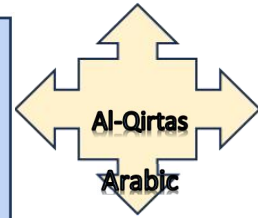


Augmented Reality'S Impact On Vocabulary Acquisition And  
Retention Of English Language Learners Of Secondary Level  
Students



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**Abstract**

This study titled, “Augmented Reality's Impact on Vocabulary Acquisition and Retention of English Secondary Language Learners in Hyderabad” aimed to investigate the impact of Augmented Reality (AR) technology on vocabulary acquisition and retention, specifically for grade 9 students learning English as a second language in Beacon House School, Hyderabad, Pakistan. The research analyses the potential of AR technology in boosting vocabulary acquisition in a classroom context, drawing on ideas such as Stephen Krashen's Input Hypothesis and Allan Paivio's Dual Coding Theory. The study's sample size consists of 24 students, divided into two groups: one with scores above 65% and the other with scores below 65%. Both groups have undergone a post-test questionnaire after the experiment. Subsequently, 10 students have been selected from this sample for semi-structured interviews. These data collection methods yield both quantitative and qualitative insights into the efficacy of AR-based vocabulary training. The findings of this research showed that augmented reality technology can prove to be a valuable tool for inadvertently acquiring and retaining vocabulary, particularly for students facing difficulties with conventional classroom teachings. This study highlighted the potential of augmented reality to enhance vocabulary growth and retention among English language learners attending schools in Hyderabad, Pakistan. By merging advanced technology with established language acquisition theories, augmented reality holds promise as an innovative approach to language learning.

**Keywords:** Augmented Reality, Input Hypothesis, Dual coding theory, vocabulary acquisition and retention

## Introduction

The notion of learning vocabulary naturally was prevalent in the past, resulting in minimal emphasis on explicit instruction. However, with today's interconnected global community and a desire for improved English language skills to communicate effectively, there is an increased recognition of its significance in language acquisition. Vocabulary serves as the foundation for constructing English sentences; thus having adequate knowledge enables individuals not only to express themselves but also to comprehend others - especially foreign or second-language learners who face significant challenges acquiring new words. Although vocabulary plays a critical role in the academic achievement of second language learners, its acquisition and retention are frequently overlooked in curriculum design, particularly in Pakistan. A common practice is for students to learn word meanings only when they encounter challenging expressions or phrases. Gaining proficiency with a language necessitates sound knowledge of the lexicon that can be acquired solely through effective learning tactics. In case ineffective strategies are employed by learners, inadequate comprehension could obstruct their capacity to grasp foreign/secondary languages (Fan 2003). To guarantee successful outcomes related to acquiring new linguistic skills it becomes imperative to attend these matters seriously.

This understanding has led to a shift in focus towards vocabulary acquisition in several second language acquisition research studies, recognizing it as an essential component of language proficiency. A strong vocabulary serves as the cornerstone for learners' performance in other language skills, including speaking, reading, listening, and writing (Paivio, 1986; Haastруп, 1989). Gass (1999) argues that learning a second language entails acquiring its vocabulary, which involves a deep understanding of various aspects of lexical items. With advancements in education and technology, mobile technology has revolutionized the way we learn and teach, paving the way for innovative educational methods (Kumar Basak et al., 2018). The current generation is increasingly drawn to technology-enhanced learning, finding it more engaging, inspiring, and purposeful (Singhal et al., 2012). One promising innovation in this regard is Augmented Reality (AR).

Despite still being in its early stages of research, augmented reality technology is beginning to make its mark in education. Studies suggest that augmented reality can enhance learning by making it more effective and enduring. Augmented reality offers 3D educational

material and permits the observation of objects from multiple viewpoints, unlike conventional two-dimensional techniques (Chang et al., 2010). Augmented reality ameliorates the actual surroundings by superimposing digital constructs in real time. As a result, users can experience an amalgamation of reality with computer-generated items that are added to their environment for interaction purposes (Cipresso et al., 2018). This revolutionary capability has proven beneficial for learning, as it enhances comprehension compared to traditional educational materials. By integrating images, videos, sounds, and animations, augmented reality offers a dynamic and engaging learning experience that promotes retention (AlKhunzain & Khan, 2021). As lifelong learning is a continuous pursuit, keeping students motivated and eager to acquire knowledge is key, and AR's ability to create an improved reality presents exciting new avenues for education. (Irwansyah et al., 2018).

