Abstract:** Technology 5.0 leads to the technological implementation to help humans, including in terms of ELT. Augmented reality provides students to combine the virtual and real situations to maximize English language acquisition. Therefore, the implementation strategies of AR-ELT implementation need to be conducted. Besides, understanding the ways for implementing AR in ELT helps Indonesian teachers make informed decisions about when and how to implement AR technology into their English teaching. This research conducts systematic literature review to discover the level of education, how it is implemented, and what recommendation of AR-ELT implementation. The results show that elementary students with vocabulary teaching method as the most aspect taught. The implementation of AR-ELT can integrate appropriate teaching approach, blend it with the language learning between online and offline class, combining with another physical media, apply the AR-English implementation with non-English materials. However, the implementation of AR in Indonesia still remains limited due to the limitation technology mastery and the facilities provided in the educational places. Therefore, the most important recommendation due to the implementation is that all parties in the institutions must support. Further Indonesian academics need to developed AR app and implement comprehensively in English language learning, so that academics do not only develop AR app without the implementation. The limitation of this research is due to the missing of further exploration regarding the factors “causing” and “caused by” the limitation of AR implementation in Indonesia. Therefore, future research should explore the possibility the factors to encourage the implementation of AR in ELT class significantly.

**Keywords:** *Augmented reality; English language teaching; Indonesian students; systematic literature review*

### INTRODUCTION

Augmented Reality (AR) has developed since 1968 and still continue developing nowadays. AR can broaden students to expose to the world without having difficult time to access (Challenor & Ma, 2019). In principle, AR can create immersive learning environments, where learners are actively engaged in the target language. Chang et al. (2020) stated that AR applications can simulate real-world scenarios for English Language Teaching (ELT), such as showing tourism places, military training simulation, or animals' behavior process (Cho & Kim, 2021) to provide material for descriptive texts. Other than that, AR has types that can be integrated in ELT. Some of the AR types are AR card (Rozi et al., 2021), AR videos (C. Chen, 2020), QR code (Yunus et al., 2020), and mobile AR application (Hao & Lee, 2021).

Although the massive implementation of AR in ELT has been identified in many countries such as

Japan (Alizadeh, 2019), Spain (Medina, 2022), Malaysia (Annamalai et al., 2023), and Turkiye (Berk et al., 2022), AR is still implemented restrictedly for ELT in Indonesia. This is because English teachers have not been aware of the AR implementation due to the very lack of training and exposure of AR use in education (Alalwan et al., 2020; Katemba, 2020) that can hinder their adoption of this technology (Oktadela et al., 2023; Tegoan et al., 2021). Other than that, research results that provides information regarding the AR implementation and recommendation for ELT is also still lacking. This leads to the confusion of teachers what to consider for AR-ELT implementation to maximize its potential for Indonesian students (Altun & Lee, 2020; Medina, 2022; Jamrus & Razali, 2021). This sees that teachers need more guidance to apply AR in their ELT classes.

Moreover, with the fact that Indonesian students' English language skills are considered

low (Agung, 2019; Cirocki et al., 2019; Jon et al., 2021; Muslim et al., 2020), AR can offer various opportunities to enhance their ability to acquire English language due to its ability to enhance the educational experience by overlaying digital information onto the physical world (Tzima 2019; Lai Cheong 2022). For example, research by Tsai (2023) found that AR could enhance the English listening and speaking skill of Taiwan EFL students. Koç et al. (2022) also stated that AR stimulates students to successfully increase EFL students' English expository text writing skill. While other research (Azimova & Solidjonov, 2023; Fan & Antle, 2020; Sydorenko et al., 2019) explicitly found that the use of AR in English language class is able to improve the' English proficiency. Due to those facts, AR actually can help English teachers to increase students' English language skills.

However, the implementation of AR in ELT emerges various types and strategies. For example, the implementation of AR based teaching in EFL class by Chang et al. (2020) are (1) having the created HP Reveal AR videos by the teachers, (2) students are invited to scan airport images with their smartphone, in order to obtain the AR videos for airport-related English conversation content, (3) the students are provided AR videos with interactive dialog events to help students to practice listening and acquire knowledge relating to airport departures. Another example is from Li (2022) who stated that the implementation of the teaching activity using AR is leading students to independent learning to enhance listening and speaking in the AR environment and helps improve classroom learning efficiency. In this environment, teachers and students communicate online through the AR application.

Those implementation strategies need to be summarized to find the patterns. This is purposed to maximize English teachers to teach English using AR. Moreover, according to Chang et al. (2020) & Majid & Salam (2021), discovering the current status of AR implementation holds paramount importance for the development and maximization of AR utilization in the country, especially in education field. A comprehensive understanding of the existing initiatives will inform targeted strategies to enhance AR integration in various sectors, including education, business, and technology (Fan et al., 2020). By strategically leveraging AR as part of Indonesia's technological landscape, the nation can align itself with global trends, fostering innovation and competitiveness on the international stage amidst

the ongoing wave of globalization. In addition, understanding the ways for successfully implementing AR in ELT helps educators make informed decisions about when and how to incorporate this technology into their teaching. This ensures that AR is integrated effectively and complements the curriculum. Therefore, the topic about AR is highly interested to be learned and analyzed for ELT.

