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The Usefulness of Augmented Reality in Enhancing English as a Second Language (ESL) Learners' Vocabulary Acquisition: A Systematic Review (2018-2022)

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Abstract

Despite technological advancements, some educators continue to use traditional ways to teach vocabulary to youngsters. As a result, pupils feel unmotivated and struggle to achieve vocabulary mastery. This is well beyond time for instructors to adapt their instructional techniques and raise knowledge of technology-based ways to boost students' vocabulary acquisition. Consequently, this research aims to present a comprehensive assessment of previous research on the usefulness of Augmented Reality (AR) in enhancing the vocabulary acquisition of primary English as a Second Language (ESL) learners. A total of ten publications from various credible databases published between 2018 and 2022 were selected and reviewed in correlation with the inclusion criteria. The findings of review portrayed AR as a potential mean of improvising young learners' vocabulary learning. Overall, this review furnishes readers with the benefits of incorporating AR in the instructional practice of vocabulary to ESL learners.

Keywords: Technology**,** Adaptive Learning, Augmented Reality (AR), English as a Second Language (ESL), Vocabulary Acquisition

Introduction

As a result of the COVID 19 endemic, many educational institutions have opted for the incorporation of technology which leads to a paradigm shift from traditional classroom setting to technology-based classroom site. The new educational trail provokes unprecedented changes in teaching and learning process (Esfandiari & Gawhary, 2019). Over the past three years, innumerable online platforms are discovered and exploited by educators to disseminate knowledge of language skills and components. Although there are numerous digital tools that offer assistance for teachers in teaching different constituent of language study effectively, the teaching of vocabulary in English As Second Language (ESL) classrooms still remains as a daunting task for many (Alghamdi, 2018). Unlike language skills, acquisition of vocabulary steals the limelight of education world as many educators realize that it is a serious issue faced by ESL pupils. Shamsan et al (2021) claims that the teaching of vocabulary

is an intricate process as it is influenced by various factors such as ESL pupils' readiness and motivation to grasp a better understanding of vocabulary. Looking into the perspective of young ESL learners, the most prevailing issues that associated with vocabulary learning are poor vocabulary retention and lack of motivation (Ni et al., 2020). The dilemma of vocabulary acquisition within a child begins at the very early stage even before they step into schooling phase (Quigley, 2018). Susanto (2021) has delineated six underlying issues associated with vocabulary learning in her research work, which are (1) problem in articulating the words, (2) difficulty in writing and spelling the word, (3) dissimilar grammatical configuration of words, (4) issue in opting for an appropriate meaning for the words, (5) uncertainty in selecting relevant words in accordance with the contexts, and (6) problem in perceiving idiomatic words or expressions. These are the serious predicaments that impede learners' vocabulary acquisition and retention (Meylina, 2018). By taking the aroused issues into a serious consideration, a sovereign rectification is needed instantaneously. One of the feasible solutions for the issue is the integration of technology in teaching and learning process of vocabulary. Augmented reality (AR) is now a technology that can render the unimaginable feasible in the school environment. It empowers instructors to produce creative circumstances inside which their learners may develop deeper strong links to their lessons, translating to improved engagement and retention (Alharbi, 2022). Apropos to it, this study is embarked with the aim of providing a review on the previous studies which have been carried out to explore the effectiveness of AR in enhancing ESL learners' vocabulary acquisition.

Research Question

1) How does the use of Augmented Reality affect a learner's vocabulary acquisition?

Literature Review

Vocabulary in ESL

Previous research has demonstrated that a pupil's vocabulary mastery influences them academically in a myriad of contexts; "measures of word recognition predict educational achievement, academic, as well as cognitive outcomes in one's life cycle, as well as the excellence of basic vocabulary, is obligated for constructing adult literacy understanding abilities" (Butler, 2019). The language that a learner acquires in the classroom will aid them in their junior high experience and during their professional career. Furthermore, vocabulary acquisition is a significant factor in predicting proficiency of English as Second Language (ESL) learners. This lends weight to the argument that when pupils grasp the language of a book, they may more effortlessly absorb what they might be studying, leading to higher educational success (Hanafi et al., 2021). ESL students' overall competence and success rise simply by comprehending their tasks when they realize what they have been reading or how learners have been required to perform.

