Implementing Augmented Reality to Promote English Oral Production, Interaction, and Engagement of Thai EFL Students

การใช้สื่อเสมือนจริงเพื่อส่งเสริมการพูดภาษาอังกฤษ การปฏิสัมพันธ์และ
การมีส่วนร่วมของนักเรียนชาวไทยที่เรียนภาษาอังกฤษเป็นภาษาต่างประเทศ

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Abstract: *The COVID-19 pandemic had an impact on the EFL classroom. Teachers struggle to provide an online lesson that allows students to practice their content, interact with specific English language usage characteristics, and develop English language proficiency. This study demonstrates the use of EFL course content and augmented reality (AR) technology to improve Thai EFL students' learning achievement and virtual learning experience via computer-generated perceptual interactive experiences across multiple sensory modalities. The participants are 34 undergraduate students from one university in Bangkok, Thailand, majoring in Classical Thai Dance. The twelve lessons were adapted from an online class that included AR. Using a questionnaire, pre-test and post-test, and observation, the researcher used a mixed-methods research design to investigate the effectiveness of the instruction, learning achievement, and participants' stages of interaction and self-adjustment toward implementing AR. This study, in particular, provides an account of the student-centered re-design of EFL instruction during the 'new normal in order to achieve learning outcomes and provide a supportive learning experience for students. To assess students' performance in English classes using an AR application, English learning lesson plans with an AR application were designed and implemented in the English classroom. Thirty students were chosen for participation using purposive sampling. Observation, pre-test/post-test, and a questionnaire were used to collect data. According to the findings of this study, Augmented Reality learning activities combined with a Task-based learning approach encourage students to participate in activities and improve student motivation in language learning. As a result, increased motivation boosts language achievement.*

Keywords: Augmented Reality, Motivation, Engagement, Task-based learning

Introduction

          Technology is a crucial tool for improving education in a variety of ways. Technology, for example, allows learners to collaborate via distance learning or to bring a real-world environment into the classroom. Furthermore, incorporating technology into the classroom can help students improve their language skills, and teachers generally value the benefits of educational technologies. As a result, it is time for teachers to take

advantage of their technological capabilities in order to improve classroom teaching and learning activities. Today's students prefer to explore while learning. Augmented Reality (AR) technology is widely used in a variety of fields today, including English language teaching.

Augmented Reality (AR) is the projection of virtual reality elements on a screen, such as images, text, videos, and sound, to enhance the visual experience. Furthermore, Augmented Reality has a long-term impact on education by incorporating a technological approach. Nowadays, Augmented Reality (AR) has been adopted as a tool that allows learners to visualize the real AR experience in a way that allows it to be modified and adapted to fit local instructional and curricular needs (Mitchell, 2011). AR technology is being used in different fields of education, and it is emphasized that effective use of AR technology can be used while teaching invisible objects and incidents, demonstrating hazardous situations, transforming intangible concepts into tangible and presenting complicated information (Walczak, Wojciechowski, & Cellary, 2006). Real objects are dominants, and virtual objects add additional information (Milgram and Kishino, 1994). Besides, AR helps students to engage in authentic explorations in the real world (Dede, 2009). This implies overlapping virtual information on digital devices to promote real-world experiences (Lo et al., 2021). By displaying virtual elements alongside real objects, AR facilitates the observation of events that cannot easily be observed with the naked eye (Wu, Lee, Chang, & Liang, 2013). Integrating technology into the classroom increases learning motivation because teachers can find a variety of information and implement it in the English classroom.

Students must complete the tasks assigned to them and be able to use technology for self-efficacy, problem-solving, and collaboration when using Augmented Reality technology in the classroom. As a result, Augmented Reality (AR) may be the material that piques students' interest in the classroom. However, because it incorporates a technological approach, Augmented Reality Technology has a long-term impact on education. This paper was a part of the research on implementing Augmented Reality technology to improve students speaking ability. Therefore, this study investigated how AR learning activities combined with a Task-based learning approach could help Thai higher education students improve their oral production in the English classroom to communicate in the target language during the English learning activities.