Research conducted by Martins et al. (2023) aims to elaborate a comprehensive SLR on AR as a corporate training paradigm focused provided. This SLR even provides the recommendation for further AR development that can make for more natural and sophisticated dialogues and better coaching of trainees to identify possible pitfalls and proactively suggest better ways to accomplish tasks in corporate. In addition, Wedyan et al. (2022) wanted to explore the importance of AR for learning English skills from the perspectives of English language teachers and educators by conducting qualitative and SLR approach. The systematic review gives the integration and development of AR for English language learning. From this, it is seen the contribution of systematic literature review can bring highly significant information towards the implementation pattern and strategies for this research to be implemented by English teachers and educators.

However, from the previous research, no article was written to determine how the implementation of AR in ELT context is to standardize the AR strategies so that the English learning outcomes can be maximized, especially in Indonesia. Therefore, this research aims to conduct systematic literature review to explore the implementation of AR in English Language Teaching in Indonesia. This article will also give recommendation to the implementation of AR for Indonesian teachers and educators. This article will answer the questions of: (1) What level of education in Indonesia that implements AR in English language teaching more during 2019 - 2023? (2) How is the implementation of AR based English language teaching in Indonesia during 2019 - 2023? (3) What is the recommendation of AR based English language teaching implementation during 2019 - 2023?

## **METHOD**

This research applies systematic literature review. According to Granić & Marangunić (2019) systematic literature review is a thorough and transparent strategy to synthesizing information on a clearly defined issue that use critical methodologies to discover, define, and evaluate

research on the topic. It entails following standardized methodologies/guidelines in systematic searching, filtering, reviewing, critiquing, interpreting, synthesizing, and reporting findings from multiple publications on a topic or domain of interest (Bolton et al., 2013; Dehganzadeh & Dehganzadeh, 2020). The steps of

searching, filtering, and reviewing are explained in order due to the inclusive and exclusive criteria (Table 1) as well as the Prisma flowchart (Figure 1); while the results of critiquing, interpreting, synthesizing, and reporting findings are shown in Table 2.

Table 1. *Inclusive and exclusive criteria of selected articles*

Inclusive Criteria	Exclusive Criteria
The articles implement AR in English Language Teaching (n=60)	The articles AR in other ELT learning materials (n=40)
The articles are published in the year of 2019 to 2023 (n=38)	The articles are published before 2019 (n=94)
The articles are published in reputable journal (n=12)	The articles are published in unreputable journal (n=15)
The articles involve Indonesian students as the research subject (n=10)	The articles involve research subject other than Indonesian students (n=13)

To maintain the quality and eligibility of the selected articles, we reanalyzed the full-text articles with questions: (1) Are the selected articles involve the AR-ELT implementation for

Indonesian students? (2) Are the articles published in reputable journal and not in conference? From this step, we believe that the quality of the articles is verified.

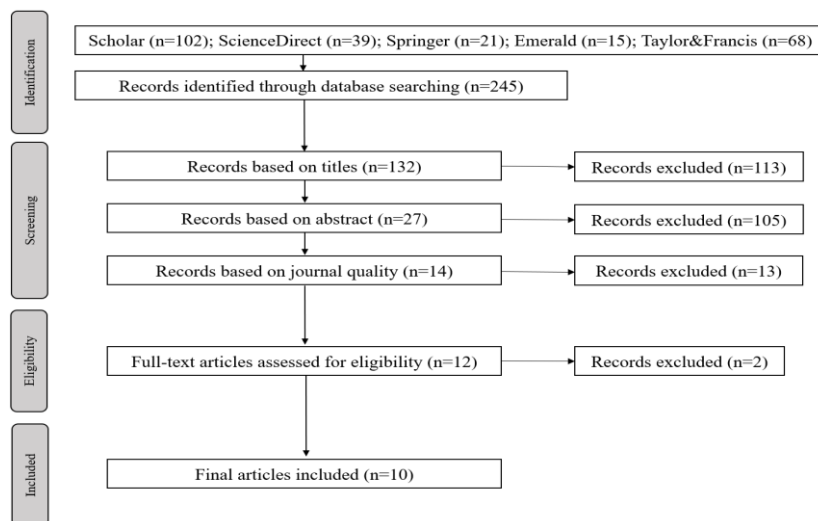


Figure 1. *Prisma flowchart of systematic review*

After an exhaustive and methodical review process, we curated a set of 10 articles (as shown in Table 2). The ten articles have their own strengths and limitation to consider in defining the aims of this research. First, research by Shaumiwaty et al. (2022), Munir & Wanti (2022), Wibowo et al. (2022), and Sulistyaningsih et al. (2021) involving the implementation of AR as a ELL media. This research provides us with the information related to the differences of students' score after-before AR implementation and the teachers' as well as students' perceptions of AR implementation. For example, the students thought that the successfulness of AR implementation is due to the usefulness and the attractiveness of AR. This will give information about in what aspects of AR implementation effectiveness for ELT. However, those studies do not involve the

consideration of other aspects that can help AR in maximizing the enhancement of the students' English skills.