To sum up, everything that has been stated, augmented reality has the potential to play a significant role in shaping the future of education, building on the foundation laid by the mobile technology revolution. The seamless integration of augmented reality into the learning process could represent the next step in the evolution of vocabulary teaching and language learning. Hence, this study has explored the influence of augmented reality (AR), in secondary-level students of Beacon House, Hyderabad using Stephen Karshen's input hypothesis from his second language acquisition theory and cognitive dual coding theory by Allan Paivio. The subject of this study is grade 9 students from Beacon House Secondary School, Hyderabad. In order to ascertain the effectiveness of augmented reality technology in facilitating vocabulary acquisition and retention, the researcher has conducted assessments comprising of post-tests and semi-structured interviews with the participants. The results of this study are pivotal in comprehending how the utilization of augmented reality in vocabulary acquisition and retention can potentially enhance language learning. By leveraging these findings, we can expand our understanding of the benefits of augmented reality technology, and identify its potential as a valuable tool for language acquisition and retention.

### **Significance of the Study**

Vocabulary is an essential component in becoming proficient in a foreign language. Alongside grammar and phonetics, the instruction of vocabulary plays a crucial role as having an extensive lexicon helps pupils master all four aspects of communication: listening, speaking, reading and

writing. Having a broad knowledge of words facilitates practicing sentence structures with ease; it enables effortless daily conversation while consolidating the notion that English can be used to express emotions or ideas conveyed by their mother tongue (Finocchiaro 1974:38). Furthermore, possessing a wide range of terminology assists learners studying other disciplines taught through English such as Sociolinguistics, Psycholinguistics, and Business Correspondence among others. It supplies them with the means to understand numerous concepts encountered throughout these subjects.

This understanding underscores the importance of vocabulary acquisition and retention in language learning, providing the foundation for mastering all language abilities. However, vocabulary acquisition remains a significant challenge for many language learners. To address this issue, scholars have focused on studying effective learning techniques to manage the complexity inherent in vocabulary learning. This study aims to bridge the gap between the importance of vocabulary acquisition and the need for effective teaching techniques by exploring the potential impact of augmented reality (AR) on vocabulary acquisition and retention among English language learners in Karachi. This project sought to make vocabulary acquisition more engaging and effective by utilizing AR technology, which offered an interactive and immersive experience.

### **Delimitations of the Study**

The purpose of this research was to investigate the influence of Augmented Reality (AR) technology on vocabulary acquisition and retention among secondary students of grade 9 in Karachi's learning English. The research's scope has been confined to students of a specified school namely Beacon House Secondary School, Karachi, Pakistan. It has evaluated the effectiveness of an AR-based approach to vocabulary acquisition with a more traditional method, such as a textbook or flashcard-based learning whichever I being taught in the school. The study has taken place over a given period, such as one academic semester (2023-2024), and has involved 24 students from grade 9. Other than that this study has only looked into students whose English is a second language. These limits served to clarify the study's bounds and offer a clear knowledge of its scope.

### Research Questions

- a) How does the use of Augmented Reality (AR) technology impact vocabulary acquisition and retention compared to traditional methods among secondary English learning students in Beacon House School, Hyderabad?
- b) In what way do visual and auditory cues in an AR-based approach to vocabulary learning enhance students' understanding and retention of new words?
- c) How does augmented Reality impact students' motivation to learn a second language?

### Research Objectives

- a) To investigate the impact of Augmented Reality (AR) technology on vocabulary acquisition and retention among secondary English learning students in Beacon House School, Hyderabad.
- b) To examine the role of visual and auditory cues in an AR-based approach to vocabulary learning and their effect on students' understanding and retention of new words.
- c) To assess the impact of AR technology on students' motivation to learn a second language.

### Literature Review

Educational institutions have recognized vocabulary as a crucial component of language and literacy development. It serves as the foundation for learners' competence in speaking, listening, reading, writing, and total literacy. (Renandya & Richards, 2002). Augmented reality (AR) is the incorporation of computer-generated data into the actual environment, such as visuals, audio, and video (Zachary et al., 1997). There has been a surge in research on the utilization of AR technology for enhancing vocabulary acquisition. For instance, a study conducted by Altalhab et.al (2021) explored the impact of using Augmented Reality (AR) to improve the vocabulary of young learners of English as a Foreign Language (EFL). The research was designed as an experiment. The findings indicated that while the difference was not statistically significant, the average scores did differ, with the experimental group showing better results. Furthermore, feedback was gathered from seventeen students about their feelings towards the use of the technology. The feedback revealed that AR-enhanced student motivation and facilitated better understanding. In a separate study by Yılmaz et al. (2022), AR technology was used to investigate vocabulary learning, retention, and attitudes of preschoolers learning English. The quantitative data showed a significant improvement in vocabulary learning and retention

following the use of AR. The qualitative data suggested that children generally liked the AR materials and that it had a positive impact on their learning.