Acquisition of Vocabulary

Vocabulary may be learned in a variety of ways. A pupil might be introduced to words directly, and then they can grasp phrases spontaneously from context (Sarip@Khalid & Abdul Aziz, 2021). Although certain words' interpretations are conveyed explicitly, implying word definitions from contextual continues to be a major aspect of vocabulary acquisition. Adopting an AR method to vocabulary instruction assists kids in inferring lexicon word definitions through contexts by generating their links of the redefinition to a location in the

AR environment (Hashim et al., 2022). Learners might be empowered to attach new knowledge in a manner that complements their reasoning by seeing and hearing that word being used perspective using AR. In theory, more and more learners who are interested, latching, and establishing connections between vocabulary terms, the lengthier the learners would be likely to digest and remember new learning and subsequently deploy these words appropriately in academic environments (Butler, 2019). Thus, word retention improves comprehension skills and overall career excellence.

Incorporation of Augmented Reality (AR) in Teaching Vocabulary

Augmented reality enables additional learning and connection factors that would not have been feasible normally while also providing a feeling of gamification to the educational setting, enhancing learner engagement, and increasing active learning enthusiasm (Papanastasiou et al., 2018). Through AR technology, students can visualize and understand challenges of Vocabulary along with approaches to overcome them (Osuna et al., 2019). The positive impacts of augmented Reality in the overall learning process of vocabulary are vivid. Besides providing an opportunity for teachers, it also helps students grasp abstract concepts of different vocabulary terms. Implementation of effective interaction and experimentation along with AR technologies will offer teachers space to promote enhancement in classroom experiences along with new teaching skills, motivate students and provide opportunities to students in exploring new interests related to academics and vocabulary. The implication of Augmented Reality can be found in wide domains of the E-learning process and has delivered several benefits which have profoundly helped ESL learners to strengthen their skills and knowledge in different aspects of Vocabulary (Tzima et al., 2019). In the field of education, Augmented Reality has brought crucial change and ensured that effective usage of technological innovation would ensure fruitful results (Jamrus & Razali, 2019). Augmented Reality offers certain critical benefits in teaching vocabulary which will eventually help pupils to boost their potentiality and skills of learning vocabulary.

Methodology

The present investigation is exploratory in design since it necessitates a huge amount of facts about the use of Augmented Reality technology and its usage in teaching new vocabulary to the learners in the classroom. This study is carried out in conformity with the four principles propounded by (Jain & Sharma, 2016).

Formulation of Research Objective

As per the proffered policy, the purpose of the study has been established in the initial stage. The objective of this study is to furnish readers with a comprehensive assessment of previous research on the usefulness of Augmented Reality (AR) in enhancing the vocabulary acquisition of primary school pupils. In compliance with the designated objective, a fitting research question is formulated. This research question can help determine if the utilization of AR technology affects a learner's ability to integrate and remember new content. The research question as follow

• Research question: How does the use of Augmented Reality affect a learner's vocabulary acquisition? (This investigates if adopting augmented reality for language teaching does have an effect).

Collection of Findings

The accumulation of studies is marked as the second procedure, in which previous researches on the utilization of Augmented Reality in teaching vocabulary from wide array of credible sources are gathered. This study's research data collection method is secondary research data; it is based on the data collected from previous journals, articles, etc., due to the limitations imposed by the COVID-19 pandemic. The needed data are amassed from the internet, journals, publications, and articles.

Validity of Collected Studies

Validity comes next in the list, ensuring the agglomerated findings are relevant and well-grounded before reaching the summit of study. According to Bashir and Marudhar (2018), validity is de-fined as a course of action that affirms whether the measuring instruments complies with its intended usage. As for this study, all the identified 18 articles are retrieved from various reliable sources such as Scopus, GoogleScholar and Educational Re-sources Information Centre (ERIC). These articles then undergo a close scrutiny in respect to the determined inclusion and exclusion criteria to attain validity. A total of eight articles have been discarded on the basis of the inclusion criteria. The established inclusion and exclusion criteria are delineated clearly in Table 1.