Besides, Yulian et al. (2022) and Wahyuni et al. (2020) also involve the implementation of AR as a ELL media. These studies do not only provide the information related to the students' after-before score and the perceptions of AR implementation, but also the additional research approach that helps AR enhancing students' English skills. This consideration takes place as a strength to integrate between the appropriate media and learning approach. However, the research does not provide the information regarding in what situation the AR-learning approach can be implemented. When this could be discovered by the research, they can help teachers when ELT teachers need to apply the combination. On the other hand, Sadikin &

Martyani (2020) provide the situation that students with very low learning outcomes with visual learning style are supposedly given the AR implementation. However, this research does not provide how many meetings AR needs to be implemented. When the meetings are not provided, ELT teachers will not know how long they need to implement AR to help their ELT.

Syamsinar (2022) informs the duration of AR implementation is in two meetings for minimum duration that can affect students' English language skills enhancement. In addition, he used qualitative research approach that can explore further and in detail about the process of implementation and situation during the implementation. However, he only informs the students' perceptions in using AR but not provided real data of how many students can answer after and before the AR implementation in class to comprehensively see the improvement. Lastly, Yelia et al. (2021) and Derlina et al. (2020) provided real data to determine clearly the improvement of the students in implementing the AR media. This will help teachers to decide whether or not teachers need to implement AR in their classes. However, these studies did not also inform the duration of AR implementation. It can

difficultate teachers to plan the AR implementation in class.

## RESULTS AND DISCUSSION

The selected ten articles are considered effectively address all Research Questions (RQs) and align seamlessly with the specified inclusion criteria in this research. These chosen articles serve as a cogent representation, offering a comprehensive insight into the landscape of Augmented Reality (AR) implementation within Indonesia over the past half-years. During this analytical exploration, a discerning examination of the articles brought forth a diverse array of keywords, each intricately interwoven to unveil the nuanced trends prevalent in the selected literature. This insightful analysis, as visually depicted in the refined Figure 2, facilitates a nuanced understanding of the prevailing themes and focal points within the AR implementation in the Indonesian English language educational context. In essence, this scrutiny not only elucidates the trajectory of AR integration but also provides a lens through which we can decipher the intellectual currents shaping scholarly conversations within the realm of English language education in Indonesia.

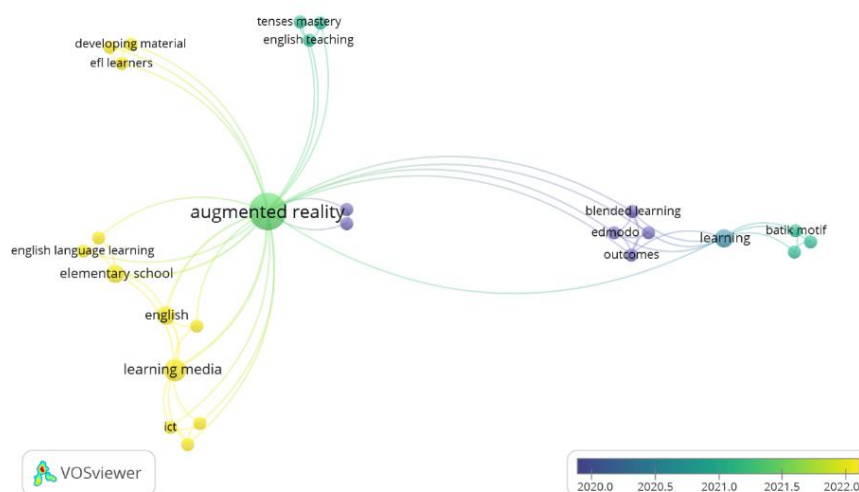


Figure 2. *Keywords detected from lists of articles*

Figure 2 examines the relationships between different keywords, revealing the diverse uses of Augmented Reality (AR) across numerous dimensions and themes in English language acquisition. This in-depth investigation demonstrates that AR can be skilfully implemented into several aspects of language instruction, including grammatical complexities such as tenses, expressive abilities such as speaking, lexical enrichment through vocabulary activities, and comprehension of written texts. Furthermore, AR's adaptability extends to its smooth integration with

different teaching approaches and specified learning materials, as demonstrated by its potential coupling with resources such as flashcards. This strategic combination aims to improve English language education by increasing student involvement and immersion in the learning process. According to researchers (Benini & Thomas, 2021; Lantolf & Poehner, 2023), the more comprehensive the educational toolbox used in language instruction, the better students' ability to understand abstract notions inherent in language acquisition.

