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RESEARCH ARTICLE

Development of a Learning Model Based on Ar and Vr Technology to Improve Efl Students

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Kata Kunci:
Speaking Skills, Virtual Reality, Augmented Reality, Technology, EFL Students.

Abstrak

Kemajuan teknologi telah membuka jalan baru untuk meningkatkan pengalaman belajar bahasa, khususnya di bidang Bahasa Inggris sebagai Bahasa Asing (EFL). Penelitian ini berfokus pada desain aplikasi Augmented Reality (AR) dan implementasi Virtual Reality (VR) dalam pembelajaran bahasa Inggris untuk meningkatkan keterampilan berbicara siswa EFL. Dengan menyediakan lingkungan yang imersif dan interaktif, VR dan AR memungkinkan siswa untuk terlibat dalam percakapan kehidupan nyata, meningkatkan pengucapan, kelancaran, dan pemahaman. Penelitian ini mengadopsi pendekatan metode campuran, menggabungkan data kualitatif dan kuantitatif. Aspek kuantitatif menggunakan skala Likert dengan lima poin untuk mengukur persepsi dan hasil belajar siswa, sementara pengambilan sampel bertujuan dalam kerangka non-probabilitas digunakan untuk memilih peserta. Temuan menunjukkan bahwa desain aplikasi AR dan implementasi VR secara signifikan meningkatkan motivasi, keterlibatan, dan kemahiran berbicara siswa dibandingkan dengan metode tradisional. Nilai validitas ahli media adalah 3,5 yang dinyatakan layak, sedangkan nilai validitas ahli materi adalah 3,5 yang dinyatakan layak. Studi ini berkontribusi pada perkembangan bidang pembelajaran bahasa berbantuan teknologi dan menyoroti potensi pengintegrasian AR dan VR dalam pengajaran EFL.

Key Word:
Speaking Skills, Virtual Reality, Augmented Reality, Technology, EFL Students.

Abstract

The advancement of technology has opened new avenues for enhancing language learning experiences, particularly in the field of English as a Foreign Language (EFL). This study focuses on designing an Augmented Reality (AR) application and implementing Virtual Reality (VR) in English language learning to improve EFL students' speaking skills. By providing immersive and interactive environments, VR and AR enable students to engage in real-life conversations, enhancing pronunciation, fluency, and comprehension. This research adopts a mixed-method approach, combining qualitative and quantitative data. The quantitative aspect employs a Likert scale with five points to measure students' perceptions and learning outcomes, while purposive sampling within a non-probability framework is used to select participants. The findings suggest that the AR application design and VR implementation significantly enhance students' motivation, engagement, and speaking proficiency compared to traditional methodsThe validity value of media experts was 3.5, declared feasible, while the validity value of material experts was 3.5, declared feasible. This study contributes to the growing field of technology-assisted language learning and highlights the potential of integrating AR and VR in EFL instruction.

INTRODUCTION

In the globalized world, English proficiency is a critical skill for academic, professional, and personal success. Specifically, speaking skills are essential for effective communication and interaction in various contexts. (Burns, 2019) The systematic and explicit instruction of speaking skills is a crucial aspect of English language teaching that is frequently overlooked.However, English as a Foreign Language (EFL) learners often face significant challenges in developing their speaking skills due to limited exposure to authentic English-speaking environments and opportunities for real-time practice. Based on (Hao, 2017) (Kalra and Siribud, 2020) Recent advancements in technology, particularly Augmented Reality (AR) and Virtual Reality (VR), offer promising solutions to these challenges. AR and VR can create immersive, interactive, and engaging learning environments that simulate real-life situations, providing learners with ample opportunities to practice speaking in contexts that mirror authentic communication settings. These technologies can bridge the gap between classroom learning and real-world application, making language learning more effective and enjoyable. Based on (Radianti et al., 2020) . (Garzón, 2021) Augmented Reality (AR) provides an interactive experience by integrating digital elements into the real world, enhancing real-world objects with computer-generated sensory information. Furthermore, the findings showed that incorporating these technologies in

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teaching speaking helps establish rapport, enhances fluency and accuracy, reduces anxiety and apprehension, and boosts students' confidence (Sosas, 2021).