Literature Review
1. Integration of AR in English language teaching

Augmented reality has been used in many fields, including English language instruction. Simultaneously, for a variety of reasons, the teaching approach has incorporated technology into the classroom. According to Rogers (2003), when considering the use of AR as an innovation, perceived compatibility has a positive effect on the adoption rate. Similarly, Godwin-Jones (2016) introduced AR as an emerging technology in language learning and investigated different practical applications. AR technology has the potential to be used in the classroom because it can increase student motivation and improve educational realism-based practices (Lee, 2012). Furthermore, AR can support a student-centered learning environment, and technology increases students' ability to be individuals in learning lessons. According to Lui et al. (2009), AR improves the ability to

explore and absorb new knowledge as well as solve problems. Some students discovered that increasing students' potential and allowing them to learn more independently from teachers was beneficial. According to Yuen et al. (2011), AR applications are more likely to result in certain benefits, such as increased motivation and student engagement in learning. Furthermore, Marc et al. (2016) believe that AR improves students' attention and satisfaction as well as their word retention. AR technology, on the other hand, stimulates student learning and provides real-world classroom experience, increasing learners' positive interest in learning English.

2. Task-Based Learning

The activity that established and implemented the Augmented Reality material was task-based learning. The definition of a task identifies two focal points, real-world or target tasks, which are non-linguistic tasks learners could use to function beyond the walls of the classroom, and pedagogical tasks that are conducted within the classroom with a particular linguistic goal in mind (long, 1985; Ellis, 2003; Willis and Willis, 2001; Nunan, 2013). Task-based learning emphasizes language use through activities that require the learner collaborates. Similarly, Nunan (2013) highlights that a task is a stand-alone structured activity in which learners are focused on "comprehending, manipulating, producing, or interesting in the target language" to communicate meaning rather than grammatical forms. Moreover, a task refers to a language learning endeavor that requires learners to comprehend, manipulate and produce the target language as they perform the set task involving real-world language (Richards, 1986). Hence, task-based language teaching with the newer technologies has the potential to "minimize students' fear of failure, embarrassment, or losing face; they can raise students' motivation to take risks and be creative while using language to make meaning" (Gonzalez-Lloret and Ortega, 2014).

3. Integration of Augmented Reality Application with Task-based learning

Technology and learning are related to the education field that students are familiar with using technology. Today's new generation is called digital natives, and the use of technology in education makes learning more inspiring, motivating, meaningful, and remarkable (Singhal et al., 2012). Augmented Reality technology is a recent topic in education that is implemented in the classroom as a tool in which the learner can perceive the real visual experience of the lesson. Augmented Reality technology has been in the limelight since it enables users to interact with real and virtual objects, provides learning through experience, and increases attention and motivation (Singhal et., 2012).

Furthermore, Augmented Reality technology provides 3D content that allows learners to engage in a real-world visual experience while learning the target language. Moreover, the teacher can implement technology materials for the Thai Dance classroom in terms of interaction and engagement. The teacher could still supplement or expand on the lesson that uses the application to teach English. To integrate technology into the English classroom, the teacher can create or design the application based on the teaching approach and develop the application as in the 3D pictures with sound to teach speaking ability. Moreover, in educational AR applications, multimedia materials such as images, texts, audio, 3D objects, 2D or 3D animations, and videos are used depending on the learning objectives (Wang et al., 2013). As a result, learners could also actively participate in the learning process while using the application provided by technology, which brings

real-life objects into the language classroom and creates a sense of authenticity. As a result, the Augmented Reality application can fill in the gaps and highlight some points in this field to help students see the picture clearer in the lesson in terms of Thai classical dance movement vocabulary. However, after the lesson plan was designed, this field's expert evaluated the Augmented Reality application. It was also tested before being employed in the classroom.

4. Mix-Reality Learning Environment

Today's world is changing at a rapid speed. The advancement of technology and the field of education are propelling humanity forward in all areas. While Augmented Reality (AR) technology has had an impact on education, traditional teaching methods continue to be used to improve students' skills. The Virtual Reality Learning Environment (VRLE) is a well-known educational tool (Lee et al., 2010). So we can say that it was a time when science and technology advanced rapidly and had the greatest impact on change in all areas. Therefore, in the information society, perception of various information is easier to do with technology, as the Augmented Reality (AR) application can bring real-world experience to teach students. Thus, knowledge is a necessary resource for developing social skills. What if students could learn history or a foreign language through visual vision and their teacher presented the real visual experience without replacing the real world?

Objectives of the Research

This research focused on how Augmented Reality activities are used in the English classroom to enhance the speaking production of Thai EFL students majoring in Dance Education and the students' perceptions toward using AR in the classroom. The following are the study's objectives:

1. To develop AR learning activities to be implemented in an EFL classroom.
2. To examine the implementation of AR learning activities in an EFL classroom.
3. To examine students' opinions toward implementing AR activities in an EFL classroom.