Table 2. Lists of selected articles

No	Articles	Research Subject	Aspect Learned	Additional Approach	Ways of Implementation	Recommendation
1	Shaumiwaty et al. (2022)	Elementary school students	Vocabulary teaching	-	Teachers provide pictures people having conversation; students scan it through AR to pop up a video conversation; students listen and repeat the pronunciation of the word according to the dialogue.	Supports from all parties in the institutions maintain the effectiveness of AR implementation for elementary school level.
2	Yelia et al. (2021)	Economic department university students	English tenses	-	Giving oral exercise with language games; giving structured writing exercises for assignments	The use of Jigsaw, role play, information gap, simulation and contact assignment in oral exercises
3	Derlina et al. (2020)	Public senior high school students	English subject learning outcomes	Blended learning	Offline class: Teacher provides information about the subject matter, guides students on activities to be conducted online, an explanation of AR, Edmodo, and Tinkercad media, as well as discussions and questions and answers on the tasks. Online class: Teachers use Edmodo facilities, including assignment features, quizzes, and others to deliver assignments and news, such as student activity sheets (LKPD) listed on AR media.	Assignments are sent via edmodo on a predetermined time. After online learning, offline class resume, where group representatives present the results of their discussions and assignments before the class.
4	Yulian et al. (2022)	Private university students	Reading comprehension	Content-Language Integrated Learning	Asking students to be in brainstorming activities; guiding students to answer some questions in the scanning activity; Scan some specific information for reading passage; Providing visual interaction in model of expressing opinions.	Students should be exposed and situated the technical assistance in advance before using the application. To mitigate the technical problems, they need to study the manual comprehensively, starting from scanning the barcode code and using the AR application's features
5	Wahyuni et al. (2020)	Visual Communication (university) students	Vocabulary	Picture Word Inductive Model (PWIM)	Distributing five different cards to each student; Ask them to identify the cards and scan them using Artivive AR App; Ask them to write down some words provided; Ask them to pronounce the	Maximizing PWIM and should be based on the students' vocabulary level.

						word; Teachers check the spelling and pronunciation.	
6	Sadikin & Martyani (2020)	Primary school students	Vocabulary	-		Giving students some flashcards; Ask them to scan it using AR app.	Using appropriate teaching method integrated with AR and flashcard
7	Wibowo et al. (2022)	Elementary school students	Speaking	-		Students were given come 3D pictures ang scan with the AR; Some rooms can be activated by giving the voice command; The pictures can change based on the voice command students input.	Needs to combine with appropriate teaching method based on class needs.
8	Sulistiyaningsih et al. (2021)	Vocational senior high school students	Speaking	-		Students access the AR app; They will face the 3D model control AR so that students can see the batik pattern clearly in real-life environment.	Expose students to the local wisdom.
9	Syamsinar (2022)	Elementary school students	Vocabulary	-		Teachers teach English alphabet by using ABC Fun with Mickey Book; Students learn and practice the alphabet directly by using the teacher's gadget; They write and spell the alphabet with their friends.	Teachers need to do a simulation before applying the media in learning to minimize the problems that occurred.
10	Munir & Wanti (2022)	Elementary school students	Vocabulary	-		Students need to open the app; Students should follow the instructions in the app, such as repeating nouns spoken aloud and correctly, performing movements, expressing speech act of asking an object	Involving physical movement to engage students

*Level of educations in indonesia that implement AR in English language teaching*

AR has been utilized in language learning for a number of objectives, such as visualizing vocabulary, creating virtual environments, and practicing speaking skills. AR can provide context (Zhang et al., 2020), feedback (Karacan & Akoglu, 2021), motivation (Cai et al., 2022), and engagement (Parmaxi & Demetriou, 2020) to learners. The use of augmented reality (AR) in English language training has benefited greatly from its potential to transform an ordinary classroom into an exciting learning environment at various levels of education and in diverse elements learnt (Azimova & Solidjonov, 2023). As we found based on the process of finding the reviewed articles, the implementation of AR for ELT in Indonesia is still restricted. It is due to the lack of information that informs the implementation of AR in Indonesia during ELT classes.

In China, however, AR technology has become one of the most widely used forms of media in the sphere of education. According to Parmaxi & Demetriou (2020), from 2014 to 2019, the utilization of AR in English and Chinese learning was 63% and 14%, respectively. According to Chen et al. (2017), early childhood pupils were exposed to English vocabulary introduction. AR is also being used in rural China for Chinese and English learning (Fan & Antle, 2020) although not all rural primary school pupils use it. Besides China, AR technology directs the high potential for teachers to teach English in Malaysia (Ahmad et al., 2019). In current implementation, AR has not only revolutionized language education but has also advanced numerous other domains, including medicine, engineering, and the art majors. These conclude that Indonesia needs to fasten their AR implementation to reach out the maximization of ELT classes.