Table 1
Inclusion and Exclusion criteria

Inclusion Criteria	Exclusion Criteria
1. Articles published on and after 2017 were taken into consideration.	1. Articles published before 2017 were not taken into consideration.
2. Articles published in English were selected only.	2. Articles published in any other language than English were sorted out.
3. Articles that related to vocabulary acquisition using Augmented Reality (AR) were chosen.	3. Articles that irrelevant to vocabulary acquisition using Augmented Reality (AR) were eliminated.

Presentation of Findings

The demonstration of findings is positioned in the bottom-most layer in the adopted principles (Jain & Sharma, 2016). Ningi (2022) states that disclosing findings perspicuously in one's research work is a point of a paramount significance. In that case, a total of 10 articles were opted and studied in keeping with the inclusion criteria to be presented in the systematic review. The depiction of findings is lucidly shown in the result section.

Results

The results are tabulated with appropriate headings to provide a clear review for the opted studies. The following table portrays the findings in detail.

Table 2
Abridgement of selected studies

Study	Aim	Samples	Findings
Tsai, 2018	The purpose of this study is to compare traditional English flash cards with the vocabulary learning method of Augmented Reality to see which English vocabulary learning is more efficient for elementary school students.	The study was conducted at an elementary school in Taiwan, and the participants were 66 third grade pupils in total.	The results showed that the learning method of Augmented Reality was more efficient than the learning with normal English flashcards as pupils took part actively in the activity.
Chen & Chan, 2019	This article aims to explore the technology's value in early childhood education by comparing it with traditional paper flashcards.	The experimental group had 48 children of both genders.	The AR flashcards had increased children's interest towards vocabulary learning. Since the images are dynamic, their mental capacity grows, and then they would grasp new vocabulary easily.
Hudaya, & Sadikin, 2019	The aim of this study is to analyze the difference of young learners' vocabulary mastery through Aurasma Augmented Reality (AR).	The sample of this study was gained from two classes of sixth grade.	Based on the findings, there was huge different in the scores of pre-test and post-test. The use of AR fostered pupils' active engagement and enthusiasm in learning vocabulary.
Jalaluddin et al., 2020	This experimental study aimed to explore the effectiveness of using mobile augmented reality (MAR) application in vocabulary learning among LINUS students.	Two groups of Year 2 students aged 8 years old from LINUS mainstream were involved in this study. Each group consisted of 23 and 22 pupils respectively.	The use of AR assisted the remedial pupils or known as Linus to learn the basic concept of English words as well as their meanings in a feasible way.
Sadikin & Martyani, 2020	This study aims to explore the use of Augmented Reality for young learners by comparing it with	A total of 30 second grade students from public Elementary school	The results showed that the use of AR flashcards improved pupils' vocabulary mastery. Besides, there was an

	conventional paper flashcards.	in Padalarang, Bandung Barat.	increase in pupils' participation. Pupils were also very excited to learn vocabulary.
Tsai, 2020	The main purpose of this study was to examine the differences in students' English vocabulary learning performance and the instructional materials motivation, comparing the traditional lecturing method and the Augmented Reality method.	A total of 42 students in two fifth grade classes in an elementary school in Central Taiwan.	The findings disclosed that AR had optimized the pupils' vocabulary learning experince as the learning environment was interesting and motivating.
Binhomran, & Altalhab, 2021	The study aims to determine the usefulness of augmented reality (AR) technology in EFL vocabulary learning.	The total of 73 sixth-graders from a primary school. The participants were assigned into two groups, experimental (38) and control (35) respectively.	As per the outcomes, AR helped pupils to have a better understanding of the learned vocabulary. Besides, AR improved pupils' motivation in learning vocabulary.
Hanafi *et al.* 2021	This study developed and used a mobile Augmented Reality (AR) reading kit to help preschool students recognize alphabets and read simple words more effectively.	This study's sample includes numerous preschool pupils of varying ages between 4 to 6, drawn across 3 preschools totalling 60 students. An Online Google survey with numerous questions gathered information from the selected elementary school instructors.	The smartphone augmented reality reading kit had a noticeable and good influence on kids' reading ability as well as their vocabulary acquisition. Pupils' educational enthusiasm also had dramatically increased.
Yuan, 2021	This quasi-experimental study investigated the efficacy of using AR in	52 kindergarten children participants were divided into	The outcomes revealed that AR developed the pupils' productive recognition of words and