Research Methodology

This study used a concurrent mixed method of gathering information to answer the research questions. The researcher employed the mixed-method design in the study, combining the qualitative and quantitative approaches to collect and analyze data (Creswell and Tashakkori, 2007). As a result, the mixed-method design can provide specifics and extensive data to achieve research objectives and answer research questions in this study. Moreover, Bryman (2006) claim that integrating qualitative and quantitative research methods has become common in research.

A mixed-method design might be used to achieve the research goals and give comprehensive data to address the research questions. Additional, quantitative research approaches involve acquiring data in numerical form and evaluating it using mathematical techniques, particularly statistics, to understand a problem or phenomenon. Thus, the process of quantitative explanation involved gathering numerical data and utilizing mathematics to analyze data reliably. Moreover, the qualitative approach focuses on learning about and comprehending participants' experiences, opinions, and views to investigate them in this study. Also, there are several methods for gathering qualitative

information, including observation, semi-structured interviews, or transcripts from open-ended questions. The study employed the observation tool to explore students' engagement and interaction using AR technology to produce speaking production and communication. Therefore, qualitative data could be analyzed by observing students' interaction and engagement while using the application in learning activity to produce target language.

Consequently, the Mixed-Method was a combination and integration of quantitative and qualitative to explore the various perspectives and data reliability to support the research results by using the statistic in this study.

Scope of the Study

This research aimed to examine the use of Augmented Reality activities in the English classroom for Thai dance students. The study's population consists of Thai EFL students at a university. This study's participants were chosen from students majoring in Thai classical dance at a Bangkok university. The participants were chosen based on students having an opportunity to attend the student exchange program. Also, students had to study English for the Thai Dance Teachers subject.

Population and Sampling

This study's population consisted of university students majoring in Dance Education. The 34 participants, year three undergraduate students from one university in Bangkok, Thailand, participated in this study. The second semester's program for the 34 participants includes an enrollment English for Dance Teacher course. All participants have access to the applications because smartphones have made it easier to use Augmented Reality, which has been developed. Purposive sampling was used to select participants from students enrolled in English for Thai dance teacher courses. There were 268 participants in this study as a whole. Thirty-four students from the Dance Education Program in year three served as the purposive sample for this study, consisting of females and males.

Data Collection

Data were collected in each class before and after the Augmented Reality (AR) application was used in the classroom. While the AR application was being implemented in the English classroom, the instruments were used to observe students' interaction and engagement; the data was gathered by observing students' interactions and discussions with their groups in the break room area during Augmented Reality learning activities. The observation was obtained on the online learning platform, which could record the video and examine students' behavior.

The pre-test and post-test were created to validate learning achievement after implementing AR learning activities in the English classroom. The oral presentation was followed by the lesson framework and the achievement test pre-test/post-test. In order to provide an answer to the research topic, it served as a tool to assess oral production improvement. The results of the Pre-test and Posttest were based on oral production techniques using the participant's AR application. Before beginning the AR learning activities, the students took the pre-test. Students will next take a post-test following their

use of the AR application in activities. The speaking test was administered together with the pre-test and post-test through an online platform. The students could choose and describe one of two questions depending on the questions. The scoring rubric serves as the foundation for validating the pre-test and post-test. Twelve lesson plans were used in the classroom, along with eighteen AR learning activities to explore learning outcomes following AR technology in English classes. The lesson plans were used in the classroom, and the augmented reality application was used for the instructional activities. Downloading the Zappar AR program enables its use in the classroom. The pupils may scan the code using the application once it has been installed. Because the Zappar program is free for 30 days and contains adaptable features for the instructor who creates the learning package, it was created for use in classrooms. Additionally, the lesson plans were created using a Task-based learning strategy with the following three stages. The researcher used questionnaires in the quantitative approach to soliciting students' comments and opinions about the AR learning activities. The questionnaire was presented after the end of the course by using the google form to examine the student's perspective after using an application.

Additionally, advisors and three experts validated this instrument and edited it based on their suggestions. In addition, as part of the ethical consideration, the researcher sent the consent form and informed the participants before the research was obtained.