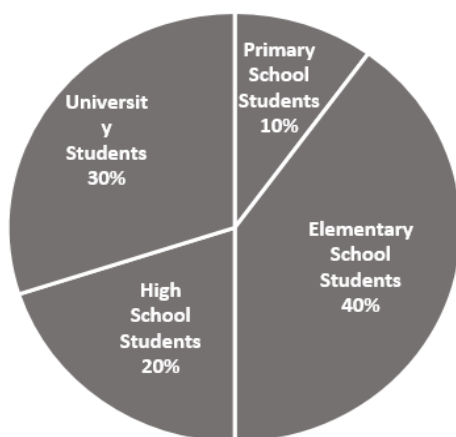


Figure 2. *Level of education in Indonesia implementing AR*

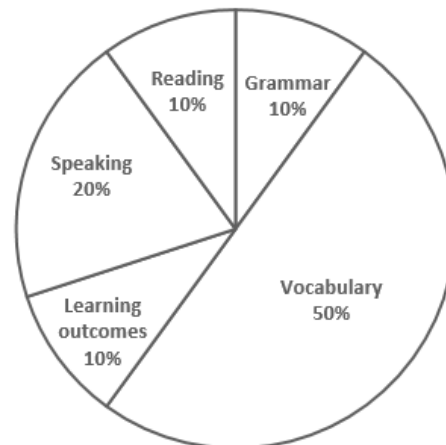


Figure 3. *Aspect learned by Indonesian education Institutions*

In the last five years, the trend examined for AR implementation to English language learning in Indonesia comes from different level of education (Figure 2). These education levels consist of primary school students (*Article number 6*), elementary school students (*Article number 1, 7, 9, & 10*), high school students (*Article number 3 & 8*), and university students (*Article number 2, 4, & 5*). The greatest number of education level that use the AR technology in Indonesia is elementary school. Elementary school students are in the stage of operational concrete (Zuliana et al., 2019). Intellectual development in this stage is demonstrated through the use of logical and systematic manipulation of symbols, which are related to concrete objects (Putri, 2019). Therefore, they need to have concrete objects to represent the abstract of language learning. Sometimes, the 3D pictures showing the real objects of several vocabularies in virtual can help students to comprehend the English acquisition (C. Chen et al., 2021). For example, as stated by Shaumiwaty et al. (2022), learning English is thought to be necessary and important for children, considering that in this very advanced era, children should have been taught English learning or learning a second language other than their mother tongue, which is where to start learning English.

In different level of education, AR is applied to enhance several aspects in English language learning. According to Figure 3, AR is used to improve English skills such as reading (*Article number 4*) and speaking (*Article number 7 & 8*), English components such as grammar (*Article number 2*) and vocabulary (*Article number 1, 5, 6, 9, & 10*), as well as English learning outcomes

(Article number 3). This shows that vocabulary is the most aspect learned that utilizes AR in Indonesia. The utilization of Augmented Reality (AR) in English vocabulary learning offers advantages by creating an immersive and dynamic learning environment. AR enhances vocabulary learning methods by overlaying digital content onto the real world, providing learners with interactive and contextual experiences (Tsai, 2023). Students can visualize and interact with virtual objects associated with specific words, reinforcing their understanding and retention of vocabulary in a more engaging manner (Yilmaz et al., 2022). The interactive nature of AR applications cultivates a sense of curiosity and exploration, making the learning process enjoyable and memorable. Additionally, AR enables personalized learning experiences, allowing students to progress at their own pace and receive immediate feedback, enhancing the efficiency of vocabulary acquisition (Binhomran & Altalhab, 2021; Ji & Shin, 2019).

*Implementation of AR based English language teaching in Indonesia*

According to Karacan & Akoglu (2021), the implementation of AR in English language teaching marks a significant stride toward modernizing and enriching the educational landscape. As technology continues to play an increasingly integral role in education, AR emerges as a powerful tool poised to transform traditional teaching methods (Bhute et al., 2021). In the Indonesian context, the integration of AR into language instruction holds the promise of enhancing student engagement and comprehension. This innovative approach not only aligns with global advancements in educational technology but also reflects Indonesia's commitment to fostering effective language learning strategies (Wahyuni et al., 2020). The implementation provides different ways of strategies to make the English learning come up with the best learning outcomes.

Table 3. Results of implementation of AR-ELT in Indonesia

No	Strategy	Number of articles
1	Integrating appropriate teaching method	2
2	Blending the language learning into inside and outside class	2
3	Combining with another physical media	5

4	Applying the AR-English implementation with non-English materials	1
Total		10

From the reviewed articles, the implementation of AR-ELT in Indonesia is concluded into four strategies (Table 3). This exploration delves into the nuances of how AR is being implemented in the Indonesian educational framework, shedding light on its impact and potential to shape the future of English language education in the country (Munir & Wanti, 2022; Sadikin & Martyani, 2020). The detail explanation for the strategies that bring the understanding of AR-English learning combination is explained in the following.

*Integrating appropriate teaching approach*

According to Fominykh et al. (2020), a teaching approach integrated ensures that AR is seamlessly integrated into the curriculum, aligning with specific learning objectives and maximizing its educational potential. This symbiotic relationship enhances engagement, comprehension, and the overall impact of AR in fostering meaningful and tailored learning experiences for students. For example, Yulian et al. (2022) integrated AR with content-language integrated learning (CLIL). This teaching approach involves a dual emphasis on both content and language, stemming from the significance of English as a global language. It addresses the communication requirements in science and professional domains within university settings. The combination between AR-CLIL brings the high enhancement of students' motivation that leads to the enhancement of reading skills of EFL students. It is seen from the mean of pre-test score from 51.43 that raises to 81.43. The improvement happened because students have their own necessary sources such as smartphones that can support the implementation of AR and AR-CLIL in reading learning is easy to be understood. However, because of the low English proficiency of the students, they need to get exposed significantly to the AR media. In addition, Munir & Wanti (2022) combined the use of AR with repetition and physical movement approach for elementary students. This combination is used due to the characteristics of elementary school students like games and other interesting activities. It is supported by the statements of the students that they motivate themselves in learning English because AR and the activities are very helpful and made them very enthusiastic and excited in learning English.