Previous studies have shown the potential of AR and VR to enhance various aspects of language learning, such as vocabulary acquisition and listening comprehension (Lin and Lan, 2015). However, their specific application in improving EFL students' speaking skills remains underexplored. This research aims to develop and evaluate a learning model that integrates AR and VR technologies to enhance the speaking skills of EFL students, thereby addressing a critical gap in the current literature. According to (Zhou, 2024) The application of VR technology in actual English teaching not only improves the learner but also enhances the modernity and modernization of English teaching activities, effectively achieving the cultivation of students' comprehensive English quality. Based on (Huertas-Abril et al., 2021)the most noted advantages of AR are that it enhances classroom engagement and its focus is different from traditional teaching methods, increasing student motivation and facilitating their learning processes.

Despite the widespread adoption of AR and VR in various fields, their integration into primary education, especially in rural schools, remains limited. Many traditional EFL teaching methods primarily involve rote memorization, grammar drills, and teacher-centered instruction. These approaches often fail to provide meaningful and contextualized language learning experiences. Additionally, limited exposure to native English speakers and authentic communication settings further hinders students' progress in developing fluency and comprehension. Based on (Aini et al., 2023) Virtual Reality media in learning science in has proven to be effective in improving student learning outcomes.

While previous research has explored the benefits of AR and VR in education, studies focusing on their application in EFL learning at the primary school level are still scarce. The gap in research highlights the need for a structured learning model that incorporates these technologies in a way that is accessible, effective, and engaging for young learners.

At SD Negeri 02 Tualang, students face several challenges in learning English, including limited access to modern learning resources, and lack of exposure to spoken English outside the classroom. By introducing an AR and VR-based learning model, this study aims to bridge these gaps by providing students with immersive and interactive experiences that engage and foster language development.

SD Negeri 02 Tualang represents a typical primary school where students have limited access to digital learning tools. Traditional teaching methods often do not align with the diverse learning styles of students, making it challenging for them to develop essential language skills effectively. Recognizing the potential of AR and VR to enhance learning, this research seeks to design a learning model that incorporates these technologies to support EFL instruction in a primary school setting.

The objectives of this research are: 1) To develop a structured AR and VR-based learning model that enhances EFL students' engagement and comprehension; 2) To evaluate the effectiveness of this model in improving students' speaking, listening, and vocabulary acquisition skills; 3) To identify challenges and opportunities in implementing AR and VR technologies in primary education.

By leveraging AR and VR, students at SD Negeri 02 Tualang can engage in simulated real-world conversations, interact with digital content in an immersive way, and experience a more dynamic and effective language learning process. This study will provide valuable insights into how emerging technologies can be integrated into primary school curricula to improve EFL instruction and overall language proficiency.

RESEARCH METHOD

The goal of this research is to develop a mobile-based AR application for independent vocabulary learning while also implementing existing VR applications. The application is designed for elementary-level students for speaking skills, aiming to enhance their ability to memorize and learn English speaking more effectively. In addition to AR development, this study explores integrating VR applications to create a more immersive learning experience. This research falls under the category of developmental studies, focusing on the creation of educational media utilizing both Augmented Reality and Virtual Reality technologies.

The selection of multimedia development follows a structured method, where each stage is described in detail and specifically outlined. This method consists of six key stages: concept, design, material collection, assembly, testing, and distribution/implementation. The stages of the multimedia development process can be observed as follows in figure 1.

Design Validation

Design validation is a crucial stage in the development process to assess the product's effectiveness. The validation process includes evaluations by media and subject matter experts, as well as product trials conducted by students, with assessments gathered through questionnaires.

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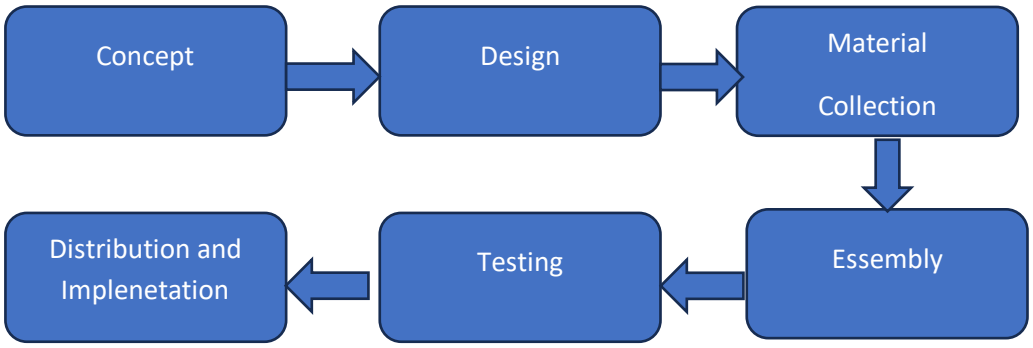