Data Analysis

The data from the pre-test and protest were analyzed in steps to meet the goal of research question one, which is to compare learning the English language before and after using the Augmented Reality application. The other goals were to find out what students thought about using Augmented Reality technology to improve their English speaking abilities. After completing the English course, the students' opinions were validated through questionnaires. Furthermore, the data collected during the observation were transcribed and analyzed in data analysis using the steps involved in the phenomenon.

Finally, the data analysis was shown, which analyzed and interpreted the data in relation to the study's findings. The interpreted analysis was based on the students' speaking ability, pre-test/post-test, observation, and opinions.

Conceptual Framework
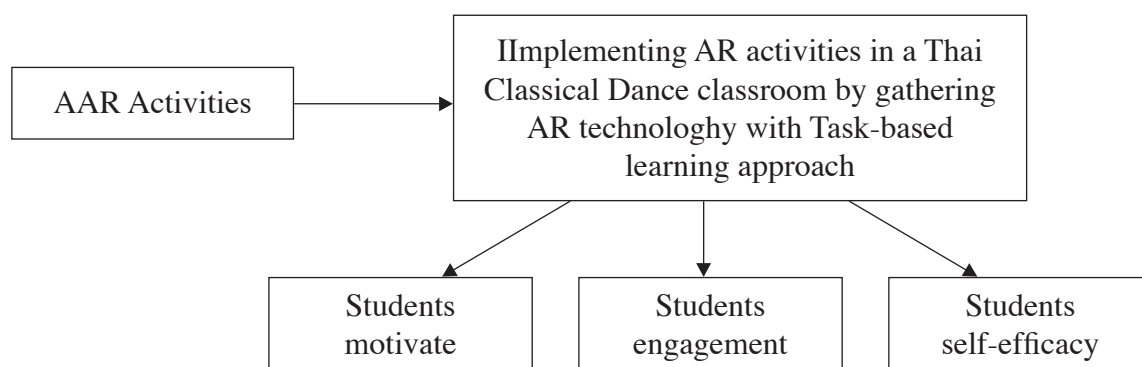
Figure 1: Conceptual Framework of the Study

The study examined the students' interaction in the learning subject while using the Augmented Reality application. The AR application employed in each lesson focused on communication while using technology. The Augmented Reality learning activity gathered with Task-based learning to encourage students to finish their tasks that emphasized student oral production rather than grammar. When the tasks were presented in the class, the students used the AR application to discuss and share their ideas with the group that students interacted into the classroom. The result after using Augmented Reality combined with Task-based learning to engage students to participate in learning activities improved in all areas.

Research Results

The research questions showed improved student speaking production after implementing Augmented Reality Technology in the English classroom. A pre-test was administered to the class prior to the administration of treatments. The speaking topics were chosen by the students, and a scoring rubric was provided for the speaking pre-test.

Table 1. *t*-test Results of the Pretest and Posttest (*N* = 34)

	N	Mean	SD
Pre-test	34	1.62	.779
Post-test	34	4.09	1.357

The results showed that after using the Augmented Reality application, the participants were engaged in all activities and could communicate in English. The data was gathered from the speaking pre-test and post-tests, as well as descriptive statistics and the dependent sample t-test. Table 1 displays the descriptive statistics. The Pretest and Posttest results are shown below. The Pretest mean score was 1.62 (SD = .779), and the Posttest mean score was 4.09 (SD =1.357). The Posttest mean score exceeds the Pretest mean score. The study found that using Augmented Reality learning activities improved students' test scores in English classes.

Table 2. *t*-test Results of the pre-test and post-test (*N* = 34)

Paired Samples Statistics			Paired Samples Test		
Overall Average Score	**Mean Total Score**	**SD**	**Mean**	**t**	**Sig. (One-tail)**
Pre-test	1.62	.779	-2.471	-16.729	.000
Post-test	4.09	1.357			

According to Table 2, the overall pre-test mean was 1.62, while the post-test mean was 4.09 out of a total of 10 scores. According to data, enhanced learning activities in the English classroom using Augmented Reality technology increased students' speaking production in English class. Moreover, the post-test results in Table1-2 show that the students interacted with the English language in class and that the learners' capability to communicate in their class after using Augmented Reality Technology learning in the target language. The results indicated that implementing Augmented Reality applications for teaching the English language could develop students' abilities and increase interest in positive in the English classroom improved in all areas.