	children's second-language acquisition (SLA).	experimental and control groups.	intrinsic motivation whilst learning vocabulary than the control group.
Hashim, Yunus & Norman, 2022	This study intends to investigate the stakeholders' acceptance and thoughts on the use of augmented reality mobile applications for children with autism.	6 children from special backgrounds with age grouping of two 12 years old, other four of 5, 6, 7 and 11 respectively	The findings revealed that each pupil had shown great enthusiasm towards vocabulary learning with the aid of this application.

The findings of the study reveal that the learners demonstrated a distinction in pre-assessment and post-assessment results between standard versus AR vocabulary sections (Chen & Chan, 2019). As stated in Table 1, students in the conventional group had never shown a single point difference between pre-assessment and post-assessment ratings. Individuals inside the AR course, on the other side, exhibited a strong two-point growth on aggregate between respective pre-assessment versus post-assessment grades (Tsai, 2018). Many people assert they appreciated the Augmented teaching style since there were representations to interact with and retain their concentration inside the same post-study assessment.

According to Binhomran and Altalhab (2021), after attending Groups 1 and 2 of such research, several distinct qualitative differences between the two groups were seen as students participated individual post-assessments. Whenever the old technique post-assessment had been completed, there was always an appearance of ambiguity and an absence of reliability with the phrases and sentences (Hudaya & Sadikin, 2019). Students struggled to use terms accurately inside the post-assessment practice statement segment. Conversely, it has more of a broad consensus after conducting their AR post-assessment (Sadikin & Martyani, 2020). People had several "tip of the tongue" occasions in which they had been trying to recall context or components of a term but simply failed to get most of the facts through, plus students were very precisely recalling visuals or aspects of the AR environment throughout their exemplary phrases (Tsai, 2020). Recalling the intricacies of the AR environment in these instances indicates how pupils had been able to construct genuine, long-lasting links between vocabulary terms and meaning and the AR reality in which they have been obtaining their fresh insights.

Aside from the beneficial findings of this research, the implementation of such an AR environment had several other beneficial initiatives in place for pupils in their classes (Hashim et al., 2022). Since their usual diversions were reduced, learners seem to have been completely focused and involved in whatever they were discovering. This has been facilitated by using digital activities (AR) inside the curriculum to increase students' interest, which can improve the consequences of their knowledge (Hanafi et al., 2021). Pupils have been enabled to use personal mobile phones, which are typically a significant source of distraction, like the instructional tool included to integrate them in the AR environment, transforming their big disturbance into a participation instrument (Jalaluddin et al., 2020). It was quicker for pupils to immerse in what they had been studying when they used their smartphones as facilitators

and reduced distraction. Additionally, learners were also projected to implement their actual correlations and instances with the terminology definitions in actual AR environments rather than being handed an illustration to memorize (Yuan, 2021). Hence, it is an axiomatic fact that the assimilation of Augmented Reality into the instructional practices has led to a significant improvement in young learners' vocabulary acquisition by enhancing their interest, motivation, understanding as well as memory retention.

Discussion

The results of this study demonstrate that, across all levels of English competence, learning vocabulary through Augmented Reality is more effective in yielding fruitful outcomes. So, it appears that the results of teaching with Augmented Reality are superior to those of more conventional approaches such as chalk and talk and rote learning (Karami & Bowles, 2019). In today's digital era, Augmented Reality technology has also become integrated into our everyday life. It is constantly being applied to numerous facets of education, including instructional aids, advice, exhibition, and so on. Incorporating AR into the classroom has the potential to not only improve students' engagement with course materials, but also to address some of the challenges now faced by language teachers (Mohammed Mamoud Qadha & Saleh Mahdi, 2019). This review provides an insightful review on the use of Augmented Reality, the technology that allows for the superimposition of virtual objects and scenarios onto the real environment, as a medium to help young ESL learners learn new words.