Figure 1. Multimedia development method

Table 1. Media Expert Validation Questionnaire

No	Indicator	1	2	3	4	5
1	The layout/background is well-organized and visually appealing.					√
2	The text and buttons are clear and well-positioned.					√
3	Color choices are attractive and suitable for users.				√	
4	The button functions work well without delay.				√	
5	First-person controller (FPC) movement/path is smooth.				√	
6	3D model rotation functions properly and smoothly.					√
7	Reading markers for 3D models works well.					√
8	The narration sound is clear and easy to understand.					√
9	The text is readable and properly formatted.				√	
10	The image quality and resolution are high and support user engagement.				√	
	Total Score				20	25
	Total Scores	45				

Table 2. Material Expert Validation Questionnaire

No	Indicator	1	2	3	4	5
1	Is the learning material in the VR/AR application relevant to the educational curriculum?				√	
2	Does the content align with students' cognitive levels and learning abilities?				√	
3	Are the learning objectives clearly stated and achievable through the application?				√	
4	Is the information presented in an accurate and scientifically correct manner?					√
5	Does the application encourage active learning and engagement?				√	
6	Is the explanation of concepts clear, structured, and easy to understand?					√
7	Does the VR/AR environment effectively illustrate abstract or complex concepts?					√
8	Does the application provide interactive elements that enhance comprehension?				√	
9	Are the examples, simulations, or case studies relevant and useful for learning?					√
10	Does the application support students' critical thinking, problem-solving, or creativity?					√
	Total Score				20	25
	Total Scores	45				

Table 3. Product Trial Questionnaire

No	Indicator	1	2	3	4	5
1	Is the initial display of the VR/AR application attractive and easy to understand?					
2	Is this application easy for your child to operate?					
3	Are the features in this application enjoyable and make learning more engaging?					
4	Is the narration or audio in the application clear and easy to understand?					
5	Does this application provide a new experience in using technology for your child?					
6	Are the information and images displayed in the application accurate and realistic?					
7	Does this application help you become more interested in learning English?					
8	Does using VR/AR help your child understand learning concepts better compared to traditional methods?					
9	Does your child find topics presented through VR/AR more interesting compared to books or regular images?					
10	Does your child want to share their experience using this application with friends or family?					

The evaluation is categorized into four rating levels, namely:

1. Score 1: Strongly Disagree
2. Score 2: Disagree
3. Score 3: Neutral
4. Score 4: Agree
5. Score 5: Strongly Agree

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The validation calculations can be conducted using the formula:
μ = Σx. Information:
μ = average value
Σx = total number of validation values n = number of validators.

RESULT AND DISCUSSION

This research development results in an Augmented Reality application created using Assemblr Edu. The design process undertaken is to make markers in the form of 3D objects, at this stage also recorded sound with the MP4 format used as audio sound when the target marker is run models. Arrange the position of 3D objects in AR space, and define interactions such as movement, rotation, or triggers that will be activated when the user interacts. After everything is completed and tested, the AR can be accessed by users via supporting apps or Android.

The final result of this AR application that can be *installed* on an Android *smartphone as shown in the following image:*

Figure 2. Barcode AR Aplication

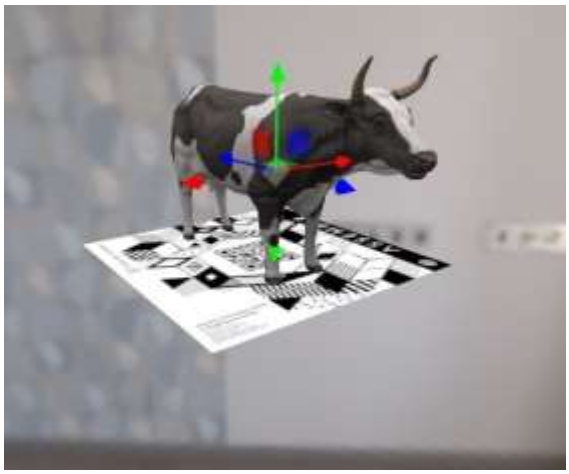
Figure 3. AR Camera Scene Results

Scene AR Camera is used to utilize AR by scanning markers in the form of animals, which use the camera on the smartphone to display a 3D model of the animals according to the book. Voice narration appears at the same time as the 3D model appears; apart from that, the slider is used to rotate the 3D model of the house.