However, the implementation of the combination between teaching approach with AR is actually varied that English teachers can apply. For example, Fidan & Tuncel (2019) integrated AR with problem-based learning (PBL) as the teaching method for junior high school students in Turkiye. This integration leads to the enhancement of students' learning achievement in comparison to teacher-based instruction. Effectively crafted AR environments offer immersive and lifelike contexts that significantly foster the enhancement of students' cognitive abilities and, crucially, facilitate the application of knowledge in real-world settings. Other integrated AR-teaching approach is also implemented by Carreon & Smith (2022) who integrated AR with inquiry-based lessons (IBLLs) for students in Georgia. This implementation invites students for concrete experience because the process is in learning by doing. During this phase of the process, students actively engage in practical experiences related to a specific task. This necessitates their involvement in applied problem-solving rather than solely relying on observation, direct instruction, or reading for learning.

#### *Blending the language learning into inside and outside class*

To maximize L2 learning, the potential of outside class activities should be maintained (Derlina et al., 2020; Lightbown & Spada, 2020; Wu & Gao, 2022). Outside the classroom emerges the situation of inside class learning that is brought into the places where students live outside the learning classes (Patil, 2023; Sari & Wahyudin, 2019). According to Utami et al. (2021), Lan (2020), and Nguyen & Stracke (2021), in outside class learning, students immerse themselves in authentic language environments through activities such as watching movies, listening to music, engaging in conversations with native speakers, or utilizing language learning apps. While in inside class students engage in structured lessons, interactive activities, and guided practice to build foundational skills and language proficiency, they can open opportunities to foster holistic language development by having additional independent learning outside class (Anis & Anwar, 2020; Nguyen & Stracke, 2021; Yabukoshi, 2020). For example, Wu & Gao (2022) conducted research to discover what aspect in blended learning contributes the enhancement of students' learning outcomes in China. The results stated that, between activities in face-to-face and online classes, the activity that can enhance students more is the homework.

In Indonesia context, the implementation of AR with blending learning activities also found in implementing take-home assignment or homework. Derlina et al. (2020) stated that the superiority of AR, Edmodo, and Tinkcard media, which offers better methods and interactions for learning, can be ascribed to the superiority of learning results in the blended learning class. Because students connect with the subject content, classmates, teachers, and parents at any time and from any location, blended learning is beneficial in enhancing learning outcomes. In addition, the blending language can be implemented online by giving students a take-home assignment. Those assignments keep students learning using AR even they are not monitored by their teachers outside class. In addition, Yelia et al. (2021) maintain the AR usage by structured writing exercises in enhancing the English tenses improvement. By incorporating AR-based assignments, teachers provide students with hands-on tasks that encourage regular interaction with the technology. These assignments do not only reinforce language learning objectives but also foster a continuous and practical application of AR tools, ensuring that students consistently harness the benefits of immersive and interactive learning experiences. However, the challenges faced by the two studies (Derlina et al., 2020; Yelia et al., 2021) are the identification of students who did not do their homework. It affects the bias of the results of their scores whether the scores gained are because of their cognitive ability or the AR implementation as helping media for learning inside class. To prevent this, they suggested to bring the take-home assignment to be discussed in the class, so that students have higher responsibility to finish the take-home assignment.

#### *Combining with another physical media*

The combination between two or more media to engage students can enhance the opportunity to maximize the English language learning. The integration allows students to engage with both digital and physical resources, catering to diverse learning styles and reinforcing comprehension through a well-rounded educational environment (Guerrero et al., 2020). Therefore, with this term, students will get more opportunity to increase their English skills higher. This is proven by Wahyuni et al. (2020), Sadikin & Martyani (2020), Wibowo et al. (2022), and Shaumiwaty et al. (2022) who used cards or external images to engage students to have different management in using the external media.

Wahyuni et al. (2020) integrated AR with Picture Word Inductive Model (PWIM) in term of flash cards. PWIM is basically a strategy to acquire knowledge with pictures. The use of AR and PWIM is appropriate for the increase of students' English vocabulary. The process of this combination is started by the teacher invited students to identify what pictures they see in the flash cards; then, they will scan the pictures using the developed third-party application. From scanning the pictures, they will get the information about the words of the pictures, the spelling, and how to pronounce the words correctly; then, they are asked to follow spelling and pronouncing the words. They are required to repeat the words so that the new vocabularies will stick to their head. The combination between the picture showing a drawing of a specific vocab helped students visualizing the abstract things they cannot imagine, especially for young learners who needs to be given a concrete media for abstract materials; thus, the more vocabularies students will know.