Acquiring vocabulary is a crucial aspect of language learning as it lays the groundwork for mastering all language skills. Nevertheless, many learners face significant obstacles in obtaining and remembering new words. Various methods have been employed by researchers to improve vocabulary acquisition and retention such as extensive reading or using song lyrics and games. However, with the advent of augmented reality (AR), there are now new possibilities for enhancing this process. This study seeks to bridge the gap between recognizing how important vocabulary acquisition is and applying effective teaching techniques by exploring AR's potential impact on English language learners' abilities from Karachi so that students and teachers can understand, retain, and improve their word knowledge through its application. Research indicates that understanding the true meaning of a term is more effective for students than simply gaining insight based on context. This deep appreciation leads to better memory recall rates and increased fluency among native speakers. Therefore, it is important to consistently strive to comprehend and comply with course materials during class.

Moreover, the research conducted by various scholars has demonstrated the potential of Augmented Reality (AR) technology to increase students' academic self-confidence. However, there is a gap in knowledge regarding contextual factors that impact how AR can be implemented effectively and contribute toward grade 9 students' academic self-efficacy, such as assignment value, and characteristics of the technology used for learning tasks and classroom settings. Exploring this area bears significance since educational institutions are increasingly embracing AR in their teaching practices. Moreover, integrating technological advancements into education has significantly altered traditional classroom setups where rows upon rows of chairs have been replaced with furniture versatile enough to cater appropriately towards facilitating effective and efficient teaching methods and providing an ideal environment conducive to learners' growth potentials.

### **Problem Statement**

Considering the significant advancements and growth of technology, both students and teachers have higher expectations, making traditional methods less desirable. Limited natural language learning opportunities and a heavy dependence on classroom instruction and traditional

academic inputs pose challenges for English second language learners. To address this, new education and training approaches need to be introduced. Despite existing research regarding technology's role in vocabulary acquisition, there is a lack of examination concerning the potential influence that augmented reality (AR) may have on English learners' vocabulary retention and learning outcomes. More specifically within 9th-grade secondary students in Hyderabad, Pakistan context, AR technology as an effective tool for enhancing vocabulary-acquiring abilities remains to be explored. Therefore this research paper aims to address the challenge of vocabulary learning and retention faced by young learners while learning English as a second language and compare the difference when using AR technology.

### **Research Method**

This study explored the impact of augmented reality technology on vocabulary acquisition and retention among grade 9 students learning English as a second language in Beacon House School, Karachi, Pakistan. The research analyzed the potential of AR technology in boosting vocabulary acquisition in a classroom context, drawing on ideas such as Stephen Krashen's Input Hypothesis and Allan Paivio's Dual Coding Theory. The study's sample size consisted of 24 students, divided into two groups: one with scores above 65% and the other with scores below 65%. Both groups had undergone a post-test questionnaire after the experiment. The findings showed that augmented reality technology can prove to be a valuable tool for inadvertently acquiring and retaining vocabulary, particularly for students facing difficulties with conventional classroom teachings.

### **Data collection and Analysis**

A post-test questionnaire consisting of 15 MCQs was given two weeks later utilizing AR technology. Each MCQ consisted of 1 point. The vocabulary terms in the questionnaire were drawn from the Cambridge C1 and C2 advanced word lists and chosen for their relevance to students' upcoming tests. A semi-structured interview, modified from the International Journal of Psychology and Educational Studies, was used to better understand students' opinions. Four open-ended questions were asked during this interview. The answers to the questionnaire have been analyzed using basic math i.e. percentages. The answers from the interview were analyzed using thematic analysis as proposed by Braun and Clarke (2006).