Table 3. The mean of the students' opinion Survey Questions

	Items	Mean	SD
1	The teacher explains the objective of the lesson clearly at the start of each period.	4.53	.563
2	The learning process emphasizes students' participation in the activities and allows students to express ideas.	4.68	.475
3	Using media and technology or innovation in teaching can promote language learning.	4.44	.561
4	Learning activities to enhance speaking skills and listening skills.	4.59	.557
5	The teacher uses various teaching approaches that are suitable for the content of the subject studied.	4.59	.557
6	Teaching activities encourage students to develop their thinking skills, analyze, and have group discussions.	4.53	.615
7	There are teaching activities that enhance self-learning.	4.41	.609
8	Teaching activities allow students to search for knowledge from various sources.	4.35	.646
9	Teachers encourage students to collaborate as a group.	4.32	.684
10	The teacher accepts the opinion and perspectives of students.	4.24	.741
11	Using Augmented Reality may help students improve their English language skills.	4.32	.727
12	Using Augmented Reality may increase students' interest in learning the English language.	4.21	.729
13	Using Augmented Reality helps the students remember more vocabulary.	4.38	.697
14	Using AR technology is able to improve English speaking and listening skills.	4.26	.666
15	Using AR in learning the English language can be fun.	4.26	.710
16	Using AR may help the students understand grammar.	3.97	.627
17	Using AR applications to learn the English language make students nervous.	3.94	.600
18	Using AR applications to teach English may improve students' effective communication.	4.24	.654
19	Using AR technology can support activities that facilitate higher-order thinking and solving problem.	4.59	.557
	All items	**4.36**	**.459**

Based on table 3, it can be seen that the data analysis from this questionnaire indicated the results of analysis item No 9; show the result, "the teacher encourages students to collaborate as a group," gained the highest level (Mean = 4.68, SD = .475), while the lowest level is the item No17 "A student feel nervous about using AR for learning the English language" (Mean = 3.94, SD = .600). The overall mean perceived value was 4.36, which indicated the students' opinion about implementing Augmented Reality Technology to enhance oral production in the English classroom obtains a "Strongly Agree" level.

Students' interaction and engagement while using AR learning activities.
- *It is very easy to scan the code, and I can do it everywhere at any time. (P3)*
- *I can listen to the sentences when I select the pictures; It is very easy to use this application. (P6)*
- *I found that using AR really helped me to understand the meanings of words, and I thought it was incredibly exciting and useful. (P7)*

Students participate in Augmented Reality Technology.
- *It feels like playing the game. I scan it and can select any topics that I like to learn. (P1)*
- *I used Augmented Reality Technology to design Mask for Hanuman. It was fun to add the picture into the application and let the people scan and see it. (P6)*
- *It feels like playing the game. I scan it and can select any topics that I like to learn. (P10)*

Students' behavior change throughout the activities in the classes.
- *I don't feel bored when I learn the English language anymore, and I like to watch the AR picture and when I press the sound. I can speak after it. (P11)*
- *I feel more confident speaking English because I have learned many new words. (P13)*
- *I had never learned English with the application before; It motivated me to learn English. (P14)*

Using Augmented Reality Technology helps students improve their speaking of English
- *My knowledge of English increased after watching an AR video about Thai Khon Dance. I knew the words to descript Thai costumes. (P16)*
- *The AR pictures clearly showed me how to explain the Thai Dance posture. (P17)*
- *After participating in AR activities, I learned many words that improved my English language, and I can also use the words I learned from AR activities to write my own thesis abstract. (P18)*

Willis' 1996 theory of the Task-based learning approach was integrated with Augmented Reality (AR) technology used in the English classroom to create the twelve lesson plans blended with the Augmented Reality application. The Augmented Reality learning activities in the classroom focused on speaking production. The learning activities based on pre-task, task cycle, and language focus were introduced to the participants. The

lesson plans were implemented over a 12-week period. The following activities were implemented to investigate student interaction and engagement of students who had participated in the Augmented Reality technology for English.

Lesson Plan and AR Activities Implemented in the English Classroom.

Phase 1: Pre-task activities

The teacher asked students to scan the AR trigger code to see the Augmented Reality pictures or watch the video from the application. Then, the teacher asked students questions to encourage them to find the words relevant to the activity. The students presented the words and shared them in the class. Next, the teacher asked students to scan the AR code to watch the video in the English language or AR pictures with pronunciation in the English language, encouraging them to find words related to the topics. Then the teacher explained some words that might cause the students difficulties and gave examples.