In addition, Sadikin & Martyani (2020) conducted a research regarding the implementation of AR and flashcard to enhance students' vocabularies. They combined the two media for the advantages of students in increasing their lexical range. These advantages include enhancing the learning curve effect, whereby students demonstrate faster and easier learning when utilizing AR applications compared to non-AR counterparts. AR fosters creativity and exploration among students, supported by research indicating its efficacy in facilitating knowledge absorption and problem-solving. Moreover, AR facilitates an effective environment for collaborative inquiry learning activities, while also sparking student interest in the teaching-learning process. These behaviors align with findings suggesting that augmented reality can enhance word retention, attention, and satisfaction among students. It is proven by the increase of 18% mean score from 52.33 for pre-test to 74.83 for post-test.

Wibowo et al. (2022) also integrated AR, voice recognition, and picture. The integration of AR and voice recognition with the wit.ai platform for object recognition in domestic settings is demonstrated through this system implementation. Through analysis and design, it has been determined that the Wit.ai platform is essential for merging AR and voice recognition functionalities. Wit.ai serves as a Natural Language Processing (NLP) service, extracting crucial structured information from sentences. The application utilizes markers to present 3D objects, followed by

user voice input. Subsequently, the application records the user's voice command and transmits it to the wit.ai platform via API. Upon receiving the voice input, wit.ai processes it and returns the result text if the user's voice input is accurate. Therefore, with this voice recognition, students will be trained to speak based on the picture shows.

Other than that, Shaumiwaty et al. (2022) explore 22 students who got the integration medium of AR and picture showing people having conversation. From the pictures, AR can show the voice how to pronounce words and how to response them in a conversation. Therefore, students can recognize the vocabularies and increase their lexical range. The 22 students demonstrated an improvement in their English vocabulary learning outcomes from the pretest to the post-test score. It can be inferred that the implementation of AR has an impact on the learning outcomes of fourth-grade elementary school students in English vocabulary. AR is considered as a groundbreaking technology that bridges the virtual world with our physical reality, blurring the boundary between the two realms. The essence of AR lies in its aim to develop technology enabling seamless integration in real-time, thereby enabling users to perceive genuine 3D objects through their smartphones. Given the diverse range of media that can leverage this technology as a conduit for information acquisition, it serves as the foundation for the readiness of this final project. Therefore, the combination will affect the students' language skills.

Even, Syamsinar (2022) explored the use of AR with course book that have interesting pictures and colours perceived to be suitable with elementary school students. The titles of the books are "ABC Fun with Mickey" and "123 Counting Fun with Mickey." This books actually combines the use of AR and texts and pictures. In the observed primary school. The implementation of AR and the books are important to constantly support the learning English for young learners there. In addition, according to the observational findings, students actively engaged in English learning with augmented reality media. They expressed great enthusiasm as it provided them with a novel learning experience. Additionally, the interactive nature of the media facilitated learning through play, particularly benefiting young learners. Consequently, the students highly endorse the use of this media due to its captivating nature. Thus, it is concluded that combining AR with other learning physical media enhances the educational

experience by providing a multi-sensory and holistic approach to learning.

#### *Applying the AR-English implementation with non-English materials*

Applying AR in English language learning with non-English materials represents an innovative approach to language acquisition (Dubskikh et al., 2021; Huang et al., 2021; Tsai, 2023). By integrating AR technology with non-English content, learners are presented with immersive experiences that foster language development in diverse contexts. This approach not only enhances language proficiency but also broadens learners' cultural awareness and understanding (Barus et al., 2021; Oktaviani et al., 2020). For instance, students can use AR to explore virtual environments depicting landmarks (Lim & Lim, 2020), cultural practices (Parmaxi & Demetriou, 2020), and everyday situations (Elbes & Oktaviani, 2022) from English-speaking regions. By interacting with these virtual elements in a contextualized manner, learners can absorb language nuances, vocabulary, and cultural insights organically. Thus, applying AR-English implementation with non-English materials not only facilitates language learning but also promotes a deeper appreciation for cultural diversity and global interconnectedness (Lin & Tsai, 2021; Yoko, 2020).

In this term, Sulistyaningsih et al. (2021) explain the implementation of AR-English language can be related to the non-English material, such batik patterns. Batik pattern is one of the learning contents that provide fascinating and interactive learning that can take use of mobile augmented reality technology, which packages learning material in real-time interactive via mobile devices in real life. This can improve students' learning experiences in a mixed atmosphere. Batik, as one of the parts of Indonesian culture can develop significantly the cultural diversity of their own countries and their lexical range of Indonesian culture itself. In addition, this research stated that the AR Camera showcased offers an introduction to batik motifs through a mobile augmented reality platform, enabling users to interactively control a 3D model within their real environment using interactive markers. Additionally, manipulation of the 3D batik motif model can be achieved through screen gestures, allowing users to zoom in/out and pan left/right. It is proven by the results of this research that students agree that the use of AR in batik can make their English learning more varied.