### Theoretical Framework

This research integrates Krashen's Input Hypothesis and the Dual Coding theory to explain how AR technology can enhance vocabulary acquisition and retention among English language learning students in Hyderabad. At the same time, Krashen's theory emphasizes the importance of comprehensible input for language acquisition. It suggests that learners acquire language by understanding language input that is slightly beyond their current level. The theory also highlights the significance of the input being interesting and relevant to the learner's real-life experiences. On the other hand, DCT, proposed by Paivio, gives equal weight to verbal and non-verbal systems in learning. It suggests that learning is enhanced when both verbal (words, sounds) and non-verbal (images, videos) systems are activated. This theory emphasizes the role of mental imagery in memory and learning. In summary, while both theories underline the importance of meaningful and engaging learning experiences, Krashen's theory focuses more on the comprehensibility of input, and DCT focuses on the dual coding of information for enhanced memory and recall. They complement each other and provide a more comprehensive understanding of language acquisition when considered together.

### Results

In conclusion, the outcomes of the study indicated that augmented reality (AR) is a more effective tool for learning English vocabulary than traditional techniques. In essence, augmented reality technology appears to outperform conventional vocabulary learning methods. The chosen participants for the interviews reveal that the use of augmented reality (AR), which overlays virtual objects onto real-world scenes, can make English vocabulary instruction more engaging. By incorporating this technology with 3D visuals in the actual environment, students' learning interests and motivation may be enhanced. The use of dynamic and animated images can capture students' attention and stimulate their curiosity. Through augmented reality (AR), students can develop a learning interest by subconsciously associating an object with its English name. The integration of augmented reality (AR) into students' daily lives could potentially improve their English language learning experience.



*Table 2: Results and Comparison of Post-test and pre-test Vocabulary words*

Augmented Reality Group (Students that scored above 65% in pretest )				
Students	Post-test Scores	Post-test scores in %	Pretest scores	Differences in %
1	10	67%	65%	2%
2	11	73%	69%	4%
3	12	80%	70%	10%
4	14	93%	75%	18%
5	12	80%	75%	5%
6	14	93%	83%	10%
7	13	87%	80%	7%
8	15	100%	90%	10%
9	12	80%	78%	2%
10	12	80%	70%	10%
11	15	100%	82%	18%
12	14	93%	81%	12%

*Table 3: Average student's post-test and Pre-test comparison of vocabulary scores*

Augmented Reality Group (Students that scored below 65% in pre-test )				
Average Students	Post-test Scores	Post-test scores in %	Pre-test scores	Differences in %
13	11	73%	53%	20%
14	10	67%	54%	13%
15	14	93%	56%	37%
16	11	73%	60%	13%
17	13	87%	52%	35%
18	10	67%	53%	14%
19	10	67%	62%	5%
20	13	87%	59%	28%

21	11	73%	45%	28%
22	14	93%	59%	34%
23	12	80%	62%	18%
24	11	73%	54%	19%

## Conclusion

Augmented Reality (AR) provides both visual and auditory cues that improve understanding and memory encoding of new vocabulary words. This allows for a deeper understanding and accommodates a variety of learning styles that out date the use of traditional methods. According to this research, the Grade 9 students in Karachi who were studying English as a second language had made significant improvements in their vocabulary acquisition and retention by using Augmented Reality (AR) technology. AR-based strategies present a promising way to help English language learners overcome their obstacles, especially in places like Karachi where there may not be as much access to immersive language learning materials. Augmented reality (AR) has the potential to improve vocabulary learning outcomes and increase student motivation and engagement in language learning. Furthermore, the study shows that students at Beacon House School indicate a preference for AR-enhanced educational opportunities. The excitement and novelty of augmented reality (AR) foster a positive attitude toward language learning and improve the environment for vocabulary retention.

The use of AR technology had a direct impact on academic achievement, as evidenced by the grades achieved by students who used it as a learning tool in comparison to the time before the experiment began, as demonstrated by pre-and post-tests. The groups had similar prior knowledge levels, but there were notable differences between the two groups in their post-test scores. The group that used augmented reality in the classroom earned higher grades than usual, especially the group of average students which supports the findings of other similar studies. Students were highly satisfied with the use of augmented reality as a teaching tool in the classroom, due to the educational opportunities it provides and the ease of use of the developed mobile application. The potential for augmented reality in education can be enormous if utilized in balance. It is important to note that this study can be duplicated in other high schools to assess the level of receptiveness to this technology. Moreover, incorporating augmented reality

elements created to cater to students' educational needs could guarantee their quality, and assessing the level of enthusiasm students demonstrate towards utilizing augmented reality could also prove valuable.

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