Phase 2: Task

The teacher gave students the problem-solving task as a role task that asked students to work as a group and used the Augmented Reality Application to finish the assignments. The teacher explained the activities and instructions that the activities took 60 minutes. Then the teacher asked a member from each group to present their work in class, asked the other group's opinions, and discussed the activities. After the task, the teacher reviewed each group report and listed the related words.

Phase 3: Post-task

The post-task activities were focused on language and practice, which consisted of asking the students to give sentences. The teacher explained the grammar and then the teacher provided the Augmented Reality pictures for the practice activities. Then, the teacher asked students questions related to the topic.

Following the implementation of Augmented Reality Technology in the English classroom, it was discovered that the participants paid attention to the activities and shared ideas about the tasks in this section. The English activities that used Augmented Reality Technology motivated students to learn the language, which resulted in positive student interest in the activities. When the teacher presented the Augmented Reality trigger code in the classes, the students immediately scanned the AR code and actively learned. The participants appeared to enjoy using the technology in each activity. They were able to present their ideas and collaborate in groups, which improved their speaking abilities. The participants actively participated in all activities, such as answering questions, listing words related to the topics, and expressing their opinions. Furthermore, the activities encouraged participants to work as a group and collaborate in order to improve their speaking skills.

In summary, the findings demonstrated that after implementing Augmented Reality Technology in the English classroom, they could communicate and express their opinions about the AR pictures they saw from the application in English. The majority of students were engaged, and interaction with Augmented Reality technology improved their speaking ability. Furthermore, most students are found to be more confident and less anxious when learning English.

Discussion

      This study aims to look into Augmented Reality learning activities that can be used in the English classroom to improve students' interaction and engagement in activities that improve oral production. According to the findings, Augmented Reality learning activities combined with the Task-Based Learning approach motivate students to participate in activities. According to the observations, the students participated in learning activities and engaged in the learning lesson by completing their tasks with the Augmented Reality application. Furthermore, the students used technology to participate in group discussions. As a result of combining Augmented Reality and a Task-based Learning approach, students are encouraged to produce speaking ability when interacting with their classmates. Task-based learning is a method of teaching that prioritizes communication over grammar. As a result, the students used the AR application to present their ideas. Furthermore, the application improved their speaking skills while working on the tasks and focused their attention on learning activities. According to the findings, Augmented Reality learning activities combined with the Task-Based Learning approach motivate students to participate in activities. Hence, Augmented Reality learning activities have been used for educational purposes as well, and it has been demonstrated that Augmented Reality learning activities promote enhanced learning achievement (Sharma, 2020). As a result, the data show that incorporating technology into the classroom made learning activities more appealing to students.

      According to the observations, the Augmented Reality learning activities in the English classroom produced significant results in increasing student discussion and participation in their group. Throughout the activities, the students worked in groups and discussed their ideas. They talked about their assignments and showed their classmates the Augmented reality pictures. In addition, the Augmented Reality learning activities investigated students' perceptions of English learning. The use of Augmented Reality Technology in conjunction with learning activities increased student interaction and engagement. Before implementing Augmented Reality Technology in the English class, students were taught using PowerPoint, which was tedious and lacked student participation. In the classroom, the students switched roles, giving them more opportunities to share and exchange information. According to Ramya and Madhumathi (2017), when students interact with the learning tool, they actively participate in these simulations, giving them some control over what they learn. All of the various learning activities improve students' performance by making them more active while using technology, and AR activities reflect the impact on their learning behavior by making them excited and paying attention to all activities. AR can be used in a learning application that is used for discovery-based learning (Yeun et al., 2011). Tsai, Yu, and Hsiao (2012) proposed the educational concept of "edutainment," which incorporates the meaning of education into the game, and stated that digital game learning could have a positive learning effect. According to Lee (2012), AR has the potential to increase students' motivation and improve their educational realism-based practices. Integrating with task-based learning encourages students to be enthusiastic about their studies. Positive interest, as a result, motivates learners to speak and learn the target language. As a result, the students actively interacted and participated in Augmented Reality learning activities. Student interaction improved their speaking production in the area of communication. Students could use Augmented Reality

Technology to create AR images on their own devices. Integrating technology into the classroom appears to be more appealing to students learning in terms of individual and group learning capacity.

Recommendations

There is a setting for AR in the language classroom, but more widespread implementation in various educational environments is required to see further advancement with newer technologies, such as AR or Metaverse. Another study could focus on implementing technology to encourage other classrooms that improve students in multi-skills. Even though this project was limited by a small number of participants at a language-focused university, more research on AR classroom tasks is required.

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