#### *Recommendation of AR on English Language Teaching Implementation in Indonesia*

From Table 2, it is discovered that the implementation of AR in English language acquisition in Indonesia inherent different strategies. Those strategies, absolutely, cannot independently be produced without notes undertaking. These notes are involved in terms of recommendation to minimize the lack of the implementation and maximize the results. The first recommendation for AR-English language implementation is the combination of teaching method should be based on the class needs (Wibowo et al., 2022). According to Barus & Simanjuntak (2020), adapting the teaching method should be tailored to class needs to ensure relevance, effectiveness, and meaningful engagement. Every classroom is unique, comprising students with diverse learning styles, preferences, and proficiency levels. Thus, by aligning the integration of AR with the specific needs of the class, educators can address the varied learning requirements of their students, making the technology a valuable asset rather than an isolated tool.

The most important recommendation for this is the facility, including the teachers' ability in utilizing the media. Teachers should be able to explain the works of the technology to the students. This would determine whether students can engage to the materials or not. As stated by Syamsinar (2022) that teachers need to do a simulation before applying the media in learning to minimize the problems that occurred. Thus, it is recommended that all parties in institutions can maintain the implementation (Shaumiwaty et al., 2022). The educational institutions need to invest in teacher training programs to equip educators with the necessary skills to effectively integrate AR into their English language classrooms. Training initiatives should focus on familiarizing teachers with various AR tools, guiding them on creating content-rich lessons, and empowering them to adapt their teaching styles to capitalize on the benefits of this technology (Hao & Lee, 2021).

AR technologies offer immersive and interactive learning experiences that can significantly enhance students' engagement and comprehension. Educators are encouraged to explore and incorporate AR applications strategically into their teaching methodologies, leveraging the technology to create dynamic language lessons that go beyond traditional approaches. By embracing AR, English teaching can become more adaptable to diverse learning

styles, fostering a student-centered environment that aligns with the evolving landscape of educational technology (Koç et al., 2022).

## **CONCLUSION**

In this technology era, augmented reality is being highlighted to help educators on the English language teaching. This is because Indonesians face several challenges when learning English as a foreign language, primarily due to linguistic differences and the distinct nature of the English language. Therefore, understanding the ways for successfully implementing AR in ELT involves Indonesian educators informed decisions about when and how to incorporate this technology into their teaching. According to the results in this research, elementary students with vocabulary teaching method as the most aspect taught. From this information, teachers can teach English vocabularies to the elementary students more comprehensively. In addition, the implementation of AR-ELT can integrate appropriate teaching approach, blend it with the language learning between online and offline class, combining with another physical media, apply the AR-English implementation with non-English materials. The most important recommendation due to the implementation is the facility maintains. All parties in the institutions must support.

However, Indonesia still needs the improvement of AR utilization in the classroom in each level of education. For example, in the provided articles, no AR-ELT implementation in junior high school level is discovered. Other than that, teachers need to use AR into other English language aspects, such as listening or writing. It can comprehend the AR implementation in every aspect of language learning so that the learning outcomes of students are reached. Moreover, smartphone has become the needs of students nowadays; thus, the technology usage should be the high aspect teachers involve in English language teaching. Ultimately, the successful implementation of AR in ELT not only reflects the commitment of the education system to embrace technological advancements but also signifies a promising step towards preparing students for a future where digital literacy is an integral aspect of language proficiency.

Even though some AR application is developed by Indonesian academics, the implementation of these apps still does not implement in the long term consistently. Other than that, some challenges faced in the reviewed articles make the implementation needs to consider several aspects

to maximize the integration of AR in ELT especially for English teachers in Indonesia. Therefore, according to our analysis of the recommendation offered by the reviewed articles, we suggest the learning steps of AR implementation in ELT for further improvement of students' language skills (Figure 4). The implementation should consider the identification of the learning objectives, students' needs, and the AR strategy, as well as the opportunities and weaknesses during the implementation so that teachers can establish more appropriate implementation to the next EFL meeting.

In addition, the most important recommendation due to the implementation of AR is that all parties must support. For example, government, especially in Indonesia needs to incorporate AR-enhanced content into the national curriculum for English language learning. This includes identifying specific learning objectives where AR can enhance comprehension, vocabulary acquisition, and language production. Other than that, government should provide professional development opportunities for teachers to learn how to effectively integrate AR technology into their English language teaching practices, such as workshops, seminars, and online courses can help teachers acquire the necessary skills and competencies to leverage AR tools in the EFL classroom. Further Indonesian technology developer need to developed AR app and should socialize the technology comprehensively towards ELT teachers, so that academics do not only develop AR app without the implementation.

This research limits the topic that only discovers the papers only in Indonesia with limited period of years. Thus, further research needs to expand the topic, such as comparing in detail regarding the AR implementation in Indonesia and any specific country to see what aspects of Indonesia AR application needs to highlight. In addition, the limitation of this research is due to the missing of further exploration regarding the factors "causing" and "caused by" the limitation of AR implementation in Indonesia. Therefore, future research should emphasize the possibility factors to encourage the implementation of AR in ELT class significantly.

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