When applied in the classroom, augmented reality promotes smooth interactions between students and digital objects in both artificial and real-world settings (Tyson, 2021). In addition, when students begin using AR in the language class, it will lay the foundation for entirely new pedagogical approaches. Instead of just retaining facts, Augmented Reality (AR) can help students to experience the learning (Aldossari & Alsuhaibani, 2021). Utilizing technology to present English lessons via 3D visuals from the physical realm will ignite students' enthusiasm and drive them to learn better. In tune with the needs of children in vocabulary learning, AR is really advantageous by presenting images that are captivating and engaging (Solak & Cakır, 2017). Furthermore, children's vocabulary acquisition can be boosted by the interactive nature of AR in which the positive connotations formed between objects and their English words contribute for a better vocabulary retention (Chang et al., 2020).

The other benefits of accommodating AR in vocabulary learning are: 1) Interaction: pupils may simply use it and engage in conversations; visual and auditory stimulation can raise schoolchildren's curiosity and boost their learning motivation, 2) Sensory feedback: the 3D real-time model shown to schoolchildren assists them in entering the space generated by virtual objects and the real environment in order to achieve immersion, 3) The spatial link between each digital image, each physical object, and the setting may be easily detected, 4) The novelty of learning: Because augmented reality uses a novel approach to presenting information and its interaction is straightforward and natural, augmented reality can also play a role as a form of multimedia, which can make learning enjoyable for students and stimulate their interest and motivation in learning (Tsai, 2020). In the context of vocabulary, motivation holds a crucial role in captivating learners' attention. The magnitude of pupils' motivation amplifies to greater extents in the presence of Augmented Reality. According to Sydorenko et al. (2019), Augmented Reality ignites the driving the force within the pupils to gear them towards active vocabulary learning by obliterating the possible visual and auditory distractions that may arise in the physical classroom setting. In another study on pupils'

motivation towards vocabulary acquisition, Lai and Chang (2021) claims that the incorporation of Augmented Reality has yielded fruitful outcomes as it projects real-life learning context. Therefore, it is meaningful to include augmented reality (AR) into children's daily lives through mobile learning in terms of helping them procure a wider English vocabulary.

Conclusions

In summary, this systematic review has studied a few research papers that correlated with the incorporation of Augmented Reality in vocabulary learning for ESL learners. A total of 18 articles were retrieved from various reliable sources such as Scopus, GoogleScholar and Educational Resources Information Centre (ERIC) to be re-viewed. However, only ten studies were opted for the review paper after weighing up the touchstones of inclusion. The results yielded from this study manifested that Augmented Reality is indeed a prospective approach in propelling ESL learners' vocabulary learning to the next level. There is a notable melioration in pupils' interest and motivation to acquire vocabulary in the light of Augmented Reality. Based on the findings of reviewed studies, Augmented Reality has established a constructive learning atmosphere for learners by bringing in real-life learning experiences. Unlike the conventional picture cards, flashcards, and realia, the Augmented reality incorporated teaching materials has enhanced pupils' memory retention through the real-life visualization. As a consequence, pupils are able to remember the vocabulary that they learned and practise it on daily basis to grasp a better understanding. This systematic review contributes some meaningful insights on the potentiality of Augmented Reality as a worthwhile tool to aid English vocabulary teaching and learning. Moreover, the review indicates the versatility of Augmented Reality, which may be used in diverse forms such as flashcards and language games to teach English vocabulary in an enthralling way. The noticeable limitation of this study is that the it focuses on ESL learners from primary education level. Yet, this limitation creates an opportunity for further study. As for the future study, various suggestions can be developed in line with the results and discussions of current study. Firstly, the further study can be in the form of empirical research which emphasizes the process-based methodology. The objective is to capture compelling evidence which supports the efficacy of the processing way of teaching vocabulary. Besides, the goal of future research can be directed towards young learners' view, opportunities and obstacles in learning vocabulary with the aid of Augmented reality. Following that, proposed experiments should look at digital tools which are rarely used in vocabulary teaching, like Google Classroom. It's because Google Classroom had been established as a component of the Malaysian government's commitment to empower education. This tool must be placed ahead of many other popular digital technologies as assistance towards the campaign.

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