Figure 4. VR Menu Scene Results


Figure 5. VR Scene Results

The scene menu functions as *a home* Virtual Reality, in it there is a button to go to the home Virtual Reality scene according to type. *The scene* functions as a virtual tour of the home according to the type previously accessed in the VR *scene* menu. This *scene* has navigation buttons and a *look around button*.

Based on validation assessments from experts, namely media experts, material experts and validation from users in product trials. The suggestions contained in the instrument are used as consideration for further improvement of media tools for learning. The following are the test results from each validator:

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Media Expert Validation

In table 4. below are the validation results expert media validation

Table 4. Media Expert Validation Assessment

Mark	Validity Criteria
3.26-4.00	Very Valid
2.51-3.25	Valid
1.76-2.50	Invalid (revised)
1.00-1.75	Invalid (total revision)

From the test results via a questionnaire totaling 10 questions, the values obtained: a) Less (1 x 0) = 0; b) Simply (2 x 0)= 0; 3) Well (3 x 5)= 15; c) Very good (4 x 5)= 20 +
35

So the validation value can be calculated: $\mu = \frac{\sum x}{n} = \frac{35}{10} = 3{,}5$

Based on the calculations above, it is known that the validation results from media experts are 3.5. This criterion is between 3.26 – 4.00, which is classified as very valid. So this application can be said to be suitable for use.

Material Expert Validation

From the test results via a questionnaire totaling 10 questions, the scores were obtained. a) Less (1 x 0)= 0; b) Simply (2 x 0)= 0; c) Well (3 x 5) = 15; d) Very good (4 x 5) = 20 +
35

So the validation value can be calculated: $\mu = \frac{\sum x}{N} = \frac{35}{10} = 3{,}5$

Based on the calculation above, it is known that the validation result from the material expert is 3.5. This criterion is between 3.26 – 4.00, which is classified as very valid. So this application can be said to be suitable for use.

Product Trial *(User)*

Product trials by users were carried out with a sample of 20 student respondents with 10 questions. Based on data from 20 respondents with 10 questions, the values obtained are as follows:

Table 5. Product Trial Questionnaire Value

Respondent	Mark					Amount
	1	2	3	4	555	
1.	2	0	9	8	12	31
2.	0	0	12	16	8	36
3.	0	0	12	16	4	32
4.	0	2	9	12	12	35
5.	0	0	15	16	4	35
6.	0	0	9	16	12	37
7.	2	0	6	16	8	32
8.	0	1	3	8	24	36
9.	0	4	9	20	0	33
10.	0	0	15	12	8	35
11.	0	0	0	24	16	40
12.	0	4	0	8	28	40
13.	0	0	0	16	28	44
14.	0	0	3	24	12	39
15.	0	0	12	8	16	36
16.	0	4	9	20	0	33
17.	0	0	3	12	20	35
18.	0	0	3	16	20	39
19,	0	0	9	8	16	33
20.	0	0	15	12	8	35
Total Scores						716

So the validation value can be calculated: $\mu = \frac{\sum x}{N} = \frac{716}{20} = 35{,}8 \quad 35{,}8 = 3{,}58$
10

Based on the calculations above, it is known that the product trial results by *users* are 3.58. This criterion is between 3.26 – 4.00, which is considered very valid. So this application can be said to be suitable for use.

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CONCLUSION

The primary goal of this research is to develop a mobile-based AR application for independent vocabulary learning while also implementing existing VR applications. The application is designed for elementary-level students, aiming to enhance their ability to memorize and learn English vocabulary more effectively in speaking. In addition to AR development, this study explores integrating VR applications to create a more immersive learning experience. This research falls under the category of developmental studies, focusing on the creation of educational media utilizing both Augmented Reality and Virtual Reality technologies.

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